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WEB TECHNOLOGIES
SYLLABI-BOOK MAPPING TABLE Web Technologies Syllabi Mapping in Book Overview: History of Internet, Internet services: telnet, e-mail, ftp, WWW. Equipments required for an Internet Connection, Opening an e-mail account, Reading and Writing e-mail., ftp, www URL, Surfing the Internet., Search Engine, uploading and downloading. Web Browsers: Functions and working principle of web browsers; plug-ins & helper applications; conceptual architecture of typical web browsers (like Mozilla). Introduction to Client/Server Computing: Client-server computing basics; types of Client/Server systems; middleware; N- tired systems: 2-tier/3-tier/4-tier systems; Fat Clients versus Fat Servers. Web Servers: Web services and web server functionality; web server composition; registration; HTTP, IPaddress, DNS & ports; conceptual architecture of a typical web server (like Apache). Introduction to HTML: Hypertext Markup Language (HTML), Writing a web page in HTML, Tags, hyperlinks, URLs, tables, text formatting in web pages, Using graphics and multimedia in web pages; image maps., Use of frames and forms. Introduction to JavaScript: Constants, variables, operators, expressions, statements. Use of user-defined and built-in functions, Client-side Form validation using JavaScript, Using properties and methods of built-in objects. Unit 1: Internet: An Overview (Pages: 3-61) Unit 2: Web Browsers (Pages: 63-144) Unit 3: Introduction to Client-Server Computing Basics (Pages: 145-192) Unit 4: Web Servers (Pages: 193-249) Unit 5: Introduction to HTML (Pages: 251-315) Unit 6: Introduction to JavaScript (Pages: 317-385)
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Anatomy of a Web Browser: The Toolbar 2.2.4 The Access Indicator 2.2.5

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Answers to 'Check Your Progress' 6.17 Questions and Exercises 6.18 Further Reading 6.19 Learning Outcomes Self-Instructional Material 1 INTRODUCTION Web technology revolutionizes the way information is exposed and circulated within every organization and enables everyone to be in the distribution business. It includes the development, hosting and maintenance of sites for big, medium and small companies. Nowadays every organization is building a

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Answers to ‘Check Your Progress’ 6.17 Questions and Exercises 6.18 Further Reading 6.19 Learning Outcomes Self-Instructional Material 1 INTRODUCTION Web technology revolutionizes the way information is exposed and circulated within every organization and enables everyone to be in the distribution business. It includes the development, hosting and maintenance of sites for big, medium and small companies. Nowadays every organization is building a

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web sites

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A web server contains a bunch of files that are called by the server software when a user sends a request through their web browser. The web browsers provide accessibility to various available

web sites to have the latest information online. Another important component for building a web site is Hyper Text Markup Language (HTML). This is the computer language of the WWW. This language is comparatively easy to use because it contains approximately thirty syntactically unique 'tags' or commands for developing a web site. There are numerous stylistic conventions for building a web site that is attractive, informative and easily navigable. Innovative and unique site designs attract and retain visitors to any web site. HTML editors help you to insert images into the body of a document and to create hyperlinks to other pages. The HTML editors also permit you to insert additional HTML code wherever required. Hyperlinks are words or graphics on a web page that take the visitor to the linked page or another linked web site. Hyperlink is specified by the destination address which is uniform resource locator (URL). This title, Web Technologies, covers the topics History of Internet, Internet services, E-mail, FTP, WWW, URL, Surfing the Internet, Search Engine, Uploading and downloading, Web browsers, Mozilla, Introduction to Client/Server computing, Web servers, HTTP, IP address, DNS and Ports, Apache, Introduction to Hypertext Markup Language (HTML), Writing a web page in HTML, Tags, Hyperlinks, URLs and Introduction to JavaScript. It has been written in the self-instructional mode or SIM

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format wherein each unit begins with an Introduction to the topic, followed by an outline of the Unit Objectives. The detailed content is then presented in a simple and organized manner, interspersed with 'Check your Progress' questions to

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format wherein each unit begins with an Introduction to the topic, followed by an outline of the Unit Objectives. The detailed content is then presented in a simple and organized manner, interspersed with 'Check your Progress' questions to

test the student's understanding of the topics covered. A Summary along with a list of Key Terms and

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a set of Questions and Exercises is provided at the end of each unit for effective recapitulation. Introduction NOTES Self-Instructional Material 3

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UNIT 1 INTERNET: AN OVERVIEW Structure 1.0 Introduction 1.1 Unit Objectives 1.2 History of Internet 1.3 Internet Services: Telnet, E-mail, FTP, WWW 1.3.1 Telnet 1.4 Equipment Required for an Internet Connection 1.5 E-Mail 1.5.1 Opening an E-mail Account 1.5.2 Reading and Writing E-mail 1.6 File Transfer Protocol (FTP) 1.6.1 Trivial File Transfer Protocol (TFTP) 1.7 World Wide Web (WWW) 1.7.1 Web Page 1.8 Uniform Resource Locator (URL) 1.8.1 URL Encoding 1.9 Surfing the Internet 1.10 Search Engine 1.11 Uploading and Downloading 1.12 Summary 1.13 Key Terms 1.14 Answers to 'Check Your Progress' 1.15 Questions and Exercises 1.16 Further Reading Internet: An Overview NOTES 1.0

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INTRODUCTION In this unit, you will learn about basics of the Internet. The Internet is a

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INTRODUCTION In this unit, you will learn about basics of the Internet. The Internet is a

global system of interconnected computer networks that use

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the standard Internet Protocol Suite to serve billions of users worldwide. It is a network of networks that

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the standard Internet Protocol Suite to serve billions of users worldwide. It is a network of networks that

consists of millions of private and public, academic, business, and government networks
of local to global scope that are linked by a broad array of electronic and optical networking technologies.

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The Internet carries a vast array of information resources and services, most notably the inter-linked hypertext documents of the World Wide Web (WWW) and the infrastructure to support electronic mail. In this unit, you will also learn about the various aspects of the Internet like Telnet,

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The Internet carries a vast array of information resources and services, most notably the inter-linked hypertext documents of the World Wide Web (WWW) and the infrastructure to support electronic mail. In this unit, you will also learn about the various aspects of the Internet like Telnet,

operating an e-mail account, reading and writing e-mails, file transfer protocol, uniform resource locator, surfing the Internet, search engines, and uploading
and downloading. 1.1

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UNIT OBJECTIVES After going through this unit, you will be able to: ? Analyse the history of the Internet ?

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UNIT OBJECTIVES After going through this unit, you will be able to: ? Analyse the history of the Internet ?

Describe various Internet services

Self-Instructional Material 4 Internet: An Overview NOTES ? Understand the functioning of Telnet? ? Explain the equipments required for an Internet connection? ? Understand the concept and significance of e-mail? ? Open an e-mail account? ? Read and send an e-mail? ? Describe the importance of file transfer protocol? ? Understand the importance of the World Wide Web? ? Understand the functioning of a Web page? ? Understand the concept of uniform resource locator and its encoding? ? Do Internet surfing? ? Understand the significance of search engine? ? Understand the nitty-gritty of uploading and downloading? 1.2 HISTORY OF INTERNET The Internet, World Wide Web and Information Super Highway are terms which are used by millions of people all over the world. The widespread impact of Internet across the globe could not be possible without the development of Transmission Control Protocol/ Internet Protocol (TCP/IP). This protocol suite is developed specifically for the Internet. The Information Technology revolution could not have been achieved without this boundless chain of networks. It has become a fundamental part of the lives of millions of people all over the world. All the aforesaid services provide us the necessary backbone for information sharing in organizations and within common interest groups. That information may be in several forms. It can be notes and documents, data to be processed by another computer, files sent to colleagues, and even more exotic forms of data. During late 1960s and 70s, organizations were inundated with many different LAN and WAN technologies such as packet switching technology, collision-detection local area networks, hierarchical enterprise networks, and many others. The major drawbacks of all these technologies were that they could not communicate with each other without expensive deployment of communications devices. These were not only expensive but also put users at the mercy of the monopoly of the vendor they were dealing with. Consequently, multiple networking models were available as a result of the research and development efforts made by many interest groups. This paved the way for development of another aspect of networking known as protocol layering. This allows applications to communicate with each other. A complete range of architectural models were proposed and implemented by various research teams and computer manufacturers. The result of this know-how is that today any group of users can find a physical network and an architectural model suitable for their specific needs. This includes cheap asynchronous lines with no other error recovery than a bit-per-bit parity function, through full-function wide area networks (public or private) with reliable protocols such as public packet switching networks or private SNA networks, to high-speed but limited-distance local area networks.
Self-Instructional Material 5 It is now evident that organizations or users are using different network technologies to connect computers over the network. The desire of sharing more and more information among homogeneous or heterogeneous interest groups motivated the researcher to device a technology whereby one group of users could extend its information system to another group who had a different network technology and different network protocols. This necessity was recognized in the early 70s by a group of researchers in the United States of America (USA) who hit upon a new principle popularly known as Internetworking. Other organizations also became involved in this area of interconnecting networks, such as ITU-T (formerly CCITT) and ISO. All were trying to define a set of protocols, layered in a well-defined suite, so that applications would be able to communicate with each other, regardless of the underlying network technology and the operating systems where those applications run. Internetworks The availability of different operating systems, hardware platforms and the geographical dispersion of computing resources necessitated the need of networking in such a manner that computers of all sizes could communicate with each other, regardless of the vendor, the operating system, the hardware platform, or geographical proximity. Therefore, we may say that Internetworking is a scheme for interconnecting multiple networks of dissimilar technologies. To interconnect multiple networks of dissimilar technologies use both additional hardware and software. This additional hardware is positioned between networks and software on each attached computer. This system of interconnected networks is called an Internetwork or an Internet. To develop standards for Internetworking, Defense Advanced Research Projects Agency (DARPA) funded research projects. ARPAnet, a project of DARPA, introduced the world of networking with protocol suite concepts such as layering, well before ISO's initiative in this direction. DARPA continued its research for an Internetworking protocol suite. This may be seen in the early NCP (Network Control Program) host-to-host protocol to the TCP/IP protocol suite, which took its current form around 1978. DARPA was well known for its pioneering of packet switching over radio networks and satellite channels and ARPAnet was declared an operational network with responsibility of administering it to Defense Communications Agency (DCA) in 1975. TCP/IP had not yet been developed. ARPAnet was basically a network based on leased lines connected by special switching nodes, known as Internet Message Processors (IMP). Many researchers were involved in TCP/IP research by 1979. This motivated DARPA to form an informal committee to coordinate and guide the design of the communication protocols and architecture. The committee was called the Internet Control and Configuration Board (ICCB). The first real implementation of the Internet was when DARPA converted the machines of its research network ARPAnet to use the new TCP/IP protocols. After this transition, which started in 1980 and finished in 1983, DARPAdemanded that all computers willing to connect to its ARPAnet must use TCP/IP. The US military adopted TCP/IP as standard protocol in 1983 and recommended that all networks connected to the ARPAnet conform to the new standards. Internet: An Overview NOTES

Self-Instructional Material 6 Internet: An Overview NOTES The success of ARPAnet was more than the expectations of its own founders and TCP/IP Internetworking became widespread. As a result, new wide area networks (WAN) were created in the USA and connected to ARPAnet using TCP/IP protocol. In turn, other networks in the rest of the world, not necessarily based on the TCP/IP protocols, were added to the set of interconnected networks. Computing facilities all over North America, Europe, Japan, and other parts of the world are currently connected to the Internet via their own sub-networks, constituting the world's largest network. In 1990, ARPAnet was eliminated, and the Internet was declared as the formal global network. DARPA also funded a project to develop TCP/IP protocols for Berkeley UNIX on the VAX and to distribute the developed codes free of charge with their UNIX operating system. The first release of the Berkeley Software Distribution (BSD) to include the TCP/IP protocol set was made available in 1983 (4.2BSD). This led to the spread of TCP/IP among universities and research centers and has become the standard communications subsystem for all UNIX connectivity. There are many updated versions of BSD code available. These are 4.3BSD (1986), 4.3BSD Tahoe (1988), 4.3BSD Reno (1990) and 4.4BSD (1993). Some examples of the different networks that have played key roles in this development are described below: The Internet The word Internet is a short form of a complete word Internetwork or interconnected network. Therefore, it can be said that the Internet is not a single network, but a collection of networks. The commonality between them in order to communicate with each other is TCP/IP. The Internet consists of the following groups of networks: ? Backbones: These are large networks that exist primarily to interconnect other networks. Some examples of backbones are NSFNET in the USA, EBONE in Europe and large commercial backbones. ? Regional networks: These connect, for example, universities and colleges. ERNET (Education and Research Network) is an example in the Indian context. ? Commercial networks: They provide access to the backbones to subscribers, and networks owned by commercial organizations for internal use and also have connections to the Internet. Mainly, Internet Service Providers come into this category. ? Local networks: These are campus-wide university networks. The networks connect users to the Internet using special devices that are called gateways or routers. These devices provide connection and protocol conversion of dissimilar networks to the Internet. Gateways or routers are responsible for routing data around the global network until they reach their ultimate destination as shown in Figure 3.1. The delivery of data to its final destination takes place based on some routing table maintained by router or gateways. These are mentioned at various places in this book as these are the fundamental devices to connect similar or dissimilar networks together. Over time, TCP/IP defined several protocol sets for the exchange of routing information. Each set pertains to a different historic phase in the evolution of architecture of the Internet backbone.

Material 7 Internet: An Overview NOTES Fig. 1.1 Local Area Networks Connected to the Internet via Gateways or Routers ARPAnet ARPAnet was built by DARPA as described earlier. This initiated the packet switching technology in the world of networking and therefore is sometimes referred to as the 'grand-daddy of packet networks'. The ARPAnet was established in the late 60s for the US Department of Defense to accommodate research equipment on packet switching technology besides allowing resource sharing for the Department's contractors. This network includes research centres, some military bases and government locations. It soon became popular with researchers for collaboration through electronic mail and other services. ARPAnet marks the beginning of Internet. ARPAnet provided interconnection of various packet-switching nodes (PSN) located across continental USAand Western Europe using 56 Kbps leased lines. ARPAnet provided connection to minicomputers running a protocol known as 1822 (after the number of a report describing it) and dedicated it to the packet-switching task. Each PSN had at least two connections to other PSNs (to allow alternate routing in case of circuit failure) and up to 22 ports for user computer connections. Later on, DARPA replaced the 1822 packet switching technology with the CCITT X.25 standard. The increase in data traffic made 56 Kbps capacity of the lines insufficient. ARPAnet has now been replaced with new technologies as backbone for the research side of the connected Internet. 1.3 INTERNET SERVICES: TELNET, E-MAIL, FTP, WWW The Internet is known as 'the Network of Networks'. It is like a phone system that connects almost anywhere around the world. It exchanges information and acts as a global link between small regional networks. Internet services offer a gateway to a myriad of online databases, library catalogues and collections, and software and document archives, in addition to frequently used store-and-forward services, such as UserNet News and e-mail. The widely used Internet services are as follows: E-mail E-mail is the prime Internet service that facilitates services to people or users across the world. Full Internet connectivity is not required for this. For example, an electronic Self-Instructional Ethernet 10 Mbps Token-ring 4Mbps, 16Mbps Router WAN 1200- 600Mbps WAN 1200- 600Mbps Router Router Ethernet 10 Mbps

Self-Instructional Material 8 Internet: An Overview NOTES address provides these services to FTP sites through which mail can be exchanged. Other Internet services, such as IP address resolver, Archie lookup, WHOIS service are done via e-mail. The header and body of the message make an e-mail message. The header contains the information where the message is to be sent and the complete path for reaching the destination, date and return path.

syntax of an e-mail address is user@ subdomain.subdomain.domain, e.g., abc@gmail.com. A service provider must be connected with leased line, dial-up or connection with any network for sending e-mail. File Transfer Protocol (FTP) FTP is also prime Internet service that acts as protocol and transfers files over TCP/IP network (Internet, UNIT, etc.). Once HTML page is developed on a local machine for a website, it is first uploaded to the Web server through FTP. Local machine is the machine on which you are initially logged into. It includes functions to log on to the network, gives a list of directories and copies files. FTP transfer is possible by entering URL preceded with ftp:// within address bar of a web browser. The FTP operations can be performed by issuing FTP commands at the command prompt or by using FTP utility running under a graphical user interface on Windows OS. FTP tasks can be performed through a browser. For example, type an IE address bar URL as ftp:// to get ftp services. For example, ftp://YourLoginName@IPaddress. The required steps used in connecting with FTP operations are as follows: The local machine is connected with remote machine by typing 'ftp machinename'. The machinename is the full name, written as aaa.cs.state.edu, of the remote machine to which the local machine is to be connected. Basically, the machine name is the remote machine's full name. If the machine name is not available other option is taken as to type the 'ftp machinenumber' that demands the Net address of the remote machine, e.g., 129.15.0.11. The FTP responds to the users to enter their loginname and password. The anonymous ftp is used widely these days. Many computer systems provide this facility so that you can access the information of specific machine without creating an account on that particular machine. These types of services are provided by anonymous FTP. You need not be a registered user of the system. The anonymous FTP server contains relevant software, documents and files used to configure networks, graphics, images, songs, lyrics and other useful information. An electronic e-mail can be archived through the anonymous FTP. The ready information is stored in machines for any user across the Net who wants to get the required information. Telnet Telnet is used to connect remote network computers. It is the Internet service that executes commands on remote host as if you are going to log in locally. For this, the machine name and valid user name are required to be connected. The commands that are issued on Telnet are as follows: Telnet hostname: A connection to the host name is opened by this command. For example, issuing the command as 'Telnet abc.maths.edu' with that machine which keeps the required information of abc.maths.edu site can connect you. Telnet address: It gives the IP address of the connected host.

Material 9 Archie If some programs are installed in a system unit and you want to know the availability of the program on the Internet, you can get to know the machine along with such programs via Archie. Basically, Archie is a program that searches files anywhere on the Net by filename. This facility is maintained by a database with the Internet sites accessible via anonymous ftp. The following table shows the various types of Archie servers: Table 1.1 Various Types of Archie Servers Name IP Address archie.rutgers.edu 128.6.18.15 archie.cs.mcgill.ca 132.206.51.250 archie.funet.fi 128.214.6.102 archie.rediris.es 130.206.1.2 archie.sura.net 192.239.16.13 archie.doc.ic.ac.uk 146.169.16.11 The Archie server can be accessed via Telnet, for example, 'Telnet archie.rutgers.edu'. For getting Archie server login to 'Archie'. It requires no password. You can look for files by its full name. For this, either 'set type exact' syntax is used or you can use 'set type sub' syntax. The 'set type sub' syntax is used if the required name of the file is known. The 'find file-name' syntax is also used to find the required file name. Gopher The Gopher protocol supports client–server software that searches files on the

Internet. A Gopher client is required for validating and testing of Gopher publishing service. For example, WS Gopher 1.2 is available on the Internet as shareware.

The server based text files are hierarchically organized and viewed by end-users. These end-users access the server by using Gopher applications of remote computers. Gopher browsers initially display the text-based files. Most of the files along with database are available on Gopher that converts HTTP compatible formats and makes them available on the net. In the preceding screen, the Internet service manager displays the services that are installed on the server to which the Internet service manager is attached. Internet: An Overview NOTES Self-Instructional

10 Material Internet: An Overview NOTES Self-Instructional Finger Finger service gives information about users, for example, username, person's first name and last name, information about recently logged in and also where they logged in. But the users must enter the required information where they get registration for particular e-mail services. Finger

is also used to get a list of users who
are currently logged into the host. In fact, the Finger program accepts input as an e-mail address that returns information of user. In some systems, Finger gives the information about the currently logged on users. World Wide Web (WWW) WWW provides hypertext access to documents located anywhere on the Internet. It is a very successful distributed information system. It
is
basically client–server data transfer protocol that communicates via application level protocol. Its structural components are
clients–browsers, servers and caches. The Internet and
semantic components include hypertext transfer protocol (HTTP), hypertext markup language (HTML) extensible markup language (XML)
and uniform resource identifiers (URIs). The clients who get various sites requested to the server via HTTP determine the structure of WWW. Then web pages constructs HTML consisting of graphics and sound embedded files. For running the complete system, TCP/IP, DNS networking protocols are required. The reason behind the evolution of Java programming language is to develop distributed application. Distributed application means many CPUs are inter-connected through different network topology so that each CPU can communicate with one another. Java introduced the remote method invocation technique to implement distributed application. The java.net package provides classes and methods to develop networking- applications through different network protocols. A group of computers connected by cable to share information is popularly known as network. Anetwork is a set of computers and peripherals that are physically connected. Networking enables sharing of resources and communication. Java applets can be downloaded from a website. This is one of the main attractions of Java. Networking in Java is possible through the use of java.net package. The classes within this package encapsulate the socket model developed by Berkeley software division. The network requires some components, such as: ? server ? client ? peer ? protocol ? physical media ? physical devices Servers provide services to the client. If a server provides application services, then it is treated as an application server. The client accesses services from the server. Peer is a computer that works as a server as well as a client. Clients A computer, which requests for some service from another computer, is called a client. The one that processes the request is called a server. A server waits till one of its
Material 11 clients makes a request. It can accept multiple connections at a time to the same port number. Multithreading is used to serve multiple users at the same time. 1.3.1 Telnet One of the basic requirements of networked computers is the ability to facilitate a communication between a client terminal and recipient terminal on remote systems, i.e., to provide communication to both the ends. That is, a user wants to invoke an application on a remote machine. There are a number of application protocols that allow this remote execution capability, most notably, the Telnet protocol. Telnet is a general-purpose client- server based application program that enables the connection to be established
to a
remote system in such a way that the local terminal appears to be a terminal at the remote system.
In Telnet
protocol, there is a standardized interface for interaction between a Telnet client and the Telnet server. Through this interface program, a Telnet client can access resources on
the Telnet server as though the client were a local terminal connected to the server.
It is one of the most popular ways to remotely control web servers on the Internet. Internet: An Overview NOTES Telnet Operation Fig. 1.2 Telnet Operation Telnet protocol is based on three basic concepts as shown in Figure 1.2: ? The Network Virtual Terminal (NVT) concept: An NVT is an imaginary device with a basic structure common to a wide range of real terminals. Each host maps its own terminal characteristics to those of an NVT and assumes that every other host will do the same. It is simultaneously used by a horde of hosts to facilitate access to other servers. ? A symmetric view of terminals and processes. ? Negotiation of terminal options: To provide services, Telnet hosts follow the principle of negotiated options though there are various options that can be negotiated. Sometimes, many hosts want to provide extra services beyond those available with NVT. Operational characteristics of their Telnet are instituted between the server and client by using a generic set of conventions through the 'DO, DONT, WILL, WONT' mechanism (Figure 1.3). The process starts with two Telnet hosts verifying their mutual understanding. This is the initial negotiation where the hosts achieve minimum understanding. Self-Instructional Workstation Terminal Remote Login Host Local Login LAN

12 Material Internet: An Overview NOTES After this, they are capable of working on the minimum level implemented by the NVT. Once this initial negotiation is complete, the hosts negotiate additional options to provide capabilities beyond the minimum level implemented by NVT. Due to the symmetric model used by Telnet, both the host and the client can recommend additional options to be used. Fig. 1.3 Telnet Negotiations Network Virtual Terminal (NUT) The Network Virtual Terminal (NVT) is an imaginary device consisting of a printer (or display) and a keyboard. Note that here the two peripherals play a contradictory role. The keyboard acts as an output device for producing outbound data to be sent over the Telnet connection. Quite contrary to this, the printer acts as an input device receiving the incoming data (Figure 1.4). The basic characteristics of an NVT are: ? Data is represented in 7-bit ASCII transmitted in 8-bit bytes. ? The NVT is a half-duplex device operating in a line-buffered mode. ? The NVT provides a local echo function. All of these can be negotiated by the two hosts and can be modified by mutually agreed options. For example, a local echo is favoured because of the lower network load and superior functioning.

The Telnet client translates characters received from the local terminal into the NVT form and delivers them to the network.

This is done using a universal interface called the NVT character set. The Telnet server then translates data and commands from the

NVT form into the form acceptable by the remote computer.

Self-Instructional Fig. 1.4 NVT Host A Host B NVT Negotiations NVT Telnet Telnet TCP/IP Operating System TCP/IP Operating System

Self-Instructional Material 13 NVT character set There are two sets of characters used by NVT: Data and Control characters. Both are 8-bit bytes. 1. The format of data characters is shown in Figure 1.5. Fig. 1.5 Data Character 2. The format of control characters is shown in Figure 1.6. Fig. 1.6 Control Character 3. Some NVT control characters are as follows: Embedding In Telnet, the data and control characters are transmitted through

the same channel. This is accomplished by embedding the control characters in the data stream (

Figure 1.7). Internet: An Overview NOTES

14 Material Internet: An Overview NOTES A special control character called interpret as control (IAC) precedes each sequence of control characters. This is done to distinguish data from control characters. Options Fig. 1.7 Embedding In Telnet, the client and server can negotiate options before or during the use of the service. Options are like extra features available to

the user with a more sophisticated terminal. The following are the options available in Telnet. Before any option can be used, option negotiation is required to be made between the client and the server on the networking protocol. The following is the NVT character set for option negotiation. 1. Offer to enable an option (Figure 1.8). Self-Instructional Fig. 1.8 Offer to Enable an Option

Self-Instructional Material 15 2. Request to enable an option (Figure 1.9). Fig. 1.9 Request to Enable an Option 3. Offer to disable an option (Figure 1.10). Fig. 1.10 Offer to Disable an Option 4. Request to disable an option (Figure 1.11). Internet: An Overview NOTES Mode of operation Fig. 1.11 Request to Disable an Option Telnet provides the capability of running servers remotely and promotes remote network operations as well. This is where Telnet has an edge over the protocols. There are three modes in which Telnet can operate: ? Default mode In case no other modes are invoked through option negotiation,

the default mode is used. In this mode, the echoing is executed by the client. The user types a character; the client echoes the character on the screen

but sends it only when the

whole line is completed. ? Character mode In the character mode,

the user types a character; the client does not echo it but sends it

to the server. The server echoes the character back to be displayed on the client screen. In this mode,

there can be a delay in echoing a character

if the transmission time is too long. It also creates traffic for the network because three TCP segments must be sent for each character of data. ? Line mode To gain mastery over the basic lacunae of the default and character mode, a new mode called the line mode

has been proposed. In this mode, the client does the line editing and then transmits the entire line to the server.

16 Material Internet: An Overview NOTES Self-Instructional 1.4 EQUIPMENT REQUIRED FOR AN INTERNET CONNECTION Surfing the Internet is quite similar to scuba diving, with regard to the sophisticated equipments deployed to access Internet. Just as we need certain equipments to dive in the deep ocean for scuba diving, we require adequate paraphernalia to successfully plunge into the huge ocean of interconnected computers and networks. Now-a-days, Internet access necessitates a broadband connection, which is, a high data rate Internet access. The dial-up access deploys a 56K dial up modem, which uses a dedicated telephone line and is limited to the bit rate of less than 56 Kbps. In contrast to this is the broadband technology, which provides more than double the dial up bit rate and that too without intervening with the telephone use. In other words, it means that Internet access and voice call can be carried out simultaneously. The broadband connections are characterized by various minimum bandwidths ranging from 64 Kbps up to 2.0 Mbps. Some standards define the broadband connection as having download data transfer rates equal to or faster than 256 Kbps, whereas others define it as having data transmission speed exceeding 768 Kbps in either downstream or upstream direction. In general, any connection of 256 Kbps or greater comes under broadband Internet. Certain equipments which are required to access the Internet are as follows. Amongst these, some of them are mandatory and some are optional: ? Computer: A computer which is used to browse the Internet may either be a personal computer with Pentium processor or a Macintosh. It should have enough power and memory concomitant with multimedia features. Though 128 MB RAM is sufficient to have access to Internet, 512 MB RAM or more is recommended. Now-a-days, devices like smart phones, mobile phones, Pocket PCs, etc. are also used to browse the Internet. ? Modem: It stands for Modulator/Demodulator. This may either be internally built in or externally connected. The modem is a device that converts data in binary code used by the computer, to an analog signal that can be transmitted over the telephone network and vice versa. With the help of telephone lines, millions of computers worldwide are connected with one another, either directly or indirectly. In order to connect with the Internet Service Provider (ISP), these connections require the regular dial up telephone lines or dedicated higher capacity telephone lines like leased lines, ISDN lines, etc. ? Internet account with a service provider: An account with a service provider is essential to create a link between the user's computer and the Internet. A service provider, which is popularly referred to as ISP (Internet Service Provider), signifies phone or cable companies that provide last mile connectivity. It may also refer to a cable line from the subscriber's home to his office and also to an exchange for long distance connectivity based on monthly or annual charges. ? Widely used current standard broadband technologies: These technologies are DSLs, that is, Digital Subscriber Line (DSL) and cable modems. However, recent technologies like VDSLand optical fiber connections are also gradually becoming popular in providing Internet access in a much more cost-effective way than copper wire technology. Wi-Fi networks are

Self-Instructional Material 17 also used to provide Internet connections. However, these are not served in the areas by cable or ADSL. WiMAX has been gaining popularity with regard to mobile and stationary broadband access. ? Internet browser software: It is the software tool which enables a user to browse the Internet with the help of web addresses or URLs. A few of the widely used browsers are Internet Explorer version 7 or 8 (IE), Netscape, Mozilla Firefox, Chrome, AOL, Opera, etc. ? Anti-virus software: These are used to protect the user from the onslaught of the nasty programs that obtain access to the user's terminal when he is surfing the network or downloading contents from there. Some examples of anti-virus software are Symantec, Norton, McAfee, etc. ? Email software: The email software may be chosen from the Outlook or Outlook Express. Google, Yahoo and Hotmail offer free web-mail for the same. ? Plug-In software: It is considered an add-on to the user terminal. It enables the user to avail services like music, video, multimedia, etc. on the Internet. The most popular plug-in-softwares include Real Audio music player, Macromedia Flash Player, Windows Media Player, Apple Quick Time, Java Virtual Machine, etc. ? Stereo speakers, microphone and webcam: These equipments enable the user to play sounds, videos, to conduct Internet telephoning and to send images to other users connected to the Internet. Internet: An Overview NOTES 1.5 E-MAIL Electronic mail is one of the most popular network services. The use of e-mail is considered the foremost reason behind the popularity of Internet. The proliferation of cyber cafés can be attributed to e-mail or World Wide Web. E-mail provides an efficient and fast means of communication with relatives, friends or colleagues throughout the world. With the help of e-mail, one can not only communicate with myriad people at a time but can also receive and send files and other information within a fraction of seconds. The biggest advantage of e-mail is that the intended receiver of the message does not require to be present at their desktop at the time of receiving of the message. Definition The term email connotes the basic communication facility provided by the Internet to its users to send and receive messages in any part of the world. It is considered one of the most popular applications of the Internet and is accounted for 90 per cent of net traffic. Email facilitates sending of messages in the form of a text, audio and video or even a combination of these types. When a message is sent from the source user, it reaches the recipient's mail box. The email message received by the recipient can be opened, discarded, edited, saved, responded back to or can even be forwarded to some other recipient. e-mail messages are delivered instantly after the transmission. An e-mail can be sent by connecting to the network from any location. An Internet connection usually requires a telephone line, a modem and a computer. Wireless connections have also become popular means of getting connected to the Internet. This job is accomplished by the Simple Mail Transfer Protocol (SMTP) running over TCP/IP.

18 Material Internet: An Overview NOTES Self-Instructional Uses of E-mail Email provides several features that are useful in day-to-day life. It is an efficient and cost-effective way of communication across the world. With the help of email, one can send common letters or circulars to several recipients. The email messages are delivered instantly, even if they are sent to remote locations worldwide. Thus, it saves time as well as money. Whereas the postal messages are time consuming. Email also provides an address book facility which keeps a record of the email addresses. This saves the user from the predicament of remembering the addresses of the recipients. In addition, a lot of time, energy and money is saved as the user creates a mailing list with a group name, so that a letter or a circular can be transmitted by just typing the name of the particular group. Another advantage of using email is that provided the email address typed in is correct, it enables the sender to know immediately whether the message has been delivered to the recipient,. In case the message is not delivered, the sender will receive a return email message to inform him about the failure of the particular message. Email goes beyond all time zones and barriers. Email also provides the user with a facility of attachment which allows the user to attach any file created in any application such as word processors, spread sheet or power point presentations. For example, if the total amount of outstanding against a client is computed in a spreadsheet, the client may be informed through a letter in email along with an attachment showing his outstanding amount in the spreadsheet. The primary advantages of email can be summarized in the following: ? It conducts paperless communication of messages quickly. ? It ensures simultaneous transmission of messages to several users. The messages may comprise of pictures, video, film clips, text, animation or even a combination of them. Voice and audio messages can also be transmitted this way. ? The email messages can also be printed, prioritized, forwarded and stored. ? Public bulletin boards can be created in which every member of the organization can post and view messages. This can also be accomplished in the case of shared text messages and application files used widely across computer platforms. ? It allows delivery and receiving of faxes and meetings can also be scheduled through email. 1.5.1 Opening an E-mail Account Opening an E-mail account is not an issue. Now-a-days, all subscribers get facility to open an email account free of cost. A number of web services like Google, Hotmail, Yahoo, etc. are readily available to register a user to open an email account and access it from anywhere in the world. However, to avail this facility, the user should have access to a computer and an Internet connection. In addition to these web services, organizations or ISPs also provide web interfaces to enable the users to open their email accounts, though by charging them. In this case, the organization or ISP possesses the personal record of the users and based on their personal records and their relationship with them, they open their email accounts and equip them with an email address. The email addresses comprise of email ids meant for individual users, which could be their first name or a combination of their name and surname or their date of birth, etc. along with the URL of the organization. For example, in sanjay0203@teraclean.com, sanjay 0203 signifies email id consisting of the name and birth date and month, whereas teraclean.com indicates the URL of the organization.
Self-Instructional Material 19 In case of universally available web services like Google, Hotmail or Yahoo, the user needs to open the website of the respective Web service by typing its corresponding URL in the Web browser. For example, if the user wants to open an account in the Google Web service, then he needs to key the Web address of Google, that is, www.google.com. Once the Website of Google opens, the user needs to click on the Gmail service of Google. The Gmail interface provides the facility for opening of a new account, for which it provides a registration form to be filled up by the user. In accordance with the procedure, the user mentions his personal information, email id and password in the form. Thereafter, he gets registered and obtains an email address. This process of creating an email account is described as follows: Type the URL 'http://www.google.com' in the address bar of a Web browser such as an Internet Explorer, to visit the Google homepage as shown in Figure 1.12. Fig. 1.12 Google Homepage The page displayed shows an icon namely Gmail as shown in Figure 1.12. Once you click on the Gmail icon, it navigates you to another webpage as shown in Figure 1.13. If you have an existing account with Gmail, you can type in your email id and your password to log on to your account. If you are accessing the Gmail for the first time, then you need to create an account for yourself. The procedure for the same is as follows: Fig. 1.13 Sign-in Page Internet: An Overview NOTES
Self-Instructional Material 20 Internet: An Overview NOTES Click on the 'Sign up' icon as illustrated in Figure 1.13. This will lead you to another webpage that contains the registration form as shown in Figure 1.14. Now you are required to fill the form that asks for your personal details along with your user ID and password to open a new email account for you. Fig. 1.14 Registration Page Once you are through with the registration process, after accepting the terms and conditions, you become a member and thereafter you are able to use your email account to send and receive emails. Now all you need is to remember your user ID and your password for future use of your email account. In other words, it means that whenever you need to log on to your newly created account, you need to simply type your user ID and your password. 1.5.2 Reading and Writing E-mail Email is extensively used by people across the world. The procedure of reading and writing an email is not a very sophisticated one. The steps involved are as follows: Reading an E-mail message The email account can be accessed at anytime and from anywhere by logging on to the particular email account, as mentioned earlier. To read or write an email, you need to perform the following steps: 1. Type the URL 'http://www.google.com' in the address bar of a Web browser. 2. Enter your user ID and the password as shown in Figure 1.15.

Material 21 Fig. 1.15 Sign-in Page Once you have signed in successfully, you can access your email account as shown in Figure 1.16. Fig. 1.16 E-Mail Account Clicking on the Inbox icon lets you open your Inbox. The Inbox folder contains all your previous email messages and also enables you to read the new ones. You also have an option of deleting the previous messages or transferring them to some other folders also. An email message in the Inbox can be read by clicking on the email subject or any other clickable item therein. This displays the contents of the message to be read and allows you to take appropriate action accordingly. Some email messages are delivered along with attachments. Attachments may comprise of textual messages, graphics, pictures, videos, sounds or a combination of these types. The email message depicts an attachment button within the message itself, which on being clicked enables you to either open the attachment in relevant applications or save it on your computer to be opened separately. Internet: An Overview NOTES Self-Instructional
Self-Instructional Material 22 Internet: An Overview NOTES Writing an E-mail message As mentioned earlier, email account can be accessed by logging on to email account. To write an email, you need to perform the following steps: The Compose option on the left hand side of the screen enables you to write an email message. Attachments can also be appended along with the email messages wherever they are required. On selection of the compose option, a screen as shown in Figure 6 will appear. The following steps are to be followed for writing and sending an email message: 1. To: It is a field in which the valid email address of the recipient like User ID@domain.com is typed in, so that the message can be delivered correctly. In case of multiple recipients, email address of each recipient is typed in the same box separated by comas. 2. Cc: It signifies the email address/(s) of the recipient/(s) to whom a carbon copy of the message is to be transmitted. The recipient/(s) specified in To field also receives the email address/(s) of the recipients in their messages indicating that email address/(s) in the Cc field also receive/(s) the same message. 3. Bcc: It denotes the email address/(s) of the recipient/(s) to whom a copy of the message is transmitted. However, in this case, the recipient/(s) in both To and Cc field remain oblivious of the other email addresses, to which the message is sent. Bcc stands for blind carbon copy. 4. Subject: This box enables the sender to write the subject of the message, so that recipient/(s) on receiving the message, could have a clear idea of what the email message is about. 5. Message box: It is the field in which you type your message which is to be transmitted. An attachment can also be appended to the email message before sending it. There exists an Attachment button within the compose mail box. On clicking on the Attachment button, you are asked to provide the location of the desired file to be attached. You then click on the Browse button which enables you to select the desired file from your computer. Finally, clicking on the Attach or OK button attaches the document along with your email message. Your message with or without attachment is now ready to be transmitted. Now you need to follow the following steps: 1. If you want to postpone transmitting of your message, you have another option called Draft in which you can save your message to be transmitted later. The message saved in the Draft can also be modified before transmission. The Draft webpage provides you a Send button. On clicking on it, your message is transmitted and a copy of the message is saved in your Sent mailbox, provided the send and save option has been set. 2. If you do not want to postpone the transmission of your message, then just click on the Send button. On clicking on it, your message will be transmitted and a copy of the message will be saved in your Sent mailbox.
Material 23 1.6 FILE TRANSFER PROTOCOL (FTP) In a networked environment, one of the most customary operations performed is to transfer data from one host to another. It is based on client-server based architecture and the standard mechanism provided by TCP/IP for copying a file from one host to another

is the File Transfer Protocol (FTP). FTP is a networked application that handles both uploading of data (transfer data from a client to a server) and downloading of data (retrieve data from a server to a client). Moreover, FTP also renders thorough shielding and validation measures to prevent unauthorized approach to data, thereby ensuring more security and observation. Overview of FTP The major characteristic of FTP is that it renders reliable end-to-end connections by using TCP as a transport protocol. Broadly speaking, FTP enforces two types of connections in managing data transfers over a network protocol. The first connection, called the control connection, is initiated by the FTP client. This connection is initiated to a well known port 21 (the client's port is, typically, ephemeral). The FTP server listens for and accepts new connections on this port. All the controls command a client implements to logon to the server, manipulate and exchange files and terminate a session. All these tasks are achieved through the control connection. This connection is also used by the FTP server to transport messages to the client in response to the issued control commands (Figure 1.17). The second connection used by FTP is known as data connection and is established on server port 20. However, depending on how the data connection is established, both the client and server might use ephemeral ports. FTP transfers data across this connection in a networked territory. Data connection is opened by FTP only when a client issues a command requiring a data transfer, such as a request to retrieve a file, or to view a list of the files available. If the client does not issue a command requiring data transfer, the entire FTPsession can be completed without a data connection ever having been opened. Data connection is unidirectional in contrast to control connection, which is bidirectional. Data transfer can take place either from the server to client or client to server but not both. Also, unlike the control connection, the data connection can be initiated from either the client or the server. Servers initiate active data connection whereas clients initiate passive data connection. The client FTP application consists of a protocol interpreter (PI), a data transfer process (DTP), and a user interface. The server FTP application typically only consists of a PI and DTP. Internet: An Overview NOTES Fig. 1.17 The FTP Model Self-Instructional User FTP User Interface Control PI Connection User PI User File System DTP User Data Connection DTP User File System Client System Server System Self-Instructional Material 24 Internet: An Overview NOTES The FTP session starts with the FTP client's user interface transmitting data with the help of the Protocol Interpreter (PI). The PI manages the control connection. The protocol interpreter transforms any application-specific commands to the RFC architected FTP commands, and then communicates these control commands to the FTP server. On receiving the commands, the FTP server's PI initiates the appropriate processes to service the client's requests. If the client requests require data transfer, the DTPS on both the client and server applications perform data management. Once data transfer is complete, the data connection is closed and the control is returned to the PIs of the client and server applications. Only one data transfer can occur for each data connection. In case of multiple data transfers in a single FTP session, one distinct control connection is opened for each transfer. FTP operations When using FTP, the user performs some or all of the following operations: ? Connects to a remote host ? Navigates and manipulates the directory structure ? Lists files available for transfer ? Defines the transfer mode, transfer type, and data structure ? Transfers data to or from the remote host ? Disconnects from the remote host 1. Connecting to a remote host: The primary method of implementing security within the FTP model starts the moment the user logs in to the remote host for transferring a file. Additional security can be provided using SSL and TLS. On the contrary, this authentication can be avoided by using anonymous FTP. There are four commands that are used for transferring a file: ? Open: This command selects the remote host and initiates the login session. ? User: This command identifies the remote user ID. ? Pass: This command authenticates the user. ? Site: This command sends information to the foreign host that is used to provide services specific to the host that initiates the login. To start an FTP interactive session type 'ftp' from a DOS Command window. C:\< ftp The initial step starts by replacing the DOS prompt with the FTP prompt. The FTP program is now running on the local system. A connection (or session) to a remote system has not been established yet. The help command or ? (question mark) may be executed without being attached to a remote system and will do a print (usually to the screen) of the FTP commands. The following is a typical result of the help command running on a PC with Windows. ftp< help Commands may be abbreviated. Commands are: ! delete literal prompt send ? debug ls put status

Self-Instructional Material 25 append dir mdelete pwd trace ascii disconnect mdir quit type bell get mget quote user binary glob mkdir recv verbose bye hash mls remotehelp cd help mput rename close lcd open rmdir ftp< The following commands will establish a connection (or session) by doing a logon between the local FTP program and a remote system. ftp< open domain.name Connected to domain.name 220 antigonous FTP server ready. User (domain.name:(none)): User-Name 331 Password required for user-name Password: password 230 User user-name logged in. ftp< 2. Navigating the directory structure: Once user authentication is accomplished and the user is logged on the server, the user can now navigate the directory structure of the remote host. The reason behind performing this job is to track down the file sought for retrieval, or the directory into which a local file will be transferred. The user can also navigate the directory structure of the client's host. After accessing the correct local and remote directories, users can display the contents of the remote directory. The subcommands that perform these functions are as follows: ? cd: Changes the directory on the remote host: A path name can be specified, but must be in sync with the directory structure of the remote host. In most implementations, cd will move one directory up within the directory structure. ? lcd: Changes the directory on the local host. Like the cd command, a path name can be specified but must conform to the directory structure of the local host. ? ls: Lists the contents of the remote directory. This command requires the use of a data connection because the list generated by this command is treated as data. This command creates output readable by human users. ? dir: Lists the contents of the remote directory. Like the ls command, the list generated by dir is treated as data and requires the use of a data connection. This command is intended to create output readable by programs. The following command will change the directory on the remote system. ftp< cd /web 250 CWD command successful. ftp< The following command will find out the pathname of the current directory on the remote system and display the information. Internet: An Overview NOTES
Self-Instructional Material 26 Internet: An Overview NOTES ftp< pwd 257 "/web" is the current directory. ftp< 3. Controlling how the data is transferred: When data is transferred between dissimilar systems, it needs to be transformed as a part of the transfer process. Three aspects of data handling need to be decided by the user: ? The way the bits will be moved from one place to another ? The different representations of data on the system's architecture ? The file structure in which the data is to be stored Each of these is controlled by a subcommand: Mode: Specifies whether the file is treated as having a record structure in a byte stream format: B: This specifies that the block mode is to be used. This specifies that the logical record boundaries of the file are retained. S: This specifies that the stream mode is to be used. This means that the file is treated as a byte stream. This is the default mode and is a more efficient form of data transfer. This mode might fail to bring forth the desired results when working with a record-based file system. Type: Specifies the character sets used in translating and representing the data: A: specifies that both hosts are ASCII-based, or that if one is ASCII-based and the other is EBCDIC-based, that ASCII-EBCDIC translation must be performed. On many implementations, this can be invoked by issuing the ASCII command, which the PI translates into the type A command. E: Indicates that both hosts use an EBCDIC data representation. On many implementations, this can be invoked by issuing the EBCDIC command, which the PI translates into the type E command. I: Indicates that no translation needs to be done on the data. On many implementations, this can be invoked by using the BINARY command, which the PI translates into the type I command. Structure: Specifies the structure of the file to be transferred: File: Indicates that the file has no internal structure, and is considered to be a continuous sequence of data bytes. Record: Indicates that the file is made up of sequential records. Page: Indicates that the file is made up of independent indexed pages. 4. Transferring files: The following commands can be used to copy files between FTP clients and servers: get: Copies a file from the remote host to the local host. The PI translates get into a RETR command. mget: Copies multiple files from the remote host to the local host. The PI translates mget into a series of RETR commands. put: Copies a file from the local host to the remote host. The PI translates put into a STOR command.
Self-Instructional Material 27 mput: Copies multiple files from the local host to the remote host. The PI translates mput into a series of STOR commands. 5. Terminating the FTPsession: The following commands are used to terminate an FTP session: quit: Disconnects from the remote host and terminates FTP. Some implementations use the BYE subcommand. close: Disconnects from the remote host but leaves the FTP client running. An open command can be issued to establish a new control connection. The following command will set the file transfer mode to ASCII (this is the default and transmits seven bits per byte). ftp< ascii 200 Type set to A. ftp< The following command will copy a file from the local system to the remote system. ftp< put d:\simoweb1\filename.txt 200 PORT command successful. Opening ASCII mode data connection for filename.txt 226 Transfer complete ftp< The following command will set the file transfer mode to binary (the binary mode transfers all eight bits per byte and must be used to transfer non-ASCII files). ftp< binary 200 Type set to I. ftp< The following command will copy a file from the local system to the remote system. ftp< put d:\simoweb1\filename.zip 200 PORT command successful. Opening BINARY mode data connection for filename.zip 226 Transfer complete ftp< The following command will exit the FTP environment (same as 'bye'). ftp< quit 221 Goodbye. When the preceding command is finished, the DOS prompt will be displayed. C:\< Internet: An Overview NOTES

Self-Instructional Material 28 Internet: An Overview Figure 1.18 gives an example of FTP transfer. NOTES Fig. 1.18 An Example of FTP Transfer Anonymous FTP Many TCP/IP sites allow public access to some file directories that can be downloaded and uploaded. This is referred to as Anonymous FTP. Using only the login name anonymous and password guest or some other common password conventions (for example, the user's Internet e-mail ID), the remote user can login to a TCP/IP site. The password convention used on a system is explained to the user during the login process. There is a restriction on the folders accessible to anonymous users as this method of login is available to anyone with Internet access to the system. 1.6.1
Trivial File Transfer Protocol (TFTP) Trivial File Transfer Protocol (TFTP) is a
simple protocol used to transfer files over a networked environment. This protocol basically concentrates on disk-to-disk data transfer. It has been deliberately kept uncomplicated in architecture so as to facilitate an easy and hassle-free execution of the task. This simplistic approach has a couple of advantages over traditional FTP, including: ? Use by diskless devices to download firmware at boot time ? Use by any automated process for which the assignment of a user ID or password is not feasible ? Due to its small application size, it can be implemented inexpensively and in environments where resources are constricted It is mandatory to implement TFTP at the beginning of the User Datagram Protocol. The TFTP client actuates the procedure by communicating a read/write request through well-known port 69. Subsequently, the server and the client mutually determine the port that they will always use in the future for the purpose of connection. TFTP lacks most of the creditable features of FTP, and instead is restricted to only reading a file from a server or writing a file to a server. TFTP is an insecure protocol because it has no provisions for user authentication. Workstation Disk /localfolder/mydata Disk /tmp/yourdata remote host FTP Client FTP Server Data 1) 2) Logon to the FTP Server Navigate to the correct remote and local folders 3) Specify the file attributes 4) Send the file Local Area Network ftp remote.host.yourcompany.com user myUserId pass myPassword cd /tmp 1 cd /local folder type 1 mode s stru f put mydata yourdata 5) Terminate the session quit
Self-Instructional Material 29 Protocol description The initial step of every TFTP transfer begins with a request to read or write a file. If the request is acknowledged by the server, the connection is opened and the file is sent in blocks of 512 bytes (fixed length). Blocks of the file are numbered consecutively, starting at 1, and each packet carries exactly one block of data. Each data packet must be answered by an acknowledgement packet before the next one can be sent. If the data packet is of less than 512 bytes, transfer is assumed to be terminated. Even though the connection is unreliable and almost all errors will cause termination of the connection, TFTP can recover from packet loss. If a packet is lost in the network, a timeout occurs; this initiates a retransmission of the last packet. This retransmission occurs both for lost data blocks or lost acknowledgements. The requirement that every packet be acknowledged—including retransmissions—uncovered a design flaw in TFTP known as the Sorcerer's Apprentice Syndrome (SAS). On networks that experience latency or other delays, this flaw might cause excessive retransmission by both sides of the TFTP implementation. TFTP usage The commands used by TFTP implementations are not controlled by an RFC. Instead, only the direct interaction between a TFTP server and client are defined. Therefore, between different implementations of this protocol, the commands used to request this interaction vary. However, each implementation has some variation of the following commands: ? Connect >host<: Specifies the destination host ID. ? Mode >ascii|binary<: Specifies the type of transfer mode. ? Get >remote filename< [>local filename<]: Retrieves a file. ? Put >remote filename< [>local filename<]: Stores a file. ? Verbose: Toggles the verbose mode, which displays additional information during file transfer, on or off. ? Quit: Exits TFTP. TFTP packets TFTP uses the following six types of packets. Internet: An Overview NOTES The TFTP header contains the opcode associated with the packet (Figure 1.19).
30 Material RRQ/WRQ packet 2 bytes Opcode = 1/2 string Filename 1 byte 0 string Mode 1 byte 0 Data packet ACK packet Error packet OACK packet Opcode = 6 opt1 0 val1 0 optN 0 valN 0 Internet: An Overview NOTES Self-Instructional 2 bytes Opcode = 3 2 bytes Block # upto 512 bytes Data 2 bytes 2 bytes Opcode = 4 Block # 2 bytes 2 bytes string 1 byte Opcode = 5 Block # Error message 0 Fig. 1.19 TFTP Packet Headers TFTP messages The TFTP operation consists of three general steps: initial connection, data transfer and connection termination. For the proper execution of these operations, it is necessary that the exchange of specific TFTP messages takes place. The first message sent by the client to initiate TFTP is either a read request (RRQ) message or a write request (WRQ) message. This message serves to implicitly establish the logical TFTP connection, and to indicate whether the
file
is to be sent from the server to the client (
read request) or the client to the server (

write request). The message also specifies the type of file transfer to be performed. Assuming the task was performed trouble-free with the request, the server in this case will respond with a positive reply. In the case of a read request, the server will immediately send the first data message back to the client. In the case of a write request, the server will send an acknowledgement message to the client, telling it that it may proceed to send the first data message. For a read, the server sends one data message and waits for an acknowledgement from the client before sending the next one. For a write, the client sends one data message and the server sends an acknowledgement for it, before the client sends the next data message. Each data message contains a block of between 0 and 512 bytes of data. The blocks are numbered sequentially, starting with 1. The number of each block is placed in the header of the data message carrying that block, and then used in the acknowledgement for that block so that the original sender knows it was received. The device sending the data will always send 512 bytes of data at a time for as long as it has enough data to fill the message. When it gets to the end of the file and has fewer than 512 bytes to send, it will send only the remaining bytes. The receipt of a data message with between 0 and 511 bytes of data signals that this is the last data message. Once this is acknowledged, this automatically signals the end of the data transfer. There is no need to explicitly terminate the 'connection', just as it was not necessary to explicitly establish it. The original TFTP standard defines six different types of messages: ? Read Request (RRQ) ? Write Request (WRQ) ? Data (DATA)
Material 31 0 4 8 12 16 20 24 28 32 Operation Code = 5 Error Code Error Message ? Acknowledgement (ACK) ? Error (ERROR) ? Option Acknowledgement (OACK) Of these six messages, the first two share the same message format. The others all have their own unique formats. The only common field in every TFTP message is the Operation Code (Opcode), which tells the recipient of the message about its type. 1. Read Request and Write Request messages (Figure 1.20) 0 4 8 12 16 20 24 28 32 Internet: An Overview NOTES Fig. 1.20 Read Request and Write Request Messages 2. Error messages (Figure 1.21) Fig. 1.21 Error Messages Self-Instructional Operation Code = 1 (RRQ) or 2 (WRQ) File Name Transfer Mode Option # 1 Code Option # 1 Value Option # N Code Option # N Code
Self-Instructional Material 32 Internet: An Overview NOTES Error MsgVariableError Message: A descriptive text error message string, intended for 'human consumption', as the standard puts it. 3. Option Acknowledgement Messages (Figure 1.22) 0 4 8 12 16 20 24 28 32 Fig. 1.22 Option Acknowledgement Messages TFTP connection Being a client server based protocol, a TFTP session uses the concept of a 'logical connection', which is opened when a client sends a request to a server to read or write a file. Communication between the client and server is performed in 'lock-step' fashion: one device sends data messages and receives acknowledgements so it knows the data messages were received; the other sends acknowledgements and receives data messages so it knows the acknowledgements were received. 1. Connection establishment (Figure 1.23) Fig. 1.23 Connection Establishment 2. UDP port numbers used by TFTP The TFTP server listens continuously for requests on well-known UDP port number 69, which is reserved only for TFTP. The client chooses for its initial communication an ephemeral port number, as is usually the case in TCP/IP. This port number actually identifies the data transfer, and is called a transfer identifier (TID) (Figure 1.24). Operation Code = 6 Option #1 Code Option #1 Value Option #N Code Option #N Value
Self-Instructional Material 33 Fig. 1.24 UDP Port Numbers used by TFTP TFTP data transfer The process of transferring a file consists of three main phases. In highly generalized terms, these are: 1. Initial connection: The TFTP client serves to implicitly establish the connection by sending an initial request to the server. The server responds back to the client and the connection is effectively opened. 2. Data transfer: Once the connection is established, the client and server exchange TFTP messages. One device sends data and the other receives and sends acknowledgements. 3. Connection termination: When the last TFTP message containing data has been sent and acknowledged, the connection is terminated. ? TFTP read process steps: Let us use an example to see how TFTP messaging works. Suppose the client wants to read a particular file that is 1,200 bytes long (Figure 1.25). 1. The client sends a read request to the server, specifying the name of the file. 2. The server sends back a data message containing block #1, carrying 512 bytes of data. 3. The client receives the data, and sends back an acknowledgement for block #1. 4. The server sends block #2, with 512 bytes of data. 5. The client receives block #2, and sends back an acknowledgement for it. 6. The server sends block #3, containing 176 bytes of data. It waits for an acknowledgement before terminating the logical connection. 7. The client receives the data, sends an acknowledgement for block #3. Since this data message had fewer than 512 bytes, it knows the file is complete. 8. The server receives the acknowledgement, and knows the file was received successfully. Internet: An Overview NOTES

Self-Instructional Material 34 Internet: An Overview TFTP Client TFTP Server NOTES Fig. 1.25 TFTP Read Process In this example, the client starts the process of reading a file by sending a request for it to the server. The server acknowledges this request by immediately sending a DATA message carrying block #1, containing the first 512 bytes of the file. The client acknowledges this with an ACK message for block #1. The server then sends block #2, containing bytes 513 to 1,024, which the client acknowledges. When the client receives block #3, it realizes it has only 176 bytes, which marks it as the last block of the file. ? TFTP write process steps Here are the steps in the same process, but where the client is writing the file (Figure 1.26): 1. The client sends a write request to the server, specifying the name of the file. 2. The server sends back an acknowledgement. Since this acknowledgement is prior to the receipt of any data, it uses block number zero in the acknowledgement. 3. The client sends a data message containing block #1, 512 bytes of data. 4. The server receives the data, sends back an acknowledgement for block #1. 5. The client sends block #2, 512 bytes of data. 6. The server receives the data, sends back an acknowledgement for block #2. 7. The client sends block #3, containing 176 bytes of data. It waits for an acknowledgement before terminating the logical connection. 8. The server receives block #3 and sends an acknowledgement for it. Since this data message had less than 512 bytes, the transfer is done. 9. The client receives the acknowledgement for block #3 and knows the file write was completed successfully. 1. Send Read Request For File RRQ DATA (Block #1) 2. Receive Read Request, Send Data Bytes 1 to 512 3. Receive Block #1, Send Acknowledgment ACK (Block #2 4. Receive Acknowledgment, Send Data Bytes 513 to 1,024 5. Receive Block #2, Send Acknowledgment DATA Block #2 ACK (Block #2) DATA (Block #3) 6. Receive Acknowledgment, Send Data Bytes 1,025 to 1,200 7. Receive Block #3, Send Acknowledgment ACK (Block #3) 8. Receive Acknowledgment; File Transfer Complete Self-Instructional Material 35 Internet: An Overview TFTP Client TFTP Server NOTES Fig. 1.26 TFTP Write Process. This example shows the client sending the same 1,200-byte file to the server that it read in Figure 1.25. The client sends a write request to the server, which acknowledges it; it uses block #0 to represent acknowledgement of the request prior to receipt of any data. The client then sends blocks of data one at a time, each of which is acknowledged by the server. When the server receives block #3 containing fewer than 512 bytes of data, it knows it has received the whole file. 1.7 WORLD WIDE WEB (WWW)

The
WWW is a distributed client–server service, in which a client
using a browser can access a service using a server.
The service provided is distributed over many locations called sites.

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The World Wide Web is a global hypertext system that was initially developed in 1989 by Tim Berners Lee at the European Laboratory for Particle Physics, CERN, in Switzerland to facilitate an easy way of sharing and editing research documents among a geographically dispersed group of scientists. The WWW has a unique combination of flexibility, portability and user friendly features that distinguish it from other features provided by the Internet.

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WRQ ACK (Block #0) DATA (Block #1 ACK Block #1 DATA (Block #2) ACK (Block #2) DATA (Block #3) ACK (Block #3) 2. Receive Write Request, Send Acknowledgment 4. Receive Block #1, Send Acknowledgment 6. Receive Block #2, Send Acknowledgment 8. Receive Block #3, Send Acknowledgment 1. Send Write Request With File Name 3. Receive Acknowledgment, Send Data Bytes 1 to 512 5. Receive Acknowledgment, Send Data Bytes 513 to 1,024 7. Receive Acknowledgment, Send Data Bytes 1,025 to 1,200 9. Receive Acknowledgment; File Transfer Complete
36 Material Internet: An Overview NOTES Architecture of WWW Fig. 1.27 Architecture of the World Wide Web Functional components of the World Wide Web Fig. 1.28 Components of the World Wide Web 1.

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Web browsers Web browsers are HTTP client software programs that run on TCP/IP client computers to access web documents on web servers. These browser programs retrieve hypertext documents and display them, and also implement many of the Web's advanced features, such as caching (Figure 1.29). Browsers used today support a wide variety of media, allowing the Web to implement many different functions aside from simply hypertext document transfer. Examples include displaying images, playing sounds and implementing interactive programs.

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Fig. 1.29 Architecture of a Web Browser Each browser usually consists of three parts: a controller, client protocol, and interpreters. The controller receives input from the keyboard or the mouse and uses client programs

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Fig. 1.29 Architecture of a Web Browser Each browser usually consists of three parts: a controller, client protocol, and interpreters. The controller receives input from the keyboard or the mouse and uses client programs

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The World Wide Web (WWW) Uniform Resource Identifiers (Urls) Hypertext Transfer Protocol (HTTP) Web Hardware and Software Web Client Hardware and Browser Software

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The World Wide Web (WWW) Uniform Resource Identifiers (Urls) Hypertext Transfer Protocol (HTTP) Web Hardware and Software Web Client Hardware and Browser Software

Web Server Hardware and Software Hypertext Markup Language (HTML)
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to access the document. After the document has been accessed, the controller uses one of the interpreters to display the document on screen. 2. Web

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to access the document. After the document has been accessed, the controller uses one of the interpreters to display the document on screen. 2. Web

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Web Servers Web servers are computers that run special server software to allow them to provide hypertext documents and other files to clients who request them. Millions of such machines around the world now serve as a virtual, distributed repository of the enormous wealth of information that the Web represents. 3.

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Web Servers Web servers are computers that run special server software to allow them to provide hypertext documents and other files to clients who request them. Millions of such machines around the world now serve as a virtual, distributed repository of the enormous wealth of information that the Web represents. 3.

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HyperText Markup Language (HTML) HTML is a text language used to define hypertext documents.

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HyperText Markup Language (HTML) HTML is a text language used to define hypertext documents.

The language was designed to add simple constructs, called tags, to regular text documents, to enable the linking of one document to another, as well as to allow special data formatting and the combining of different types of media. HTML has become the standard language for implementing information in hypertext, and has spawned the creation of numerous other related languages. 4. Hypertext Transfer Protocol (HTTP) The TCP/IPapplication-layer protocol that implements the World Wide Web, by enabling the transfer of hypertext documents and other files between a client and server. HTTP began as a very crude protocol for transferring HTML documents between computers, and has evolved to a full-featured and sophisticated messaging protocol. It supports transfers of many different kinds of documents, streaming of multiple files on a connection, and various advanced features including caching, proxying and authentication. 5. Uniform Resource Identifiers (URIs) URI is a method of defining labels that identify resources on an internet so that they can be easily found and referenced. URIs were originally developed to provide a means by which the users of the Web could locate hypertext documents so they could be retrieved. URIs are actually not specific to the Web, though they are most often associated with the Web and HTTP. Uniform Resource Locators (URL) An Internet address usually begins with http://. This uniquely identifies a web page (Figure 1.30). Fig. 1.30 URL http://www.rediffmail.com/index.html Where, http:// – standard protocol (Hypertext Transfer Protocol) www – world wide web rediffmail.com – domain name index.html – file name of the web page Internet: An Overview NOTES Self-Instructional Material 38 Internet: An Overview NOTES ? Every single document on the web page has its own unique URL. ? Type the URL in the address box of the browser and the browser is directed to the document's location. ftp:// – File Transfer Protocol https:// – Secure Hypertext Transfer Protocol Working of World Wide Web ? Viewing a Web page on the World Wide Web

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normally begins either by typing the URL of the page into a web browser, or by following a hyperlink to that page or resource. ? First, the server-name portion of the URL is resolved into an IP address using the global, distributed Internet database known as the domain name system. ? The browser then requests the resource by sending an HTTP request to the web server at that particular address. ? The HTMLtext of the page is requested first and parsed immediately by the Web browser, which will then make additional requests for images and any other files that form a part of the page. ? Having received the required files from the web server, the browser then renders the page onto the screen as specified by its HTML, CSS, and other web languages. Any images and other resources are incorporated to produce the on-screen web page that the user sees. Hypertext Hypertext is the main concept that makes the

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normally begins either by typing the URL of the page into a web browser, or by following a hyperlink to that page or resource. ? First, the server-name portion of the URL is resolved into an IP address using the global, distributed Internet database known as the domain name system. ? The browser then requests the resource by sending an HTTP request to the web server at that particular address. ? The HTMLtext of the page is requested first and parsed immediately by the Web browser, which will then make additional requests for images and any other files that form a part of the page. ? Having received the required files from the web server, the browser then renders the page onto the screen as specified by its HTML, CSS, and other web languages. Any images and other resources are incorporated to produce the on-screen web page that the user sees. Hypertext Hypertext is the main concept that makes the

World Wide Web

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more than just another message transfer system. The prefix 'hyper' usually means 'above' or 'beyond', and thus hypertext is like text, but goes beyond it in terms of functionality. The extra information in a hypertext document is used to tell the computer program that displays the file to a user how to format it. This information takes the form of special instructions that are interspersed with the actual text of the document itself, which are written according to the syntax of a defining language. This addition of extra elements to the content of a document is commonly called marking up the document.

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more than just another message transfer system. The prefix 'hyper' usually means 'above' or 'beyond', and thus hypertext is like text, but goes beyond it in terms of functionality. The extra information in a hypertext document is used to tell the computer program that displays the file to a user how to format it. This information takes the form of special instructions that are interspersed with the actual text of the document itself, which are written according to the syntax of a defining language. This addition of extra elements to the content of a document is commonly called marking up the document.

World Wide Web

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hypertext documents use Hypertext Markup Language (HTML). HTML documents are as ASCII text files, but are arranged using a special structure of HTML elements that define the different parts of the document and how they should be displayed to the user. Each element is described using special text tags that define it and its characteristics (Figure 1.31). Fig. 1.31 HTML Tag Self-Instructional Material 39 Web documents The documents in www can be grouped into three broad categories: ? Static documents ?

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hypertext documents use Hypertext Markup Language (HTML). HTML documents are as ASCII text files, but are arranged using a special structure of HTML elements that define the different parts of the document and how they should be displayed to the user. Each element is described using special text tags that define it and its characteristics (Figure 1.31). Fig. 1.31 HTML Tag Self-Instructional Material 39 Web documents The documents in www can be grouped into three broad categories: ? Static documents ?

Dynamic documents ? Active documents

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Static documents: These are fixed content documents that are created and stored in a server. The client can only get a copy of the document. The contents of the file are determined when it is created and not when it is used. The user cannot change the document (Figure 1.32). Fig. 1.32 Static Document Dynamic documents: This document is created by the server whenever the browser requests the document. When a request arrives, the web server runs an application program or a script that creates the dynamic document. The server returns the output of the program or script as response to browser that requested the document. A fresh document is created for each request; the contents of dynamic document can vary from one request to another. For example; retrieval of date and time from a server. There are two ways to create dynamic documents: ? Common Gateway Interface (CGI) is a technology that creates and handles dynamic documents. CGI is a set of standards that defines how a dynamic document is created, how data is input to the program and how output result is used. ? Scripting technologies are embedded in the HTML page.

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Static documents: These are fixed content documents that are created and stored in a server. The client can only get a copy of the document. The contents of the file are determined when it is created and not when it is used. The user cannot change the document (Figure 1.32). Fig. 1.32 Static Document Dynamic documents: This document is created by the server whenever the browser requests the document. When a request arrives, the web server runs an application program or a script that creates the dynamic document. The server returns the output of the program or script as response to browser that requested the document. A fresh document is created for each request; the contents of dynamic document can vary from one request to another. For example; retrieval of date and time from a server. There are two ways to create dynamic documents: ? Common Gateway Interface (CGI) is a technology that creates and handles dynamic documents. CGI is a set of standards that defines how a dynamic document is created, how data is input to the program and how output result is used. ? Scripting technologies are embedded in the HTML page.

For example; PHP, JSP and ASP etc. Fig. 1.33 Dynamic Document with Application Program Internet: An Overview NOTES

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Self-Instructional Material 40 Internet: An Overview NOTES Fig. 1.34 Dynamic Document with Script Active documents: In active documents the program or script

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Self-Instructional Material 40 Internet: An Overview NOTES Fig. 1.34 Dynamic Document with Script Active documents: In active documents the program or script

is running

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at the client side. When a browser requests an active document, the server sends a copy of the document or script. The document is then run on the client site. Active documents are sometimes referred to as client-site dynamic documents (Figure 1.35). Active documents can be created in two ways: ? Java applets, programs written in Java on the server, are compiled and ready to run. The browser creates an instance of this applet and runs it. Fig. 1.35 Active Document ? JavaScript is interpreted and run by the client at the same time. The script is in the source code (Figure 1.36) Fig. 1.36 Active Document

at the client side. When a browser requests an active document, the server sends a copy of the document or script. The document is then run on the client site. Active documents are sometimes referred to as client-site dynamic documents (Figure 1.35). Active documents can be created in two ways: ? Java applets, programs written in Java on the server, are compiled and ready to run. The browser creates an instance of this applet and runs it. Fig. 1.35 Active Document ? JavaScript is interpreted and run by the client at the same time. The script is in the source code (Figure 1.36) Fig. 1.36 Active Document

Self-Instructional Material 41 Common Gateway Interface (CGI) A CGI script is a server-side program launched by a web server to generate a dynamic document. It receives encoded information from the remote client (user's browser) via STDIN and environment variables, and it must produce a valid HTTP header and body on STDOUT. CGI is just a protocol, a formal agreement between a web server and a separate program. The server encodes the client's form input data, and the CGI program decodes the form and generates output. The protocol says nothing regarding which language the program must be written in; programs and scripts that obey the CGI protocol have been written in C, shell, Rexx, C++, VMS DCL, Smalltalk, Tcl, Python, and (of course) Perl. Form in browser Internet: An Overview NOTES 1. User enters data in form 2. User presses submit button Fig. 1.37 CGI 3. Data sent to web server with URL of CGI 4. Server starts a CGI and passes data 5. CGI processes data and generates HTML page CGI Programming: Any programming language that allows reading Standard Input and writing to the Standard Output can be used for CGI programming. Perl is commonly used for CGI, also used are C/C++, Python, Unix shell script, AppleScript, Visual Basic, Java, etc. The CGI Interaction Process: There are four basic steps in a CGI program: 1. Read the data (input parameters) 2. Process the data 3. Output an HTTP response header 4. Generate a document ? The CGI should send a blank line to separate the HTTP header from the generated document. ? Reading the data is different depending upon the method used to send the data (GET, POST). Server CGI data data 1-User enters data in form HTML

Self-Instructional Material 42 Internet: An Overview How CGI scripts work NOTES Fig. 1.38 How CGI Scripts Work 1. The web surfer fills out a form and clicks, 'Submit'. The information in the form is sent over
the Internet to the web server. 2. The Web server 'grabs' the information from the form and passes it to the
CGI software. 3. The CGI software performs whatever validation of this information that is required. For instance, it might check to see if an e-mail address is valid. If this is a database program, the CGI software prepares a database statement to add, edit, or delete information from the database. 4. The CGI software then executes the prepared database statement, which is passed to the database driver. 5. The database driver acts as a middleman and performs the requested action on the database itself. 6. The results of the database action are then passed back to the database driver. 7. The database driver sends the information from the database to the CGI software. 8. The CGI software takes the information from the database and manipulates it into the format that is desired. 9. If any static HTML pages need to be created, the CGI program accesses the Web server computer's file system and reads, writes, and/or edits files. 10. The CGI software then sends the result it wants the Web surfer's browser to see back to the Web server. 11. The Web server sends the result it got from the CGI software back to the Web surfer's browser. CGI scripts are called in two main ways, referred to as methods, GET and POST. A HTTP GET stores form data in the URL. This means it can be conveniently bookmarked for canned requests, but has limitations on the total size of the data requested. The HTTP POST method sends form data separate from the request. It has no such size limitations, but cannot be bookmarked. Forms that update information on the server, like mailing in feedback or modifying a database entry, should use POST. Client browsers and intervening proxies are free to cache and refresh the results of GET requests behind your back, but they may not cache POST requests. Web Server File System Web Surfer's Browser Web Server CGI S re oftwa Database Driver Database

Self-Instructional Material 43 1.7.1 Web

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Page The WWW is a subset of the Internet and comprises of a huge collection of documents stored in computers across the world. The web encompasses special sites called websites along the Internet, that support web browsing. By clicking on the links that appear on the webpage, one can navigate from one place to another. Hence, webpage can be defined as a single hypertext document written in Hypertext Markup Language (HTML) and described in HTML basics. A webpage normally incorporates the basic information and links to navigate in the websites to which it belongs. Documents in the World Wide Web are classified into three types, namely static, dynamic and active documents. Static web page These are fixed content documents which perpetually provide the same information in response to all download requests from all web users. Static documents are stored in a web server to be accessed by the web client. The web client, on requesting for a web page, gets a copy of the same. The contents of such files are not subject to modification on part of the web user as the web user does not have right to alter them. However, the web pages can be modified in the server per say. Thus, the static web pages display the same information to all the web users and provide hypertext links to perform navigation through static documents. Their biggest advantage is that they are cache friendly. This enables the web pages to display one copy of the same web page to many people simultaneously. However, it becomes difficult to maintain web pages in case of large sites as they demand consistency and updation. Dynamic web page These web pages provide interactive web navigation and help modify the content like text, images, form fields, etc. on a web page, depending on different contexts or conditions. The dynamic web pages make use of two types of inter-activities, which are enlisted

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Page The WWW is a subset of the Internet and comprises of a huge collection of documents stored in computers across the world. The web encompasses special sites called websites along the Internet, that support web browsing. By clicking on the links that appear on the webpage, one can navigate from one place to another. Hence, webpage can be defined as a single hypertext document written in Hypertext Markup Language (HTML) and described in HTML basics. A webpage normally incorporates the basic information and links to navigate in the websites to which it belongs. Documents in the World Wide Web are classified into three types, namely static, dynamic and active documents. Static web page These are fixed content documents which perpetually provide the same information in response to all download requests from all web users. Static documents are stored in a web server to be accessed by the web client. The web client, on requesting for a web page, gets a copy of the same. The contents of such files are not subject to modification on part of the web user as the web user does not have right to alter them. However, the web pages can be modified in the server per say. Thus, the static web pages display the same information to all the web users and provide hypertext links to perform navigation through static documents. Their biggest advantage is that they are cache friendly. This enables the web pages to display one copy of the same web page to many people simultaneously. However, it becomes difficult to maintain web pages in case of large sites as they demand consistency and updation. Dynamic web page These web pages provide interactive web navigation and help modify the content like text, images, form fields, etc. on a web page, depending on different contexts or conditions. The dynamic web pages make use of two types of inter-activities, which are enlisted

in the following: ?

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Client side scripting: This is used to modify interface behaviours within a specific web page. This modification is based on the mouse or keyboard actions and is conducted at specified time intervals. The dynamic behaviour takes place within the presentation. The presentation technologies like JavaScript or ActionScript for dynamic HTML (DHTML) and Flash for media types

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Client side scripting: This is used to modify interface behaviours within a specific web page. This modification is based on the mouse or keyboard actions and is conducted at specified time intervals. The dynamic behaviour takes place within the presentation. The presentation technologies like JavaScript or ActionScript for dynamic HTML (DHTML) and Flash for media types

of the presentation

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are used. The client side scripting also facilitates the use of remote scripting in which the DHTML page requests for additional information from the server. The content is generated on the web client's machine in which the web browser retrieves a page from the server and processes the code embedded in the web page, so that the contents of the retrieved page can be displayed to the web user. Sometimes, the web browsers do not support the language and the commands of the scripting language, in the client-side dynamic pages. ? Server side scripting:

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This

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is used to modify the requested web page source amongst pages to either adjust the sequence or reload the web pages delivered to the browser. Server responses are based on certain conditions like data in a posted HTML form, parameters in the URL, the type of browser being used, the passage of time or a database or server state. Server side scripting dynamic web pages are designed with the help of server-side languages like PHP, Perl, ASP, JSP, etc.

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Internet: An Overview NOTES
Self-Instructional Material 44 Internet: An Overview NOTES

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Both the techniques may be used simultaneously to develop the dynamic web pages. The advantages of dynamic web pages are that these facilitate easy update of the web pages and faster web page loading. In the dynamic web pages, the content and the design are located separately, thereby allowing frequent modifications to the web pages including the text and image updates. Active documents The programs that run at the client side are known as the active documents. Whenever a web client requests for an active document, the web server provides a copy of the same in the form of byte code. The document is now ready to be run at the web client machine. As the active document is served in the binary form, compression and decompression can be applied at the server and the client side to reduce the bandwidth requirement and throughput. 1.8

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Both the techniques may be used simultaneously to develop the dynamic web pages. The advantages of dynamic web pages are that these facilitate easy update of the web pages and faster web page loading. In the dynamic web pages, the content and the design are located separately, thereby allowing frequent modifications to the web pages including the text and image updates. Active documents The programs that run at the client side are known as the active documents. Whenever a web client requests for an active document, the web server provides a copy of the same in the form of byte code. The document is now ready to be run at the web client machine. As the active document is served in the binary form, compression and decompression can be applied at the server and the client side to reduce the bandwidth requirement and throughput. 1.8

UNIFORM RESOURCE LOCATOR (

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URL) URL denotes Uniform Resource Locator. It is the address of a document on the World Wide Web. Web browsers enable a person to enter either a known address in the web server or a specific document within that server. Addresses usually begin with http://, ftp://, gopher://, WAIS://, file://, etc. It is not feasible to maintain WWW without using the URLs. These are also used to represent hypermedia links and links to network services within the HTML documents. Any file or service on the Internet can be presented with the help of the URL. The first part of the URL that comes before the two slashes specifies the method of access or protocol being followed for communications between the browser and the web server. The second part coming after two slashes represents the address of the host machine, whose data or services are being sought. The remaining parts signify the names of the files, the port to connect to or the text to search for in a database. All the parts of an address for obtaining a file or service from a host machine in a URL are shown as a single unbroken line with no spaces and the locations of the host machines or websites that run www servers are typically named with a www at the beginning of the network address. The web browsers enable the users to access web services by specifying a URL and connecting to that document or service. Once the user gets connected with the web server, the web browsers select the hypertext in an HTML document and send a request to open a URL. Thus, hyperlinks are used not only to provide other texts and media in the same document but also to facilitate other network services. Web browsers are not simply web clients. They are full-featured FTP, Gopher and telnet clients. 1.8.1

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URL Encoding Uniform Resource Locator (URL) is a pointer that avails specified resources across the net. A Resource simply connotes information containing files or directories. It is referenced with query to available databases through search engines, such as Google or Yahoo. An example of URL that appears on the address bar is given as follows: http://aaa.bbb.edu/flower.html Table 1.2 depicts the above given URL details: Self-Instructional Material 45 Table 1.2 URL Details URL part Function http The protocol specifier aaa.bbb.edu The domain name flower.html The page location The http is used as a protocol in which information resides on the domain called aaa.bbb.edu. The information that resides in the host machine is taken as flower.html. The host machine can either be protocol dependent or host dependent. A component of URL is known as the path component. Sometimes the URL is also referred to as 'port', that is, it is a port number by which TCP connection is possible to the remote host machine. The default port for protocol is used if port is not specified. For instance, port 80 is known as default port for HTTP. The two ports, port 20 and port 21 are used by ftp. The alternative port can be used in the following way: http://aaa.bbb.edu:80/ flower.html Table 1.3 shows some specific symbols and characters which are used by the URL. These are, in fact, URL encoding. Table 1.3 Used Symbols and URL Encoding Specific Symbols and Characters URL Encoding ; %3B ? %3F / %2F : %3A # %23 & %24 = %3D + %2B $ %26 , %2C % %25 > %3C < %3E ~ %7E % %25 >

98% **MATCHING BLOCK 64/472** W

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space< +

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or %20 Note: The >spacebar< is frequently used and '+' sign is reserved for its URL encoding. For example, string 'A B' in URL is encoded as either 'A%20B' or 'A+B'.

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or %20 Note: The >spacebar< is frequently used and '+' sign is reserved for its URL encoding. For example, string 'A B' in URL is encoded as either 'A%20B' or 'A+B'.

If you are looking for some information, say 'computer graphics basics' on Google search, you just need to type the text that has to be searched, in the following way: Internet: An Overview NOTES
Self-Instructional Material 46 Internet: An Overview NOTES After pressing the >ENTER< key or clicking on 'Google Search' button, you can get the resulting URL in the address bar as follows: If you analyse the result of URL, you will get to know that [http:// www.google.co.insearch?hl=en&source=hp&q =computer+graphics+ basics+&meta=&aq=f&oq=], the result comes as the >space< character between computer+graphics+basics in URL encoded as '+' symbol. In order to access any website, the web browsers are used which are assisted by the URL that uses the http scheme. It is the URL or the port number that assists the browser in linking with a website. The server indicates a computer connected to the Internet, whereas the port number indicates a type of socket to which the browser plugs in to link with the Web server. The web server not only provides the requisite web pages but also describes a computer program that runs on a computer to provide web pages. When a browser receives an the URL will attempt to connect with the server computer having the required web pages by connecting to the specified port number. The URL can be provided to the browser either by typing its specified location or by clicking on the link available on some already displayed web page or document.
Material 47 The browse connects with the server in which the requisite requests from clients or users are stored. When the web server receives the request from the browser, it responds back to the browser, which is the client in this case. The information contains the HTTP protocol version, name of the server, the media type of the document, date etc. The media type of the document is important in so far that the browser is required to know what kind of document this is, prior to its processing. HTML is the most common media type transferred over the Web. Other media types are GIF image and JPEG image. Sometimes, a response like 'HTTP 404 Not Found' is displayed on the screen, which means that the request document is not available at the link. There are different responses defined in HTTP. In order to access a web page, HTTP involves a browser that issues a request followed by a few headers. In response, the server replies back with a few headers and a document. The web server basically maps the URLs to files on its hard disks. It interprets the path in any URL to map it with a filename on its hard disk. In order to map it with the requisite file, the web server is configured to contain a 'document root' directory relative to which all URLs are resolved as filenames. Let us take an example, suppose the URL is http://myspace.tutorial.in, and the document root is D:\WWWFiles\. When a user types the URL http://myspace.tutorial.in/lesson1/networking.htm into the browser, the browser requests the server for the document /lesson1/networking.htm. The web server begins searching in the directory D:\WWWFiles\lesson1 for a file called networking.htm. If the requisite file is available, it responds with a header followed by the document. If it is not available, then it responds with a 404 Not Found followed by an error message, which tells the user to search elsewhere. Internet: An Overview NOTES 1.9 SURFING THE INTERNET

96% MATCHING BLOCK 67/472 W

The advent of Internet and WWW drastically changed the life of people for

96% MATCHING BLOCK 68/472 W

The advent of Internet and WWW drastically changed the life of people for

the

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better. It has altogether altered the way people access information. With the help of WWW, a myriad of websites dealing with diverse subjects have come into existence. Millions of computers with billions of web pages are hooked to the Internet and are ready to

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provide information and knowledge pertaining to any subject or topic of your choice. To extract information from the Internet, we need to explore the Internet. Surfing the Internet entails searching for two types of materials, namely the textual and the non-textual materials. HyperText Transfer Protocol (HTTP) facilitates exchange of documents between two or more computers that are connected to the Internet. It is the web browser which has the ability to provide requisite documents in the form of web pages. As an Internet is a repertoire of information, one needs to be adept in digging out the relevant information from such a vast ocean of web pages. Basically, there are two popular methods for surfing the Internet. In the first method, you know the web address of the particular website in which the pertinent information can be searched for. In this case, you just need to key the web address in the form of URL in the address bar of your web browser. It enables you to see the homepage of the desired website which allows navigation of different web pages contained in that website. The second method necessitates the use of search engines, that is, the software systems which enable the users to search for information on the WWW using specific keywords. Internet users key some keywords in the space provided in the search engine page. Obtaining the desired information contingent upon the keywords entered to a great extent. Surfing the Internet with the help of search engines has become an integral part of our life. Surfing the Internet also facilitates access to chat rooms where online discussions or chatting take place. However,

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surfing the Internet has several disadvantages too. Some notorious people misuse the Internet and hack into other peoples' private accounts. Widespread injection of Spam is also annoying. 1.10

100% **MATCHING BLOCK 74/472** W

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SEARCH ENGINE

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Search engines are the software that enable searching of the content available on Internet. A search engine is an information retrieval system which is used to access and retrieve information stored in WWW or a computer system attached to the Internet. Search engines also help minimize the time required to find the relevant information on the computer system. The computer system could be a standalone system or it could also be attached to the Internet. The search engines are popular amongst people as web search engines help explore information on the World Wide Web. Search engines are the interface to a group of contents, which allow the users to type in the keywords, so that the engine can find several matching contents to the corresponding keywords out of millions of web pages. The keywords provided by the user are referred to as a search query. Several styles of search query syntax are used by the net users. Search query differs for different types of search engines, that is, some search engines enable users to enter two or three words separated by space, whereas others may require users to provide entire documents, pictures, sounds, and various forms of languages. Some search engines attempt to enhance the search queries to provide a quality set of items through a process known as query expansion. http://en.wikipedia.org/wiki/Image:Search-engine-diagram-en.svg

97% **MATCHING BLOCK 76/472** W

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Index-based search engine In case of such engines, the list of items to meet the criteria specified by the query, is typically sorted or indexed. Indexing the contents by relevance, that is, from the highest to lowest, minimizes the time needed to explore the desired information. Some search engines use probabilistic approach to rank the contents, depending on measures of similarity, popularity or authority. Boolean search engines typically provide contents which match exactly irrespective of the order in which the keywords are typed. However, the term boolean search engine may also allude to the use of boolean-style syntax. Thus, in order to provide a set of matching contents that are based on some criteria, the search engine will collect metadata concerning the group of contents under consideration, through a process called indexing. The advantage of indexing is that it calls for a smaller amount of computer storage. Types and characteristics Some of the popular search engines with their types and characteristics are following: ? Alta Vista: It is a crawler type of search engine which comes up with results based on how many times the search words appear in the text. It searches the complete text. ? Excite: It is also a crawler type of search engine and it makes use of meta tags. ? Google: It is the most widely used search engine. It is also a crawler type and its results are based on the number of times, the other sites link to the ranked site. ? Yahoo: This is also a crawler type search engine and its functions are similar to that of Google. Self-Instructional Material 49 1.11 UPLOADING AND DOWNLOADING

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Uploading refers to sending of data from a local system to a remote system. like a server to keep a copy of the data there for various purposes. Downloading refers to retrieving of data from a remote system to a local system. Examples of remote systems include the web server, FTP server, email server or other similar systems. Information needs to be digitized for uploading or downloading. In the case of uploading, the files are generally copied from a smaller peripheral system to a larger central system. For example, a mobile phone file can be easily uploaded to a personal computer. Similarly, files from personal computer can be uploaded again to a server. Small files take only a few seconds in uploading, whereas larger graphic files can take hours in uploading. Downloading entails transfer of data from a central system to a smaller system. It is quite palpable that larger files take more time as compared to smaller files in downloading. Email is an interesting example of downloading and uploading in which emails in Inbox are downloaded from a server, whereas the replies are uploaded, so that they may be transmitted to the recipient. File Transfer Protocol (FTP) program is used to upload files to servers as well as to download files from remote locations. A number of programs are available to assist the users with uploading and downloading.

98% **MATCHING BLOCK 78/472** W

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Internet: An Overview NOTES 1.12 SUMMARY In this unit, you learnt that: ? The widespread impact of Internet across the globe could not be possible without the development of Transmission Control Protocol/Internet Protocol (TCP/IP). This is the protocol suite developed specifically for the Internet. ? The word Internet is a short form of a complete word Internetwork or interconnected networks. Therefore, Internet is not a single network, but a collection of multiple networks of dissimilar technologies. These networks communicate with each other via TCP/IP. ? ARPAnet was basically a network based on leased lines connected by special switching nodes, known as Internet Message Processors (IMP). It initiated the packet switching technology in the world of networking and therefore is sometimes referred to as the 'grand-daddy of packet networks'. ? The widely used Internet services are e-mail, file transfer protocol (FTP), telnet, Archie, Gopher, Finger, World Wide Web (WWW) and clients. FTP transfers files over TCP/IP network (Internet, UNIT, etc.). Telnet is used to connect remote computers. Telnet address gives the IP address of the connected host. Archie is a program that searches files anywhere on the Net by filename. The Gopher protocol supports client/server software that searches files on the Internet. Finger service gives information about the currently logged on users.
WWW provides hypertext access to documents located anywhere on the Internet. It is a very successful distributed information system. It
is
basically client/server data transfer protocol that communicates via application level protocol. Its structural components are
clients – browsers, servers and caches.
Self-Instructional Material 50 Internet: An Overview NOTES ? Telnet is a client/server application that allows a user to log on to a remote machine. It uses the network virtual terminal (NVT) system to encode characters on the local system. On the server machine, NVT decodes the characters to a form acceptable to the remote machine.? ? The equipments and necessary requirements to access the Internet are Computer, Modem, ISDN lines, Internet account with a service provider, Widely used current standard broadband technologies (Digital Subscriber Line (DSL) and cable modems), Wi-Fi networks, Internet browser software (Internet Explorer, Netscape, Mozilla Firefox, Chrome, AOL, Opera, etc.), Anti-virus software, E-mail software, Plug-In software (Real Audio Music Player, Macromedia Flash Player, Windows Media Player, Apple Quick Time, Java Virtual Machine, etc.), stereo speakers, microphone and webcam. Amongst these, some of them are mandatory and some are optional.? ? The term e-mail connotes the basic communication facility provided by the Internet to its users to send and receive messages in any part of the world. It facilitates sending of messages in the form of a text, audio and video or even a combination of these types. The email message received by the recipient can be opened, discarded, edited, saved, responded back to or can even be forwarded to some other recipient. This job is accomplished by the Simple Mail Transfer Protocol (SMTP) running over TCP/IP.? ? File transfer protocol (FTP) is a program used for transferring files on the Internet. It requires two connections for data transfer: a control connection and a data connection. FTP is a networked application that handles both uploading of data (transfer data from a client to a server) and downloading of data (retrieve data from a server to a client). It also renders thorough shielding and validation measures to prevent unauthorized approach to data, thereby ensuring more security and observation.? ? Trivial File Transfer Protocol (TFTP) is implemented on top of the User Datagram Protocol and basically concentrates on disk-to-disk data transfer. TFTP lacks most of the creditable features of FTP and is an insecure protocol because it has no provisions for user authentication.? ? The
World Wide Web (
WWW) is a distributed client/server service, in which a client
using a browser can access a service using a server.
The service provided is distributed over many locations called sites.
WWW
is repository of information linked together from points all over the world.
Web browsers interpret and display a web document. A web document is classified as static, dynamic and active.? ?

90%	MATCHING BLOCK 79/472	W

Uniform Resource Locator (URL) is the address of a document on the World Wide Web.

90%	MATCHING BLOCK 80/472	W

Uniform Resource Locator (URL) is the address of a document on the World Wide Web.

100% **MATCHING BLOCK 81/472** W

Addresses usually begin with http://, ftp://, gopher://, WAIS://, file:// etc. It is not feasible to maintain WWW without using the URLs.? ?

100% **MATCHING BLOCK 82/472** W

Addresses usually begin with http://, ftp://, gopher://, WAIS://, file:// etc. It is not feasible to maintain WWW without using the URLs.? ?

Billions of web pages are hooked to the Internet to

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provide information and knowledge pertaining to any subject or topic of your choice. To extract information from the Internet, we need to explore the Internet. Surfing the Internet entails searching for two types of materials, namely the textual and the non-textual materials.? ?

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Surfing the Internet or World Wide Web

100% **MATCHING BLOCK 85/472** W

with the help of search engines has become an integral part of our life.

100% **MATCHING BLOCK 86/472** W

with the help of search engines has become an integral part of our life.

Search engines are the software that helps in searching the content available on Internet. These

88% **MATCHING BLOCK 87/472** W

are the interface to a group of? Self-Instructional Material 51 contents, which allow the users to type in the keywords, so that the engine can find several matching contents to the corresponding keywords out of millions of web pages. ?

88% **MATCHING BLOCK 88/472** W

are the interface to a group of? Self-Instructional Material 51 contents, which allow the users to type in the keywords, so that the engine can find several matching contents to the corresponding keywords out of millions of web pages. ?

62% **MATCHING BLOCK 89/472** W

Uploading refers to sending of data from a local system to a remote system and downloading refers to retrieving of data from a remote system to a local system.

62% **MATCHING BLOCK 90/472** W

Uploading refers to sending of data from a local system to a remote system and downloading refers to retrieving of data from a remote system to a local system.

Information needs to be digitized for uploading or downloading.? Internet: An Overview NOTES 1.13 KEY TERMS ? Internetworking: A scheme for interconnecting multiple networks of dissimilar technologies. ? ARPAnet: Stands for Advanced Research Projects Agency Network and is based on leased lines connected by special switching nodes, known as Internet Message Processors (IMP). ? Telnet: Aclient/server application that allows a user to log on to a remote machine. ? Modem: Stands for MOdulator/DEModulator. It converts data in binary code to an analog signal that can be transmitted over the telephone network. ? Plug-in software: An add-on to the user terminal, which enables the user to avail services like music, video, etc. ? E-mail: The communication facility provided by the Internet to its users to send and receive messages in the form of text, audio and video or even a combination of these types in any part of the world is called E-mail. ? File transfer protocol (FTP): A program used for transferring files on the Internet. ?
World wide web (WWW): It
is a distributed client/server service, in which a client
uses a browser to access a service using a server.
The service provided is distributed over many locations called sites. ?

85% **MATCHING BLOCK 91/472** W

Uniform resource locator (URL): The address of a document on the World Wide Web.

85% **MATCHING BLOCK 92/472** W

Uniform resource locator (URL): The address of a document on the World Wide Web.

100% **MATCHING BLOCK 93/472** W

Addresses usually begin with http://, ftp://, gopher://, WAIS://, file:// etc. It is not feasible to maintain WWW without using the URLs. ?

100% **MATCHING BLOCK 94/472** W

Addresses usually begin with http://, ftp://, gopher://, WAIS://, file:// etc. It is not feasible to maintain WWW without using the URLs. ?

Search engines: Software that helps in searching of content available on the Internet. 1.14 ANSWERS TO 'CHECK YOUR PROGRESS' 1. Internetworking is a scheme for interconnecting multiple networks of dissimilar technologies. To interconnect multiple networks of dissimilar technologies use both additional hardware and software. This additional hardware is positioned between networks and software on each attached computer. This system of interconnected networks is called an Internetwork or an Internet. 2. The word Internet is a short form of a complete word Internetwork or interconnected network. Therefore, It is not a single network, but a collection of networks.
Self-Instructional Material 52 Internet: An Overview NOTES 3. Basically, ARPAnet was a network based on leased lines connected by special switching nodes, known as Internet Message Processors (IMP). ARPAnet provided interconnection of various packet-switching nodes (PSN) located across continental USA and Western Europe using 56 Kbps leased lines. ARPAnet provided connection to minicomputers running a protocol known as 1822 (after the number of a report describing it) and dedicated it to the packet-switching task. 4. E-mail is the prime Internet service that facilitates services to people or users across the world. Full Internet connectivity is not required for this. The header and body of the message make an e-mail message. The header contains the information where the message is to be sent and the complete path for reaching the destination, date and return path.

syntax of an e-mail address is user@ subdomain.subdomain.domain, e.g., abc@gmail.com. A service provider must be connected with leased line, dial-up or connection with any network for sending e-mail. 5. The FTP operations can be performed by issuing FTP commands at the command prompt or by using FTPutilityrunning under a graphical user interface on Windows OS. 6. Telnet is used to connect remote network computers. It is the Internet service that executes commands on remote host as if you are going to log in locally. For this, the machine name and valid user name are required to be connected. 7. The Gopher protocol supports client/server software that searches files on the Internet. AGopher
client is required for validating and testing of Gopher publishing service.
Gopher browsers initially display the text-based files. 8. Finger service gives information about users,
for example, username, person's first name and last name, information about recently logged in and also where they logged in.
Finger
is also used to get a list of users who
are currently logged into the host. 9. The reason behind the evolution of Java programming language is to develop distributed application. Distributed application means many CPUs are inter- connected through different network topology so that each CPU can communicate with one another. Java introduced the remote method invocation technique to implement distributed application. 10. Telnet protocol is based on the following three basic concepts: ? The Network Virtual Terminal (NVT) concept: An NVT is an imaginary device with a basic structure common to a wide range of real terminals. Each host maps its own terminal characteristics to those of an NVT and assumes that every other host will do the same. It is simultaneously used by a horde of hosts to facilitate access to other servers. ? A symmetric view of terminals and processes. ? Negotiation of terminal options: To provide services, Telnet hosts follow the principle of negotiated options though there are various options that can be negotiated. Sometimes, many hosts want to provide extra services beyond those available with NVT. Operational characteristics of their Telnet are instituted between the server and client by using a generic set of conventions through the 'DO, DONT, WILL, WONT' mechanism.
Material 53 11. The Network Virtual Terminal (NVT) is an imaginary device consisting of a printer (or display) and a keyboard. Note that here the two peripherals play a contradictory role. The keyboard acts as an output device for producing outbound data to be sent over the Telnet connection. 12. The following are the three modes in which Telnet can operate: ? Default mode: In case no other modes are invoked through option negotiation,
the default mode is used. In this mode, the echoing is executed by the client. The user types a character; the client echoes the character on the screen
but sends it only when the
whole line is completed. ? Character mode: In the character mode,
the user types a character; the client does not echo it but sends it
to the server. The server echoes the character back to be displayed on the client screen. In this mode,
there can be a delay in echoing a character
if the transmission time is too long. It also creates traffic for the network because three TCP segments must be sent for each character of data. ? Line mode: To gain mastery over the basic lacunae of the default and character mode, a new mode called the line mode

has been proposed. In this mode, the client does the line editing and then transmits the entire line to the server. 13. The equipments and necessary requirements to access the Internet are Computer, Modem, ISDN lines, Internet account with a service provider, Widely used current standard broadband technologies (Digital Subscriber Line (DSL) and cable modems), Wi-Fi networks, Internet browser software (Internet Explorer, Netscape, Mozilla Firefox, Chrome, AOL, Opera, etc.), Anti-virus software, E-mail software, Plug-In software (Real Audio Music Player, Macromedia Flash Player, Windows Media Player, Apple Quick Time, Java Virtual Machine, etc.), stereo speakers, microphone and webcam. Amongst these, some of them are mandatory and some are optional. 14. It stands for Modulator/Demodulator. This may either be internally built in or externally connected. The modem is a device that converts data in binary code used by the computer, to an analog signal that can be transmitted over the telephone network and vice versa. 15. The following are the primary advantages of e-mail: ? It conducts paperless communication of messages quickly. ? It ensures simultaneous transmission of messages to several users. The messages may comprise of pictures, video, film clips, text, animation or even a combination of them. Voice and audio messages can also be transmitted this way. ? The e-mail messages can also be printed, prioritized, forwarded and stored. ? Public bulletin boards can be created in which every member of the organization can post and view messages. This can also be accomplished in the case of shared text messages and application files used widely across computer platforms. ? It allows delivery and receiving of faxes and meetings can also be scheduled through email. 16. The G-mail interface provides the facility for opening of a new account, for which it provides a registration form to be filled up by the user. In accordance with the procedure, the user mentions his personal information, email id and password in the form. Thereafter, he gets registered and obtains an email address. Internet: An Overview NOTES Self-Instructional
Self-Instructional Material 54 Internet: An Overview NOTES 17. The Inbox folder contains all your previous email messages and also enables you to read the new ones. You also have an option of deleting the previous messages or transferring them to some other folders also. 18. File Transfer Protocol (FTP) is based on client/server architecture and is considered as
the standard mechanism provided by TCP/IP for copying a file from one host to another.
It handles both uploading of data (transfer data from a client to a server) and downloading of data (retrieve data from a server to a client). FTP also renders thorough shielding and validation measures to prevent unauthorized approach to data, thereby ensuring more security and observation. 19. FTP helps the user to perform the following operations: ? Connect to a remote host ? Navigate and manipulate the directory structure ? List the files available for transfer ? Define the transfer mode, transfer type and data structure ? Transfer data to or from the remote host ? Disconnect from the remote host 20. The following commands are used to terminate an FTP session: ? quit: Disconnects from the remote host and terminates FTP. Some implementations use the BYE subcommand. ? close: Disconnects from the remote host but leaves the FTP client running. An open command can be issued to establish a new control connection. 21. RRQ packet, WRQ packet, Data packet, ACK packet, Error packet and OACK packet are the six types of packets used by TFTP. 22. The
World Wide Web (
WWW) is a distributed client/server service, in which a client
uses a browser to access a service using a server.

98% **MATCHING BLOCK 97/472** **W**

The World Wide Web is a global hypertext system that was initially developed in 1989 by Tim Berners Lee at the European Laboratory for Particle Physics, CERN, in Switzerland to facilitate an easy way of sharing and editing research documents among a geographically dispersed group of scientists. The WWW has a unique combination of flexibility, portability and user friendly features. 23.

98% **MATCHING BLOCK 98/472** **W**

The World Wide Web is a global hypertext system that was initially developed in 1989 by Tim Berners Lee at the European Laboratory for Particle Physics, CERN, in Switzerland to facilitate an easy way of sharing and editing research documents among a geographically dispersed group of scientists. The WWW has a unique combination of flexibility, portability and user friendly features. 23.

99% **MATCHING BLOCK 99/472** W

Each browser usually consists of three parts: a controller, client protocol and interpreters. The controller receives input from the keyboard or the mouse and uses client programs to access the document. After the document has been accessed, the controller uses one of the interpreters to display the document on screen. 24.

99% **MATCHING BLOCK 100/472** W

Each browser usually consists of three parts: a controller, client protocol and interpreters. The controller receives input from the keyboard or the mouse and uses client programs to access the document. After the document has been accessed, the controller uses one of the interpreters to display the document on screen. 24.

100% **MATCHING BLOCK 101/472** W

A web page normally incorporates the basic information and links to navigate in the websites to which it belongs. Documents in the World Wide Web are classified into three types, namely static, dynamic and active documents. 25.

100% **MATCHING BLOCK 102/472** W

A web page normally incorporates the basic information and links to navigate in the websites to which it belongs. Documents in the World Wide Web are classified into three types, namely static, dynamic and active documents. 25.

The term CGI stands for common gateway interface. A CGI script is a server- side program launched by a web server to generate a dynamic document. It receives encoded information from the remote client (user's browser) via STDIN and environment variables, and it must produce a valid HTTP header and body on STDOUT. CGI is just a protocol, a formal agreement between a web server and a separate program. The server encodes the client's form input data, and the CGI program decodes the form and generates output.
Material 55 26.

100% **MATCHING BLOCK 103/472** W

URL denotes Uniform Resource Locator. It is the address of a document on the World Wide Web. Web browsers enable a person to enter either a known address in the web server or a specific document within that server. Addresses usually begin with http://, ftp://, gopher://, WAIS://, file:// etc. It is not feasible to maintain WWW without using the URLs. 27.

100% **MATCHING BLOCK 104/472** W

URL denotes Uniform Resource Locator. It is the address of a document on the World Wide Web. Web browsers enable a person to enter either a known address in the web server or a specific document within that server. Addresses usually begin with http://, ftp://, gopher://, WAIS://, file:// etc. It is not feasible to maintain WWW without using the URLs. 27.

100% **MATCHING BLOCK 105/472** W

Surfing the Internet entails searching for two types of materials, namely the textual and the non-textual materials.

100% **MATCHING BLOCK 106/472** W

Surfing the Internet entails searching for two types of materials, namely the textual and the non-textual materials.

100% **MATCHING BLOCK 107/472** W

Millions of computers with billions of web pages are hooked to the Internet and are ready to

100% **MATCHING BLOCK 108/472** W

Millions of computers with billions of web pages are hooked to the Internet and are ready to

94% **MATCHING BLOCK 109/472** W

provide information and knowledge pertaining to any subject or topic. To extract information from the Internet, we need to explore the Internet. Surfing the Internet

94% **MATCHING BLOCK 110/472** W

provide information and knowledge pertaining to any subject or topic. To extract information from the Internet, we need to explore the Internet. Surfing the Internet

100% **MATCHING BLOCK 111/472** W

also facilitates access to chat rooms where online discussions or chatting take place. 28.

100% **MATCHING BLOCK 112/472** W

also facilitates access to chat rooms where online discussions or chatting take place. 28.

Search engines are the software that helps in

97% **MATCHING BLOCK 113/472** W

searching the content available on Internet. A search engine is an information retrieval system which is used to access and retrieve information stored in WWW or a computer system attached to the Internet.

97% **MATCHING BLOCK 114/472** W

searching the content available on Internet. A search engine is an information retrieval system which is used to access and retrieve information stored in WWW or a computer system attached to the Internet.

These

100% **MATCHING BLOCK 115/472** W

are the interface to a group of contents, which allow the users to type in the keywords, so that the engine can find several matching contents to the corresponding keywords out of millions of web pages.

100% **MATCHING BLOCK 116/472** W

are the interface to a group of contents, which allow the users to type in the keywords, so that the engine can find several matching contents to the corresponding keywords out of millions of web pages.

100% **MATCHING BLOCK 117/472** W

Search engines also help minimize the time required to find the relevant information on the computer system. 29.

100% **MATCHING BLOCK 118/472** W

Search engines also help minimize the time required to find the relevant information on the computer system. 29.

100% **MATCHING BLOCK 119/472** W

Uploading refers to sending of data from a local system to a remote system like a server to keep a copy of the data there for various purposes. Downloading refers to retrieving of data from a remote system to a local system.

100% **MATCHING BLOCK 120/472** W

Uploading refers to sending of data from a local system to a remote system like a server to keep a copy of the data there for various purposes. Downloading refers to retrieving of data from a remote system to a local system.

Internet: An Overview NOTES 1.15 QUESTIONS AND EXERCISES Multiple Choice Questions 1. The widespread impact of Internet across the globe could not be possible without the development of: (a) WWW (b) Web browser (c) Web site (d) TCP/IP 2. The networks connect users to the Internet using special devices that are called: (a) Browsers (b) Gateways (c) Modem (d) Server 3. The client required for validating and testing of Gopher publishing service is: (a) Archie (b) Telnet (c) Gopher (d) Finger 4. The reason behind the evolution of Java programming language is to develop: (a) Distributed application (b) Internet application Self-Instructional
Self-Instructional Material 56 Internet: An Overview NOTES (c) Server application (d) Search application 5.
The Telnet client translates characters received from the local terminal into the NVT form and delivers them to the: (
a) Network (b) User (c) System (d) LAN 6. An NVT is an imaginary device with a basic structure common to a wide range of real: (a) Commands (b) Protocols (c) Terminals (d) Devices 7. An account with a service provider is essential to create a link between the user's computer and the Internet and is popularly referred to as: (a) DSL (b) ISDN (c) IPS (d) ISP 8. The body of the e-mail message is the actual message that has to be: (a) Received (b) Sent (c) Erased (d) Removed 9. When a message is sent from the source user, it reaches the recipient's: (a) Server (b) Address (c) Mail box (d) None of the above 10. The GMail interface provides the facility for opening of a new account, for which it provides a registration form to be filled up by the: (a) User (b) Client (c) Administrator (d) All of the above 11. FTP enforces two types of connections in managing data transfers over a network protocol, namely: (a) Server connection and data connection (b) Control connection and data connection (c) Internet connection and data connection (d) Network connection and data connection
Material 57 12. The distributed client–server service is termed as: (a) Web server (b) Web site (c) Internet (d) World wide web 13.

100% **MATCHING BLOCK 121/472** W

Once the user gets connected with the web server, the web browsers select the hypertext in an HTML document and send a request to open a: (

100% **MATCHING BLOCK 122/472** W

Once the user gets connected with the web server, the web browsers select the hypertext in an HTML document and send a request to open a: (

a) Web page (b) Web site (c) URL (d) Link 14.

100% MATCHING BLOCK 123/472 W

Some search engines attempt to enhance the search queries to provide a quality set of items through a process known as: (

100% MATCHING BLOCK 124/472 W

Some search engines attempt to enhance the search queries to provide a quality set of items through a process known as: (

a) Query expansion (b) Query syntax (c) Query information (d) Query search 15.

100% MATCHING BLOCK 125/472 W

Uploading refers to sending of data from a local system to a: (

100% MATCHING BLOCK 126/472 W

Uploading refers to sending of data from a local system to a: (

a) User system (b) Network system (c) Client system (d) Remote system Answers: 1. (d), 2. (b), 3. (c), 4. (a), 5. (a), 6. (c), 7. (d), 8. (b), 9. (c), 10. (a), 11. (b), 12 (d), 13 (c), 14 (a), 15 (d) Fill in the Blanks 1. Internetworking is a scheme for interconnecting of dissimilar technologies. 2. ARPAnet was basically a network based on leased lines connected by special switching nodes, known as . 3. exchanges information and acts as global link between small regional networks. 4. The __ protocol supports client/server software that searches files on the Internet. 5. Telnet is a general-purpose client/server based application program that enables the connection to be established to a . 6. Network virtual terminal provides a local . 7. Telnet provides the capability of running servers and promotes remote network operations as well. 8. The is a device that converts data in binary code used by the computer, to an analog signal that can be transmitted over the telephone network and vice versa. 9. The e-mail messages are delivered , even if they are sent to remote locations worldwide. Internet: An Overview NOTES Self-Instructional
58 Material Internet: An Overview NOTES Self-Instructional 10. FTP renders thorough shielding and validation measures to prevent approach to data, thereby ensuring more security and observation. 11. TFTP is an insecure because it has no provisions for user authentication. 12.

100% MATCHING BLOCK 127/472 W

Web browsers are HTTP client software programs that run on TCP/IP client computers to access web documents on . 13.

100% MATCHING BLOCK 128/472 W

Web browsers are HTTP client software programs that run on TCP/IP client computers to access web documents on . 13.

A script is a server-side program launched by a web server to generate a dynamic document. 14.

92% MATCHING BLOCK 129/472 W

Uniform resource locator is the of a document on the World Wide Web. 15.

92% MATCHING BLOCK 130/472 W

Uniform resource locator is the of a document on the World Wide Web. 15.

92% MATCHING BLOCK 131/472 W

Search engines are the that enable searching of the content available on Internet.

92% MATCHING BLOCK 132/472 W

Search engines are the that enable searching of the content available on Internet.

Answers: 1. Multiple networks, 2. Internet Message Processors, 3. Internet, 4. Gopher, 5. Remote system, 6. Echo function, 7. Remotely, 8. Modem, 9. Instantly, 10. Unauthorized, 11. Protocol, 12. Web servers, 13. CGI, 14. Address, 15. Software State Whether TRUE or FALSE 1. The Information Technology revolution could not have been achieved without this boundless chain of networks. 2. Internetworking is a scheme for interconnecting multiple networks of dissimilar technologies. 3. The Gopher protocol does not support the client–server software that searches files on the Internet. 4. Each host maps its own terminal characteristics to those of an NVT and assumes that every other host will do the same. 5. The Telnet client translates characters sent from the remote terminal into the NVT form and receives them on the network. 6. Telnet provides the user with a common login facility which enables the user to login through a local computer to the host server. 7. The Telnet is used to access remote computer networks. 8. Virtual terminals emulate a wide range of terminals, which reside in large or complex networks. 9. Surfing the Internet is quite similar to scuba diving, with regard to the simple and easy equipments deployed to access Internet. 10. WiFi networks are also used to provide Internet connections. 11. In accordance with the procedure, the user mentions his personal information, e-mail id and password in the form. 12. The procedure of reading and writing an e-mail is very sophisticated. 13. An attachment can also be appended to the email message before sending it. 14. A website usually contains a single page which is replete with few kinds of information about few specific topics. 15. To extract information from the Internet, it has to be explored. Answers: 1.
True, 2. True, 3. False, 4. True, 5. False, 6. False, 7. True, 8. True, 9. False, 10. True, 11. True, 12. False, 13. True, 14. False, 15. True
Self-Instructional Material 59 Match Column A with Column B Column A Column B 1. Transmission Control Protocol/Internet Protocol suite is developed specifically for the A Mail box. 2. The large networks that exist primarily to interconnect other networks are called B Line-buffered mode. 3. Internet exchanges information and acts as global link between small C Web server. 4. Java introduced the remote method invocation technique to implement D Internet. 5. In Telnet protocol, there is a standardized interface for interaction between a Telnet client and the E Computer storage. 6. The network virtual terminal is a half-duplex device operating in a F HTML basics. 7. When a message is sent from the source user, it reaches the recipient's G Backbones. 8. Cc signifies the email address/(s) of the recipient/(s) to whom a carbon copy of the message is to be H Regional networks. 9. The major characteristic of FTP is that it renders reliable end-to-end connections by using TCP as a I Dynamic documents. 10.

93% MATCHING BLOCK 133/472 W

The World Wide Web is a global hypertext system that was initially developed in 1989 by

93% MATCHING BLOCK 134/472 W

The World Wide Web is a global hypertext system that was initially developed in 1989 by

J Internet. 11. Common gateway interface is a technology that creates and handles K Transmitted. 12.

100% MATCHING BLOCK 135/472 W

webpage can be defined as a single hypertext document written in Hypertext Markup Language (HTML) and described in

100% MATCHING BLOCK 136/472 W

webpage can be defined as a single hypertext document written in Hypertext Markup Language (HTML) and described in

L Tim Berners Lee. 13.

100% MATCHING BLOCK 137/472 W

The first part of the URL that comes before the two slashes specifies the method of access or protocol being followed for communications between the browser and the

100% MATCHING BLOCK 138/472 W

The first part of the URL that comes before the two slashes specifies the method of access or protocol being followed for communications between the browser and the

M Distributed application. 14.

100% MATCHING BLOCK 139/472 W

To extract information from the Internet, we need to explore the

100% MATCHING BLOCK 140/472 W

To extract information from the Internet, we need to explore the

N Telnet server. 15. The advantage of indexing is that it calls for a smaller amount of O Transport protocol. Answers: 1. (D), 2. (G), 3. (H), 4. (M), 5. (N), 6. (B), 7. (A), 8. (K), 9. (O), 10. (L), 11. (I), 12. (F), 13. (C), 14. (J), 15. (E) Short-Answer Questions 1. What is Internet? 2. What is APRAnet? Mention the advantages of ARPAnet. 3. List the widely used Internet services. 4. Why are Gopher and Finger services used? 5. What is the significance of Telnet protocol? 6. Why is network virtual terminal used? 7. What is Modem? 8. List and define any two prime requisites of an Internet connection. 9. Write a short note on plug-in software. Internet: An Overview NOTES

60 Material Internet: An Overview NOTES Self-Instructional 10. List any four advantages of e-mail. 11. What is file transfer protocol? 12. What is the usage of TFTP? 13. What do you understand by a Web browser? 14. How CGI scripts work? 15. Distinguish between client-side scripting and server-side scripting. 16. Briefly define the Active documents. 17. What is the importance of URL? 18. Why is Internet surfing done? 19. List any two types of search engines along with their salient features. 20. What is uploading? Long-Answer Questions 1. Explain the importance and significance of Internet. How is the standard of Internetworking developed? 2. Describe the various types of Internet services. 3. What is Telnet? Describe the basic concepts on which Telnet protocols is based? 4. What is the significance of network virtual terminal? What are its basic characteristics and mode of operation? 5. Explain the various hardware and software required for an Internet connection. 6. What is the significance of e-mail? Elucidate the procedure of opening an e-mail account. 7. Elaborate upon the procedure of reading and writing an e-mail message. 8. Describe the connection types used in file transfer protocol and their significance. 9. Explain the various operations performed using FTP. 10. When is trivial file transfer protocol used? Explain its advantages over traditional FTP. 11. Discuss about the trivial file transfer protocol packets and messages. 12. Explain the importance and architecture of World Wide Web. 13. What is the significance of web browser, web server, HTML, HTTP and URL in World Wide Web? 14. Discuss the working of World Wide Web. 15. Explain the various types of web documents. 16. What is common gateway interface? How it helps in programming and interaction process? 17. What is the importance and use of a web page? 18. Explain the functioning of the URL and give some examples of it. How is URL encoding done? 19. Describe the procedure of surfing the Internet. 20. Why are search engines used? Describe its type and characteristics. 21. Write short note on uploading and downloading.
Self-Instructional Material 61 1.16 FURTHER READING Black, Utyless D. Computer Networks. USA: Prentice-Hall. 1993. Stallings, W. Data and Computer Communications. New Delhi: Prentice-Hall of India. 1997. Tanenbaum, Andrew S. Computer Networks. USA: Prentice-Hall 2002. Duckett, Jon. Beginning Web programming with HTML, XHTML, and CSS. New York: Wiley, 2004. Hilzner, Steven. HTML Black Book. New Delhi: Dreamtech Press, 2000. Zhi-Hua Zhous & Shaowu Liu (2021) Machine learning 1.17 LEARNING OUTCOMES ? Understand the functioning of Telnet? ? The equipments required for an Internet connection? ? Understand the concept and significance of e-mail? ? Open an e-mail account? ? Read and send an e-mail? ? The importance of file transfer protocol? ? Understand the importance of the World Wide Web? ? Understand the functioning of a Web page? ? Understand the concept of uniform resource locator and its encoding? ? Do Internet surfing? Internet: An Overview NOTES
Material 63 UNIT 2 WEB BROWSERS Structure 2.0 Introduction 2.1 Unit Objectives 2.2 Web Browsers: Basics 2.2.1 Components of a Web Browser (Browser Architecture) 2.2.2 Functions and Working Principle of Web Browsers 2.2.3

100% **MATCHING BLOCK 141/472** W

Anatomy of a Web Browser: The Toolbar 2.2.4 The Access Indicator 2.2.5

100% **MATCHING BLOCK 142/472** W

Anatomy of a Web Browser: The Toolbar 2.2.4 The Access Indicator 2.2.5

Technologies Used in the Working of Web Browsers 2.3 Plug-Ins And Helper Applications 2.4 Conceptual Architecture of Typical Web Browsers 2.4.1 Hypertext Markup Language (HTML) 2.4.2 Adding Content to Home Page 2.4.3 URL 2.4.4 Quirk Mode and HTML 2.4.5 HTTP 2.4.6 Extended Architecture of Web Browser 2.4.7 Common Gateway Interface (CGI) 2.4.8 Java 2.4.9 Mozilla 2.5 Summary 2.6 Key Terms 2.7 Answers to 'Check Your Progress' 2.8 Questions and Exercises 2.9 Further Reading 2.10 Learning Outcomes Web Browsers NOTES 1.0

95% **MATCHING BLOCK 143/472** W

INTRODUCTION In this unit, you will learn about basics of the

95% **MATCHING BLOCK 144/472** W

INTRODUCTION In this unit, you will learn about basics of the

web browser. A web browser is a software that interprets the coding language of the World Wide Web in graphic form. It also displays the translation rather than the coding. It allows users to 'browse or surf the web'. If you search the information through the browser it provides you the complete list of requested information. You will be able to navigate and switch between various linked pages. But you should be bypassing the surfing techniques. The role of keyword is very important in web surfing because keyword tags contains words and phrases the creator of the page considers to be relevant to the document. The words are separated by commas or spaces
or '+' sign. The documents and information available across World Wide Web are written in HTML and can be viewed with the help of required software other than a web browser. You will also learn that browsers are helpful in transfering the various types of files, such as sound files, image files, etc. 2.1

90% **MATCHING BLOCK 145/472** W

UNIT OBJECTIVES After going through this unit, you will be able to: ? Know the basics of

90% **MATCHING BLOCK 146/472** W

UNIT OBJECTIVES After going through this unit, you will be able to: ? Know the basics of

web browser ? Understand the functioning and working principle of web browsers ? Describe the technologies used in the working of web browsers Self-Instructional
Self-Instructional Material 64 Web Browsers NOTES ? Understand the significance of FTP, RTSP, HTTPS, firewalls, etc.? ? Know the fast Internet surfing? ? Create the home page for your web site? ? Understand the techniques of plug-ins and helper applications? ? Describe the conceptual architecture of web browsers? ? Understand the linear media, hypermedia, HTTP, CGI? ? Know the concept of Mozilla Firefox, FireFTP, configuration of FireFTP and FireFTP plug-in? 2.2 WEB BROWSERS: BASICS A browser is a software which your computer uses to view WWW documents and access the Internet. The browser program residing in your computer provides you with the facilities like text formatting, hypertext links, images, sounds, motion and other features. Internet Explorer and Netscape are considered the most widely used browsers. Browsers have sub programs called plug-ins to handle the documents found on the web. It may also have other plug-ins stored elsewhere in the computer. Web browsers are used to interpret special hypertext pages consisting of the hypertext mark up language (HTML) and JavaScript so that they can be displayed in the given format. Some of the widely used web browsers are Internet Explorer, Netscape Navigator, Mozilla Firefox, Google Chrome, Lynx, Opera, Apple's Safari, etc. 2.2.1 Components of a Web Browser (Browser Architecture) A web browser comprises of three parts. These are controllers, client programs and interpreters. ? Controller: The controller obtains input from the keyboard or the mouse to access web pages with the help of a client program. After accessing the web pages,

100% **MATCHING BLOCK 147/472** W

the controller uses one of the interpreters to display the

100% **MATCHING BLOCK 148/472** W

the controller uses one of the interpreters to display the

web pages on the host screen. ?
Client
Programs: These are used to establish TCP sessions with the web server or the proxy server. To accomplish this task, the client programs make use of HTTP, FTP, Gopher or Telnet. ? Interpreters: These are used to display the web pages on the web user's screen. The interpreters which are used to translate web pages on the client's screen are HTML, CGI and JAVA. Such interpreters depend on the type of document. The HTML, which is a markup language and which allows the browser to change the format of the web pages, is used for scripting web pages. The HTML also helps store instructions along
with the text, so that any browser can read the instructions and format the text according to the

respective host machine. 2.2.2 Functions and Working Principle of Web Browsers Aweb browser is considered to be a client software program using HTTP. It is supported by a TCP/IP client accessing the web documents on web servers. The browser program basically retrieves hypertext pages that provide advanced features of the web, such as virtual memory, memory caching, etc. Browsers support the transfer of the hypertext document, for example, playing sound files, transferring images and implementing the interactive programs, etc. The following figure illustrates the structure of a web browser:
Material 65 Fig. 2.1 Architecture of a Web Browser
Each browser

95% **MATCHING BLOCK 149/472** W

consists of three parts, a controller, client protocol and interpreters. The controller receives input from input devices, such as keyboard, mouse, etc. It uses client programs to access the web pages. After the document has been accessed, the controller uses one of the interpreters to display the document on screen.

95% **MATCHING BLOCK 150/472** W

consists of three parts, a controller, client protocol and interpreters. The controller receives input from input devices, such as keyboard, mouse, etc. It uses client programs to access the web pages. After the document has been accessed, the controller uses one of the interpreters to display the document on screen.

The
following figure lists the popular web browsers that are used by users' world over, as follows: Fig. 2.2 Popular Web Browsers 2.2.3

100% **MATCHING BLOCK 151/472** W

Anatomy of a Web Browser: The Toolbar The various toolbars that are structured in browsers make up the anatomy of a web browser.

100% **MATCHING BLOCK 152/472** W

Anatomy of a Web Browser: The Toolbar The various toolbars that are structured in browsers make up the anatomy of a web browser.

Download Speed: The download speed is measured by various web protocols in which Internet Protocol (IP) is frequently required. The Internet Protocol (IP), also known as web protocol, is one of the most dominant protocols, such as TCP/IP protocol located at the network layer. The network layer is used to deliver the data packets. These data packets are safely sent from source location to destination location between devices or networks. They are sometimes interconnected with arbitrary way in the internetwork. Internet protocol is used for sending and communicating data from one device to another on TCP/IP networks. The primary job of IP protocol is to deliver datagrams across an Web Browsers NOTES Self-Instructional

Self-Instructional Material 66 Web Browsers NOTES internetwork of connected networks. The packet of data passed across a network is known as datagram. Internet Protocol has proved to be a boon in incalculable ways. Of course, it has served the industry in manifold ways to accomplish the task because of its unsurpassed characteristics. The total size of a webpage should be no more than 40 to 60 kilobytes. The distinguishing attributes of IP is known as follows: Universally addressed: The data is sent from point A to point B is to be considered as internetworking connection, but the configured devices are able to communicate a different device as point B. The addressing mechanism shows the list of web protocols as follows: Underlying protocol independent: Internet protocol permits the transmission of data crossing to underlie network with TCP/IP stack. It investigates the lower-level protocols, such as IEEE 802.11 or Ethernet. Special data link protocols and Serial Line Internet Protocol (SLIP) were designed to interact with Internet Protocol. For example, the fragment large block of data matches with the physical networks so that the recipient rebuilds the connection as needed. Delivered connectionless: Internet protocol refers to connectionless protocol. It explains that if A sends data to B, the connection is not made directly to B. It sends data to make the datagram and then sends the data. Delivered unreliably: Internet protocol is known as unreliable protocol because if datagram are sent from device A to device B, A sends each data as packet and then moves to the next. IP does not maintain the tracks of earlier sent data. It even does not provide service quality or reliability, such as error protection for sending data, retransmitting data of lost datagram and flow control. Thus, IP is known as best-effort protocol. It makes 'no guarantee' where exactly data would be delivered. Delivered without acknowledgements: Internet protocol does not acknowledge to deliver the required data to the source. If device B receives datagram from device A, it does not add acknowledgement that tells A if the datagram is received. The question about the efficiency of datagram always comes with this mechanism. The list of web protocols is as follows:

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The back button takes you the previous page, the forward button returns you the page from where you went back, home button takes you the home page of the specified web site, stop button stops the browser to load the current page and the print button lets Material 67 you print a copy of the web page. The toolbars are available in the web browser is described as follows: Back button: This is shown by an arrow that points to left. Clicking on it brings you back to the previous web page you had visited. Forward button: This is shown by an arrow pointing to the right. Clicking on it returns you to the page from where you just came. Home button: This button is recognized by the icon of home in Mozilla and Internet explorer and clicking on it takes you to the

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The back button takes you the previous page, the forward button returns you the page from where you went back, home button takes you the home page of the specified web site, stop button stops the browser to load the current page and the print button lets Material 67 you print a copy of the web page. The toolbars are available in the web browser is described as follows: Back button: This is shown by an arrow that points to left. Clicking on it brings you back to the previous web page you had visited. Forward button: This is shown by an arrow pointing to the right. Clicking on it returns you to the page from where you just came. Home button: This button is recognized by the icon of home in Mozilla and Internet explorer and clicking on it takes you to the

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home page you have chosen. If no home page is selected by you

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home page you have chosen. If no home page is selected by you

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it would bring you to a default home page that is normally a website of Google, Microsoft or Netscape. Reload or Refresh button: This loads the web page once again. This is normally done when all elements of a web page are not loaded in the first attempt and file transfer gets interrupted. Also, while downloading a web page, data is temporarily stored in computer memory and it is told that 'data is cached'. On accessing this web page next time, the web browser accesses it from cache instead of requesting the web server for retrieving this file. There are certain web pages that are updated frequently, as with scores of sport events, financial data or news. In such cases you do not get current information, but by reloading it, data gets updated from the web server. Print button: Clicking on it enables you to have a hard copy of current page that is loaded in the browser. Stop button: This button is used to stop the browser from loading the current page. Search button: This button provides connection to search tools and directories of the websites of Google, Microsoft or Netscape. Bookmarks or Favorites button: Internet explorer shows Favorites button whereas Mozilla and Netscape shows Bookmarks. This enables you to record addresses of websites for revisiting. On adding a URL in your list, you may come back to that web page by just clicking the link in the list that you have made and you need not retype entire address. Address Bar: This is situated either next to the toolbar or above it.

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it would bring you to a default home page that is normally a website of Google, Microsoft or Netscape. Reload or Refresh button: This loads the web page once again. This is normally done when all elements of a web page are not loaded in the first attempt and file transfer gets interrupted. Also, while downloading a web page, data is temporarily stored in computer memory and it is told that 'data is cached'. On accessing this web page next time, the web browser accesses it from cache instead of requesting the web server for retrieving this file. There are certain web pages that are updated frequently, as with scores of sport events, financial data or news. In such cases you do not get current information, but by reloading it, data gets updated from the web server. Print button: Clicking on it enables you to have a hard copy of current page that is loaded in the browser. Stop button: This button is used to stop the browser from loading the current page. Search button: This button provides connection to search tools and directories of the websites of Google, Microsoft or Netscape. Bookmarks or Favorites button: Internet explorer shows Favorites button whereas Mozilla and Netscape shows Bookmarks. This enables you to record addresses of websites for revisiting. On adding a URL in your list, you may come back to that web page by just clicking the link in the list that you have made and you need not retype entire address. Address Bar: This is situated either next to the toolbar or above it.

There is a long box where user has to

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type URL or address of the website to visit. After entering the address here, hit the Enter or Return key for accessing the site. Alternatively make a click on 'Go' or an Arrow button situated towards the right of address box. By making click on the small downward triangle towards the right of Location box, a drop-down list appears showing most recent websites visited by you. This helps you in revisiting a site and you can select the address instead of typing it. Fig. 2.3 Various Buttons in

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type URL or address of the website to visit. After entering the address here, hit the Enter or Return key for accessing the site. Alternatively make a click on 'Go' or an Arrow button situated towards the right of address box. By making click on the small downward triangle towards the right of Location box, a drop-down list appears showing most recent websites visited by you. This helps you in revisiting a site and you can select the address instead of typing it. Fig. 2.3 Various Buttons in

IE Browser Web Browsers NOTES Self-Instructional
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The Menu Bar: This is located at the top of browser window. This enables you to select things with a web page. You may save the web page on your hard disk or may like to increase the text size on the page. Most of these choices are same as buttons on the toolbar. Click once on a menu item for accessing the drop-down menu, then select and click to perform action as desired. For example, clicking on File menu shows a dropdown menu from which Save As option appears. You may save the web page on your hard disk by choosing a location with default file name given by the browser or may choose a name as desired by you. File menu is used to save the web page, import or export the files too. 2.2.4 The Access Indicator Internet Explorer or Mozilla Firefox, contain small graphics for indicating the activity of the browser. Animation of this image indicates that the browser software as a client is attempting to access data from a server that is a remote computer. Access Indicator: A server may be located at any remote location, maybe a city in your country or may be in another country or even another continent. The browser can download files from a remote computer to your computer and can also display these on your computer screen. Time taken by this process depends on many factors; speed of net connection, file size, load on the server and traffic on the Internet. The Status Bar: This is situated at the bottom of the web browser. Once you try to access a website this bar shows the progress on transactions in the web page. For example, when you type the address of the site you are trying to visit, status bar shows whether the

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The Menu Bar: This is located at the top of browser window. This enables you to select things with a web page. You may save the web page on your hard disk or may like to increase the text size on the page. Most of these choices are same as buttons on the toolbar. Click once on a menu item for accessing the drop-down menu, then select and click to perform action as desired. For example, clicking on File menu shows a dropdown menu from which Save As option appears. You may save the web page on your hard disk by choosing a location with default file name given by the browser or may choose a name as desired by you. File menu is used to save the web page, import or export the files too. 2.2.4 The Access Indicator Internet Explorer or Mozilla Firefox, contain small graphics for indicating the activity of the browser. Animation of this image indicates that the browser software as a client is attempting to access data from a server that is a remote computer. Access Indicator: A server may be located at any remote location, maybe a city in your country or may be in another country or even another continent. The browser can download files from a remote computer to your computer and can also display these on your computer screen. Time taken by this process depends on many factors; speed of net connection, file size, load on the server and traffic on the Internet. The Status Bar: This is situated at the bottom of the web browser. Once you try to access a website this bar shows the progress on transactions in the web page. For example, when you type the address of the site you are trying to visit, status bar shows whether the

web site

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has been found along with number as well as size of files that are being downloaded. Self-Instructional The Scroll Bar: There is a vertical or horizontal bar located towards the bottom side and right side of the browser respectively. Using this you can scroll a web page down

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has been found along with number as well as size of files that are being downloaded. Self-Instructional The Scroll Bar: There is a vertical or horizontal bar located towards the bottom side and right side of the browser respectively. Using this you can scroll a web page down

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and up. To do this, place your pointer on arrows, up or down by using left key of the mouse. You may drag the slider by placing the pointer on slider control and holding down the left key of the mouse. With some mouse there is a scrolling wheel that provides an alternative way to navigate a long web page. In case width of a web page is more and can not fit the computer screen, you will find a horizontal scroll bar just above status bar. This can be used to move web page left or right.

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and up. To do this, place your pointer on arrows, up or down by using left key of the mouse. You may drag the slider by placing the pointer on slider control and holding down the left key of the mouse. With some mouse there is a scrolling wheel that provides an alternative way to navigate a long web page. In case width of a web page is more and can not fit the computer screen, you will find a horizontal scroll bar just above status bar. This can be used to move web page left or right.

Fig. 2.4 Scroll Bars in Web Browser 2.2.5 Technologies Used in the Working of Web Browsers The various technologies, such as, FTP, RTSP, HTTPS, firewalls, etc. used in functioning and working of the web browsers are described below: File Transfer Protocol: Many browsers also support a variety of other protocols, such as FTP, RTSP, HTTPS, etc.
FTP refers to application protocol to exchange the files between computers across net.
It is simplest method to download the upload file from a server, for example, downloading documents or articles from a website. FTP uses TCP/ IP to
transfer data. For this, FTP server and FTP client are required.

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FTP also works on a client/server principle where an FTP client program is used to make a request to an FTP server.

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FTP also works on a client/server principle where an FTP client program is used to make a request to an FTP server.

The files can be stored on computers that are generally referred to as FTP servers. FTP supports programs involved in TCP/IP. In client-server computing, many applications are processed on a computer. The system unit is worked as client-side which can be obtained in application services, such as database services received from various computers. The client-server computing describes the relationship between information and programs. Basically, client-server computingcreates the following queries: ? Uses of multiprogramming and time sharing ? Development of less expensive personal computers ? Collecting centralized resources and storing data representing corporate database Web Browsers NOTES

Self-Instructional Material 70 Web Browsers NOTES ? Uses of ARPANET and need for LANs and Internet ? Uses of communication protocols between computers progressing through globalization. The main computing part is taken as client machine that interacts with user and provides mechanisms to communicate with server, whereas server decides where data is located and how it is computed. The Remote Procedure Call (RPC) is another communicating method used in client-server computing. In this mechanism, client sends an RPC message to a server and server waits to receive the message. The client handles the user interface and translates the desired protocol. It sends then user's request to the server. Then it waits for the server' response. It translates the response into human readable result and presents the result to user, whereas server hears the client's query. The query is sent to be processed. It returns the result back to the client. In essence, the client-server computing supports a total mechanism that facilitates computing task. Fig. 2.5 FTP Client and FTP Server User interface is designed in the system for the users. The developers develop the system to meet the user's need and also something that it easy to use for users. UI is designed in terms of users to interact with the system for a specific device, machines and computer programs. The command line interface is to be considered as a less user-friendly interface. Users are asked to issue the commands at command prompt. A set of commands are inputted via the keyboard. This user interface is known as Command Line Interface (CLI). In the era of Windows operating system, the command line interface is accessed by typing the command cmd at run prompt. The FTP is used as a command line interface. For example, a commercial program provides GUI features at Window's DOS prompt. The Windows OS contains shell as graphical user interface (GUI) in Microsoft Windows. The Windows shell contains windows components, for example, Start menu and taskbar. The first home GUI computer was the Apple Mac released in 1984. The OS manages the resources in a system unit, such as disk drive, internal memory, mouse printers and network connections. The OS along with GUI is known as WIMP (Windows, Icons, Menus and Pointers) interfaces. The designers of OS keeps command shell for restricted uses, such as checking the system files and ping the workstations to find the network connectivity. A command shell is not a good user interface for frequent users. Internet Control Connection Data Connection FTP Client FTP Server

Self-Instructional Material 71 Fig. 2.6 FTP Commands at MS-DOS Prompt Using FTP you can update files on a server. Web browser makes FTP requests and is able to download pages/programs that have been requested. For this, you need to login on FTP server. The files are easily available because of anonymous FTP. Fig. 2.7 Login to FTP Server File transfer protocol is a prime Internet service that acts as protocol and transfers files over TCP/IP network (Internet, UNIT, etc.). FTP tasks can be performed through a browser. For example, type on IE as follows instead of normal web page URL: ftp://YourLoginName@IPaddress The required steps used in connecting with FTP operations are as follows: Step 1: To make a connection from local machine to remote machine you need to type the following command syntax: Web Browsers NOTES

Self-Instructional Material 72 Web Browsers NOTES ftp machinename In the above syntax, machinename keeps the name of remote machine, i.e., aaa.cs.state.edu. Step 2: If system/machine name is unknown, the following command line is to be opted: ftp machinenumber In the above syntax, machinenumber keeps the IP address of the remote machine, for example 129.15.0.11. FTP responds to the user to enter user name and password, if remote machine has successfully been reached. The anonymous ftp is used widely in these days. Most computer systems use anonymous FTP to send and receive files. The anonymous FTP servers keep the software, documents/files that are used to configure the networking system. The server is able to transmit the graphic images, song lyrics and all sorts of other information. E-mail lists are also archived through anonymous FTP. E-mail is the prime Internet service that facilitates services to people or users across the world, for example, FTP sites keeps electronic address and helps to exchange the mail. A web site is launched using a File Protocol Program (FPP). The owner of web site

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must instruct the web designer and system analysts to implement FTP for the

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must instruct the web designer and system analysts to implement FTP for the

web site.

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The two ports, port 20 and port 21 are used by FTP.

The two ports, port 20 and port 21 are used by FTP.

ftp<put image_file.jpg You can use the above command if you want to download an image file from the remote computer to the local computer. Real-time Streaming Protocol (RTSP) The Real-time Streaming Protocol allows controlling multimedia streams delivered through RTP. Control includes absolute positioning within the media stream, recording and possibly device control. It is a client-server multimedia presentation control protocol. RTSP is designed to leverage existing web infrastructure such as inheriting authentication and PICS from HTTP and works well both for large audiences as well as single-viewer media-on-demand. RTSP supports the following features: ? RTP packets can stream over UDP or over TCP. If the client can tolerate packet loss, streaming over UDP can be more efficient than TCP because UDP does not incur the overhead of retransmitting lost packets. ? The encapsulation of Advanced Streaming Format (ASF) packets in RTP is proprietary. ? The description of the ASF file, called ASF encapsulated in SDP, is proprietary. ? Warehouse Management System (WMS) supports retransmission of lost RTP packets sent over UDP. This behavior allows a client to give up on expired RTP packets, which in turn help the client, avoid falling behind after losing packets. ? WMS supports a Forward Error Correction (FEC) scheme for RTP packets. ? Streaming with RTSP fails if a firewall separates the client and server, and the firewall blocks the ports and protocols that RTSP uses. This problem is especially common with home Internet gateways. Even if the gateway has a built-in RTSP NAT, streaming might fail at times.
Self-Instructional Material 73 ? RTSP has the overhead of requiring multiple requests before playback can begin. However, the client can pipeline many of these requests and send them over a single TCP connection, in which case WMP does not need to block waiting for a response. Hypertext Transfer Protocol over Secure Socket Layer (HTTPS) HTTPS is an SSL encrypted version of HTTP, which is used to indicate a secure HTTP connection. You must be aware of the concept of security features, such as CRC, digital signature, SSL, HTTPS, private and public key, etc., which are used in data transmission. The client initiates an HTTP request for an SSL tunnel either via a hook in HTTP or by calling HTTPS directly. The cache can then issue a CONNECT method using https:// URL to tunnel SSL over HTTP. By default, SSL uses a number of ports including 443, 643, 1443 and 2443. HTTPS supports digital signature for authenticating the message. Digital signature (DS) follows
authentication mechanism. A code is attached with messages in DS. Primarily, the signature is generated by hashing the message and then later this message is encrypted with the sender's private key. DS is based on public key encryption. A signature confirms that integrity and source of
the
message is correct. NIST (National Institute of Standards and Technology) recognized the DSS standard that basically uses the secure hash algorithm (SHA). Message authentication protects digital signature because in that mechanism messages are exchanged
by
the third-party. DS is analogous to manual signature. The characteristics of DS are as follows: ? It attaches date and time along with
the
author of the signature. ? It authenticates the contents when signature
is
being completed. ? It solves the disputes using third-party. ? It ensures that message is not altered. The message can be electronic documents, such as email, text file, spreadsheet, etc. A person or information is authenticated on the computer by
using various techniques. Brief descriptions of these techniques are as follows: Password User name and password provides authentication. If a
user logs on the system unit or application, user name and password will be asked for checking authentication. Generally the
following type of password authentication is provided to user in which two prime fields, such as 'User Name and Password' are required to access the system: If two requirements are not matched, users are not allowed to access the system. Web Browsers NOTES
Self-Instructional Material 74 Web Browsers NOTES
Checksum The checksums provide a form of authentication where an invalid checksum is not recognized. If the packet of checksum is one byte long, it will have the maximum value of 255. If the sum of other bytes of the packet is 255 or les than that the checksum contains exact value. But, if the sum of other bytes is more than 255, the checksum is the remainder of total value.

Table 2.1: Checksum Calculation Byte1 Byte2 Byte3 Byte4 Byte5 Byte6 Byte7 Byte8 Total Checksum 212 232 54 135 244 15 179 80 1151 127 In Table 2.1 1151 is divided by 256 that returns remainder 4.496 (round value is taken as 4). Then it is multiplied with 4×256 that equals to 1024. The value 1024 is subtracted 1151 that returns 127. In this way, the total checksum value is calculated. Cyclic Redundancy Check (CRC) The cyclic redundancy check is a technique for detecting errors in digital data, but not for making corrections when errors are detected. CRC is used primarily in data transmission. In the CRC method, a certain number of check bits, often called a checksum, are appended to the message being transmitted. The receiver can determine whether or not the check bits agree with the data, to ascertain with a certain degree of probability whether or not an error occurred in transmission. If an error occurred, the receiver sends a Negative Acknowledgement (NAK) back to the sender, requesting that the message be retransmitted. The process of CRC
is same as checksums. In this method, the polynomial division is determined the value of CRC, which can be equal in length as 16 or 32 bits. The one difference between CRC and
checksum
is that CRC is more accurate. If a single bit is taken as incorrect the CRC value does not match.
A digital signature follows the various operations as follows: Key pair generation: In this process, a public and private key pair is generated. Generation operation: In this process, a signature is produced for a message with private key. Verification operation: In this process, a signature is checked with the public key. Digital signature provides data integrity, signer authenticity, authorization, security, accountability and non-repudiation. These are the mechanisms that frequently associated with signing the digital signature. These mechanisms are interrelated with each other that increase its popularity in transaction of digital cash, e-money transfer across net etc. The properties of digital signature are as follows: ? Digital signature
can not be forged by other persons. ? Once signer signs the document or message, it can not be forged. ? Signer can not replace the sign once message is signed. The concept of digital signature is explained with the help of an example. Assuming there are two people and a message is being sent from one people to other
people. With reference to
Cryptography, person 'A' encrypts the message to person 'B' using public key. The message is signed with person 'A' with secret key. The
Self-Instructional Material 75 Content type Major ver. Minor ver. Compressed length Plaintext (Optionally compressed) MAC (0, 16 or 20 bytes) Encrypted
secret is the code in which the ciphertext can be decoded. Person 'B' decrypts the message with own secret key and then
verifies it with A's
public key. If the code is matched 'B' gets the correct message. The hash coding condenses the message into a 100 to 200 bits range. Signing of hash message is faster than signing a
whole message. The one-way hash function provides that no two messages will have the exactly same value.
The digital signature is taken as document, message, driver or program that is being signed. Then the message is encrypted by the public and or private key. The document or message is signed by using the sender's private key that encrypts the digest. Once message is encrypted, the file cannot be altered by an attacker.
Once signer signs the data is verified. Signing the digital signature is to verify the signing data. Verifying signature confirms if the signed data is altered or not. If digital signature is verified, it can be decrypted by using the public key that produces the original hash value. If the two hash values are matched, the signature is exactly same.
HTTPS basically allows secure e-commerce transactions, such as online banking. This type of transaction is used to authenticate the message. The message authentication code is added to encrypt the SSL record header. The SSLCompressed.type is the higher level protocol used in the fragment. The role of SSL record header is to compress the message that is later used to append the encrypted message. Fig. 2.8 Format of Record Header In the above figure, the record header contains the content type, major and minor version of SSL and compressed length. The compressed length is basically the length (bytes) of the plain text fragment. In client and server computing, the MAC operation is used. For this, the client and server share a secret key that is used to perform the functions of master_secret referring initial random values from both client and server sides. Server authentication: The server authentication is a part of client-server computing. Basically, SSL/TLS is used for authentication. A web server acquires digital certificate from available server using Certification Authority (CA). CA is third party authority that issues digital certificates for authentication. The digital certificate (DC) authenticates the signature that is in fact digitally signed message. The DC uses SSL/ TLS (Secured Socket Layer/Transport Layer Security) in X.509 public key infrastructure that was defined by International Telecommunication Standardization Sector (ITU-T). Web Browsers NOTES

76 Material Server 401 WWW.Authenticate: Basic realm="PurchaseOrder" Get/myapps/servlet/order Authorization: Basic QWxhZGRpbjpvcGVuIHNIc2FtZQ== Base64-encoded "user id:password" Client Get/myapps/servlet/order Web Browsers NOTES Fig. 2.9 Authentication in SSL/TLS In Figure 2.9, if client connects to server using SSL/TLS both client and server follows strong cryptographic algorithm. Then the server sends X.509 certificate that contains the server's public key. In the public key encryption it uses private and public keys. The private key is restricted for the individual systems, whereas public key can be accessed by any system where message would be communicated securely with the individual system. Decoding for encrypted message is possible with public key that is provided by the individual system and its own private key. Basically, the key is based on hash value. The client then generates a 48-byte random number, a premaster secret key after encrypting the number used by the server's public key. The encrypted premaster secret key is sent to the server by client. After getting premaster secret key, the server decrypts the message using the private keys. The private key encryption contains a secret key that is taken as code. This mechanism encrypts a packet of information if it passed across network to the other computer. The private key requires installing the key which is essentially the same as secret code. The code provides the key to decode the message. Then both client-server shares the same premaster secret key which is basically symmetric key used to encrypt the message. Then they start communicating via generated keys. In this mechanism, only server knows the private key which decrypts the encrypted premaster secret key and then clients knows the message after sending the decrypted message by server. It proves that client is talking with correct server. This whole mechanism represents the complete scenario of authenticating the server. Client authentication: In SSL/TSL, client authentication is optional and not required. A client stays anonymous communicating between web server and browser in B2B business transaction. Therefore, they use HTTP authentication methods. Self-Instructional Fig. 2.10 HTTP Authentication Certification Authority Issue Certificates Server Certificate Client Certificate SSL Session Server Private Key Client Private Key

Self-Instructional Material 77 In Figure 2.10 the HTTP authentication known as RFC 2617 represents the HTTP protocol in which client and server communicates between each other via HTTP protocol. It basically considers two factors as userid and password to authenticate the users/ clients. Sometimes, userid might be user's email-id also. Both values are sent to authenticate without encryption and hence they are not considered as secure method of authentication in cryptography. In this mechanism, client sends Base64-encoded userid and password in HTTP header. If data is sent through SSL/TLS connection therefore, it is not altered or stolen during transmission. The malicious server can not disguise itself as genuine web server and also not steal the password of user. For client authentication, SSL/TLS certificate is used to obtain an appropriate digital certificate before connecting to the server. A client generates the private key/public key pair to obtain the client certificate. The private key is kept as secret key and protected by passphrase. The passphrase works as password with added security. It is a sequence of word to control access to the system. The application does not maintain the database of userid and password. It verifies the certificate that is signed by trusted CA. Application A Web Browsers NOTES Fig. 2.11 Uses of Client Certificates The above figure shows the complete scenario of using client certificates. Let us take an example: the customer manages ten passwords in which company 'XXX' uses a specific password to access the system and company 'YYY' uses the service. Once certificate-based authentications are used by applications 'A', 'B' and 'C', the company issues CA where company trusts on legitimate user. In this way, client certificates are used to authenticate the message. Firewall When using a web browser behind the firewall, access to URLs and references to non- standard ports, such as port 8080 does not work. Only access to URLs and references on port 80 will be available by default. To handle requests to non-standard ports, users can configure their browsers to use the firewall as their proxy. An automatic proxy configuration file provides one location where changes can be centralized and users simply point their web browsers to this file.

Firewall software is considered an effective means to protect the Internet from malfunctions and networked-based security threats.

Trust Application C Certification Authority Certificate Application B

Self-Instructional Material 78 ?? This was requested by a computer on the home network, deliver it Web Browsers NOTES Information and services are essentially required for the organizations. Internet connectivity uses dialup capability and installed with the system unit to the Internet service provider. Connections network requires various types of software as well as operating systems. Firewall is inserted between Internet and Internet-based attacks that provide a single choke point in which all other malfunctions are tracked.

The characteristics of firewall are as follows: ? All Internet traffic must be passed via firewall. ? Only authorized traffic is to be allowed to pass. ? It itself is to be immune. ? It filters traffic with the help of allotted IP address and also takes help of TCP port number. ? It hosts the server software, such as web or mail service. ? It monitors security-related events. ? It provides a platform for IPSec that includes a network address translator, audits

and alarms. The limitations of firewall are as follows: ? Some of the complex types of attacks are not protected by firewalls. ? It can not protect virus-infected programs and not is able to scan incoming files, messages for viruses, emails, etc. ? It does not protect against threats. Stateful Packet Inspection Firewall Cnn.com This was not requested by a computer on the home network, drop it Hacker Here's the Web file transfer you asked for Fig. 2.12 Firewall Connection After mapping the required page, the firewall scrutinizes whether the requested page comes from a secure network or not. Firewall allows the requested documents or pages via home network. If a hacker tries to interrupt on the Internet services to send the message, you can get the information that request has not been processed. The red highlighted series of events shows that firewall blocks the message because such type of request does not occur. In fact, this time message has been sent via hacker. The firewall consists of two systems, known as a bastion-host and a packet filtering router. Bastion-host is needed for authenticating services and performing Here's the Web Page you asked for Request a Web Page Home Computer

Self-Instructional Material 79 proxy functions. The configuration of firewall is assembled between two packet- filtering routers. In this setting, one approach comes between the bastion-host and the Internetwork. This configuration is set with an isolated subnetwork, which provides three levels of defence to thwart intruders. Fast Internet connection is provided by cable connection or fast DSL connection always connected with firewall services. It provides basic security issues and protect from malicious programs and hackers. Fig. 2.13 Internal and External Firewall Setting in the Internet Connectivity In Figure 2.13 you can find that the five paths are sent via system unit/laptops to the server, Internal/external firewall with Virtual Private Network (VPN), Internet, etc. The firewall must be secured by the following steps: ? The administrator password must be changed. ? The SSL connection must be used between system unit and firewall. ? The all external management interfaces must be closed. ? The dynamic Host Configuration Protocol (DHCP) reservation must be set. ? The Internet subnet mask is changed as default setting. ? The 28-bit subnet masks (2555.255.255.240) for 14 hosts or a 29-bit subnet mask (2555.255.255.248) for 6 hosts is created to make limitation of network. ? The ping command is not allowed for the external interfaces. ? The back up of configuration must be taken for further usage. Secure sockets layer uses a cryptographic system that encrypts data with two keys either public or private. If SSL Digital Certificate is installed on a web site during a money transaction through PayPal or other third party, users can see a padlock icon at the bottom area of the navigator. Web Browsers NOTES

Self-Instructional Material 80 Web Browsers NOTES Fig. 2.14 Online Shopping Via Third Party Ebay is an original and primary online auction site that one can browse through from various categories such as antiques, clothing and accessories, computers and networking, jewelry and watches, etc. When a user chooses the items, he or she clicks on the auction title and views the details. On this page, they are able to view the pictures, descriptions, payment options and shipping information. When an Extended Validation Certificates (EVC) is installed on a web site, users with the latest versions of Firefox, Internet explorer or Opera can check the green address bar at the URL area of the navigator. Fig. 2.15 Validation to Web Site Visitors In Figure 2.15, extended validation SSL gives web site visitors an easy and reliable way to establish trust online. Only SSL Certificates with Extended Validation (EV) will trigger high security web browsers to display a green address bar with the name of the organization that owns the SSL Certificate and the name of the Certificate Authority that issued it. The green bar shows site visitors that the transaction is encrypted and the organization has been authenticated according to the most rigorous industry standard. Common Browser Error Messages Sometimes, a web browser may not work and provide various error messages. You can troubleshoot if you know the mechanism and meaning of error messages. Error messages may appear as follows: Server does not have a DNS entry: If you type the URL in web browser, the system unit contacts with Domain Name System (DNS) server. The DNS server translates the URL into the IP number that computers can understand and after it does that the browser can go to the site.

Self-Instructional Material 81 503 service unavailable: This is a catch-all error message for a variety of problems, but all of them mean that the web site is incapable of contact by your browser. The problem might be the site's server has crashed because of too much traffic or network congestion problem. 403.9 access forbidden: If you get the message 'Too Many Users Are Connected' it usually means that the web site is up and running, but you can not get in because the maximum number of people are already on the site. Web Browsers NOTES 2.3 PLUG-INS AND HELPER APPLICATIONS A plug-in is a small program which extends the capabilities of another program. It is a small application that is used to plug-in to other programs. It makes the host program work differently. In case of web browsers, plug-ins typically allow the browser to play different types of multimedia or to run small web-based programs. To view a list of currently-installed plug-ins in the Firefox web browser, type 'about: plug-ins' in the address bar and press Return. Aplug-in can be a player for extending animations, graphics and music capabilities of the web browser.

Many plug-ins are small programs and are easy to download. The browser could be IE, Mozilla Firefox, Netscape Navigator, Safari or some other browser. You can download and install the plug-in by selecting the 'Temp files'. Inside that, you have to create a sub folder. Select the Browse button to download the programs. The >param< tag is used to define parameters or variables for an object or applet element. It is supported by all major browsers. Objects such as videos, audio clips, and Flash animations are typically handled by browser plug-ins. Each plug-in recognizes certain parameters, which can make choosing parameters difficult when the author does not know which plug-in the user has. A plug-in is a small program which extends the capabilities of another program. Ahelper application is a separate application program that is invoked by the browser. It is simply a program that can understand and interpret files which the browser cannot handle by itself. Almost any program can be configured to act as a helper application for the browser. The helper applications include Telnet and Excel. Telnet provides a login facility in which users can remotely login through remote computer to the host server. Telnet server uses TCP protocol and hence is connection-oriented. The client is communicated to the destination port 23 to the server side. The protocol is specified to RFC 854. The RFC 854 supports Telnet protocol specifications. Telnet is virtual terminal facility which facilitates users to connect the remote system. Virtual terminals emulate wide terminals, and sometimes reside in larger or complex networks. It also provides a fundamental protocol to handle the negotiation facility and controls various types of signaling and terminal protocols. The four ways are specified to use talent. The terminal is connected to the TCP/IP terminal server with standard communication interface, for example (v-24/v-28 or EIA 232) and these terminal types are registered with Internet Assigned Networks Authority (IANA). A number of parameters, such as speed, parity, flow control, and types of terminals are involved in Telnet talk. Telnet is used in remote network computers. It is the Internet service that executes commands on remote host as if you are going to log in locally. For this, the machine name is required to which you want to connect and a valid username. The Telnet standard protocol is described in RFC–854 that deals with protocol specification Self-Instructional Material 82 Web Browsers NOTES and RFC–855 that deals with option specifications. The network of Interface Message Processor (IMP) is used to demonstrate the Telnet protocol that culminates with TCP specification. This technology predates the IP packets and TCP transport layers through internetworking. The graphics capabilities are generally not provided with most of the Telnet implementations. Fig. 2.16 TELNET Protocol An advantage of helper applications over plug-ins is multitasking between a helper application and the browser Window. For example, the web follows the client-server mechanism so that a client program gets required information from the server. Then the server sends the requested data to the Net through the browser. The requested data is then interpreted and displayed on the screen. The process can be explained in the following steps: ? The very first step is to open a web browser, for example Netscape or IE. ? The requested page is opened on the web if you type the corresponding URL in the address bar. ? The URL then extracts the necessary information for the requested page via transfer protocol, for example HTTP. ? The web server

then transmits the requested pages sent by the clients and displays the information. If the browser is closed, the helper application lives on. Aplug-in is an application program invoked by the browser. It is a dynamic code module designed to extend the capabilities of the browser by integrating a third party application program into the browser. Thus, a plug-in is part of the browser binary tree and runs inside the browser window. It cannot live on its own. When plug-ins are installed they automatically tell the browser what file extensions they work with. There is no configuration involved with plug-ins, only installation. Plug-ins are part of the browser binary tree, which are platform specific. Therefore the correct version must be downloaded for plug-ins to work properly. Examples of plug-ins include RealAudio and Shockwave. When you leave that particular web page, the browser will discard the plug-in and free up all the memory it used. So a helper application has a mind of its own, and a plug-in is literally plugged into the browser. A web browser may not be able to display a file if it is created in a format that is not built in the browser and hence unable to support it. Support is provided by plug-ins and helper applications for displaying such files. If a video file is created using MacroMedia Director, web browser may not display it if it is not supported by it. It needs plug-in or a helper application. Same is true for a file created in Portable Document Format (PDF file) by Adobe Acrobat. Plug-ins are created as modules. The module is, in fact, an application

Self-Instructional Material 83 program that extends capabilities of a browser. Plug-ins can be installed with the browser by default, downloaded and installed automatically and also downloaded and installed manually usually requiring restart of the browser. The three modes, in which a plug-ins runs, are known as embedded, full screen and hidden. The two tags known as >PLUGINSPAGE< and >PLUGINURL< are used in HTML coding to add the plug-ins to the Web page. Embedded is the part of a bigger HTML page inside a frame that uses the tag >EMBED<. The full-screen is shown in a separate window, whereas in hidden mode there is no onscreen display. Aplug-in is also written as plugin, add-in, addin, add- on, addon, snap-in or snapin. Helper applications are used only if browser or a plug-in is unable to handle a particular file format. In such cases browsers would make use of an application chosen in as Helper Applications for opening a file. To utilize maximum capability of the browser, you have to configure the browser for handling different types of files appearing on the web. The examples of applications and their plug-ins are listed as follows: ? An e-mail client uses plug-ins for decrypting and encrypting e-mail or Globalscape Mail Express for sending an email attachment that is oversized. ? Graphics software utilize plug-ins for supporting file formats and processing of images. ? Media players utilize plug-ins for supporting file formats and applying filters. Such Plug-ins are Winamp, foobar2000, Quintessential, GStreamer, XMMS, VST etc. ? Microsoft Office calls plug-ins as add-ins and uses these for extending capabilities of its application by addition of few custom commands and some specialized features ? A Packet sniffer uses plug-ins for decoding packet formats and OmniPeek is one such Plug-in. ? An application used for remote sensing uses plug-ins for process data taken from different types of sensors. Opticks is one such Plug-in. ? Rockbox is a firmware for playing digital audio that uses plug-ins for playing games and using text editor. ? Plug-ins are used in software development environments for supporting programming languages. Eclipse, MonoDevelop and jEdit are example of such Plug-ins. ? A web browser uses plug-ins for playing presentation formats and videos. Microsoft Silverlight, 3DMLW, Flash and QuickTime are examples of such Plug-ins. ? There are few digital mixing consoles that permit plug-ins for extending features that give reverberation effects, compression and equalization. ? Few web content management systems make use of plug-ins for increasing and enhancing functionality. Web Browsers NOTES

Self-Instructional Material 84 Web Browsers NOTES Popular Applications that Use Plug-ins The following table shows the popular applications of plug-ins: Table 2.2: Popular Applications of Plug-Ins Applications of Plug-in Functions Beatnik Beatnik supports Rich Music Format (RMF), MIDI, MOD, AIFF, WAV, MP3 and AU. Both Windows and Mac versions are available for Beatnik. Acrobat 4.0 The PDF files can be viewed easily and navigated too in almost all the leading web browsers. Using a Capture plug-in, any TIFF image can be scanned to PDF format or printed document can be scanned using Optical Character Reader (OCR) to turn it into PDF format. QuickTime QuickTime delivers the multimedia documents, such as videos, audios, soundtracks of MIDI soundtracks, 3D animation and virtual reality. This Plug-in enables contents of QuickTime and QuickTime VR for viewing directly within a browser. Shockwave The multimedia files can be created using Director of Macromedia. This plug-in has compatibility with Internet Explorer. RealPlayer The RealPlayer is a live player for RealVideo and RealAudio on-demand and functions with no delay in download. VivoActive Player This delivers audio and video, on-demand from any website and offers VivoActive content. Netscape Browser plug-ins These plug-ins are organized into various categories, such as audio/video, business and utilities, image viewers, 3D and animation, and presentations. The following screen shows the list of various Plug-ins, such as Java embedding Plug-ins, QuickTime Plug-ins, Shockwave Flash, etc. Fig. 2.17 Plug-Ins Screen Normally, only one application is assigned to one MIME type. But if your files contain a type of application/octet-stream, it is somewhat different. The fact that Mozilla is not saving settings for this type, can be used and Mozilla will look for a helper application by extension in case it fails to find one by MIME type. Just create a helper application entry with a type other than application/octet-stream for extension ABC, and another entry for extension XYZ. In case Mozilla comes across a file having type application/octet-stream with extension ABC, first helper application is

Material 85 used and if the extension is XYZ, the second is used. This also works well for e-mail attachments. Email is an electronic medium through which the message can be sent or received from one user to another. For example, if you use Outlook Express to send the message you need to type in the To: Cc: and Subject: fields to specify who the e-mail is being addressed to and what it is all about. A small edit area is provided to write the message. After clicking on the send button, a message comes that says, 'Message has been sent'. If you want to reply to the message, select the Reply button. It provides you a small area to reply to the message along with very brief details of the original message. You can also insert attachments in form of files. The process of attaching and sending such e-mails has been discussed in the subsequent paragraphs. Firstly, you need to find the file which needs to be attached. If you attach the file(s), it appears in the 'Attach: bar' as file name and size, for example here the 'Daily Backup.log' file has been attached. Follow the trails When an e-mail passes from one system to another via the mail server, the message is said to have been sent to the destination mail server. The whole process takes place in seconds. Once the message arrives it stays on the mail server until the recipients open the message. This mechanism is a 24×7 service which is one of the factors that makes it popular and flexible. The

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format of an email message, as follows: Envelop: Contains the sender's and receiver's addresses. Message: Contains the body and header. The header contains the sender, receiver, the subject of the information and some other information. The body of the message contains the relevant information readable by the recipient. UA is triggered by the user

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format of an email message, as follows: Envelop: Contains the sender's and receiver's addresses. Message: Contains the body and header. The header contains the sender, receiver, the subject of the information and some other information. The body of the message contains the relevant information readable by the recipient. UA is triggered by the user

while sending or receiving a
message. If a user has new

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mail, the UA informs the user with a notice. If the user is ready to read the mail, a list is displayed with each line

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mail, the UA informs the user with a notice. If the user is ready to read the mail, a list is displayed with each line

that contains the

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summary of the information about a particular message in the mailbox. The summary usually includes the sender's mail address, the subject and the time of server when the mail was sent or received. The user can select the messages

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summary of the information about a particular message in the mailbox. The summary usually includes the sender's mail address, the subject and the time of server when the mail was sent or received. The user can select the messages

from among the searched list of choice. After the user selects the relevant information as per his requirement, the content is displayed on screen. The various features included by plug-ins and helper application
are as follows: S/MIME functionality: It offers to sign up the encrypted messages. It examines the message formats and prepare the enveloped data (contains encrypted content and keys for recipients), signed data.
In case of local and other files for which Mozilla has no content type from the server, a helper application entry can be used to provide a specific MIME Type to files having specific extension. For doing this, you should create an entry in Edit/Preferences/Helper Applications and then enter the MIME Type as required by you in the Type field with entry for extensions in the extension field. Rest may be left at default values. Web Browsers NOTES Self-Instructional
Self-Instructional Material 86 Web Browsers NOTES
IPSec: It provides security services in the layer of IP selection. It uses security services in the layer of IP selection. It uses two protocols known as authentication protocol and authentication header. Encapsulating Security Payload (ESP): ESP provides confidential services for data packets and data filtering during the transmission of requested data across net. It supports sequence number (32 bits), security parameter index (32 bits), payload data (variable), pad length (8 bits) padding (0-255 bytes) and authentication data (variable).

The main feature of plug-ins is that it helps the browser to perform specific functions, such as viewingspecial graphic formats or playing multimedia files. Addition of multimedia documents are required if you make your web site effective and presentable. These multimedia documents are tagged with HTML. It is possible with image, multimedia effect and text (Logo design, floating text on web page) editing software, for example, Adobe Fireworks CS4 (Graphics editor), Adobe Flash CS4 (rich interactive Multimedia application), Adobe Photoshop CS4 (quality image editor), Corel Photoshop (creating icons) that appear on web page. Basically all browsers for HTML do not support multimedia. The HTML element imgis a multimedia element. This element has extensions that allow embedding of videos, Virtual Reality Modeling Language (VRML) along with border, size property and alignment. This standard delivers 3D rendering across net. The BACKGROUND attribute to BODY element in HTML coding allows embedding of sounds that is played if a web page is viewed.

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The multimedia objects can be installed by OBJECT element that includes multimedia content with HTML document.

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The multimedia objects can be installed by OBJECT element that includes multimedia content with HTML document.

The HTML elements Area, Applet, Img, Map, bgsound, Embed and Sound are used to deliver the multimedia objects across net. The following steps are required to disable a plug-in: ? Open the Tools menu. ? Choose Add-ons. ? Click the Plugins tab. ? Click on a plug in in the list. ? Click the Disable button. Disabling a plug-in means that you will no longer be able to do certain things, for example, if you disable Flash, you will not be able to watch videos on YouTube. Plug- ins are installed by certain steps in case of IE, these steps are as follows: Select Tool menu and click on 'Manage add-ons ...' Material 87 The following screen appears in which you can disable or enable the plug-ins. Multimedia is considered an important application in HTML. Multimedia networks are logically broken into two categories. These two categories are LAN and WAN. LAN multimedia networking concentrates on distinguishing and showing the information of media files within the office. It involves global accessing of multimedia information. Multimedia data are bandwidth intensive. The full-motion video transfers data at the rate of 30 frames per second. Video conferencing requires that multiple data streams (audio and video) move across the multiple locations. In a synchronized fusion, the multimedia data requires a standard Ethernet or token ring LAN. Video bandwidth requirements range from 128 to 768 kilobytes per second (bps) per user for video conferencing, 1.3 Mbps for CD-Rom based or VCR quality video and up to 6Mbps for entertainment quality video using Motion Picture Expert Group-2 (MPEG- 2). The digital video interacts with 1.2 Mbps, MPEG-1 video compression require 1.5 Mbps and motion joint photographic expert group (motion JPEG) is considered as the king of bandwidth that is required from 10 to 240 Mbps. The CCDR 601 requires 2 MHz samples at 8 bits per sample. The transfer rate is 216 Mbps per sample. The transfer rate is 216 Mbps keeps the digital copy of analog standards (National Television Standard Committee) NTSC and Phase Alteration by Line (PAL). Audio files also use bandwidth. The standard voice requires minimum transfer rate of 32 kbps. The average quality stereo easily consumes 384 Kbps of bandwidth per stream. LAN is used in multimedia because it transmits voice, audio tracks, full-motion video, images and interactive data. Multimedia on LAN maintains standards. There are 30 separate digital audio standards in which 24 specifications are required for video data types and 12 are required for CD- ROMs. The router is reconfigured to increase bandwidth as needed using dial-up lines. It adds temporary extra bandwidth to optimize the available bandwidth. In these days, multimedia is fostered to change extensively to access the network media. Multimedia Web Browsers NOTES Self-Instructional

Self-Instructional Material 88 Web Browsers NOTES data are transferred to change extensively to access the network media. Multimedia setup changes the physical structure of network and LAN requirements. Multimedia includes business entities become global and a simple LAN cannot communicate properly for the virtual environment. LAN on multimedia refers to a group of connected computers within limited geographical area. Each PC is treated as node and each node contains its own processor. This setup does not require a central mainframe processing unit. A node is basically a workstation equipped with maximum bandwidth. Multimedia applications support 802.11e network capability that playas a role in multimedia wireless. The standard Institute of Electrical and Electronics Engineers (IEEE) 802.11e provides multimedia wireless network that simulates software to add new function known as Hybrid Coordination Function (HCF). It includes contention-free and contention-based OPtimum NETwork performance (OPNET). The following table shows the LAN and WAN setting for Multimedia environment: Table 2.3: LAN and WAN Requirements for Multimedia Environment Video Compression Technology in Multimedia Bandwidth Per User WAN Service Consultative Committee on International Radio (CCIR) recommendation 601 140 to 270 PetaBytes Per second (Pbps) ATM at 155 Mbps Digital Video Interactive (DVI) 1.2 Mbps DS1 Lines, ISDN H11 Motion JPEG 10 to 240 Mbps ATM at 155 or 622 Mbps MPEG1 1.5 Mbps DS1 Lines, ISDN H11, frame relay, ATM at 1.5 Mbps or higher MPEG2 4 to 6 Mbps DS2, DS3, ATM at DS3 rate or higher Delivering multimedia in HTML The inline images (>IMG< tag), movies, VRML world, client side image maps (>AREA< and >MAP< tags (hyperlinks defined by geometric regions of an image), background sounds (>BGSound< and >sound< tags), multimedia objects (>OBJECT<, >APPLET< tags) etc. are frequently used to deliver multimedia objects in HTML. You can add music or video into your web page. The easiest way to add video or sound to your web site is to include the special HTML tag called >EMBED<. This tag causes the browser itself to include controls for the multimedia automatically. You do not need to have any ActiveX, Java VM, VBscript or JavaScript to support this >EMBED< tag. The following HTML code is written to play and embedded midi file: >embed src="/html/flower.mid" width="100%" height= "60" < >noembed<>img src="flowerimage.gif" <>/noembed< >/embed< This will produce following result: The HTML inserts video media file types. The following table shows the Flash file types that are supported by >EMBED< tag:

Material 89 File types Functions .swf files These files are the file types created by Macromedia's Flash program. .wmv files These files are Microsoft's Window's Media Video file types. .mov files These file types are Apple's Quick Time Movie format. .mpeg files These file types are movie files created by the Moving Pictures Expert Group. To insert a Flash FMA file, you need to insert HTML code that embeds the file in the Dreamweaver page. You can insert the SWF file or exported Flash Movie file into the page. When you insert a SWF file in Dreamweaver, it provides user-friendly Flash HTML code. To insert a flash file as multimedia application, you need to step through the following steps: ? With the index.html page open in the Dreamweaver Document window, click once inside the second row of the first table. ? This is the table row immediately below the banner graphic you inserted in the previous section. ? In the Property select Window?Properties and then select Center from the Horizontal pop-up menu. Select also Middle from the Vertical pop-up menu. This places the contents of the table cell in the middle of the cell. Select Insert?Media?Flash. In the Select File dialog box, browse to the flash_fma.swf file select the file and then click on OK button. A Flash content placeholder, rather than a scene from the FMA itself, appears in the Document window. This is because the HTML code is 'pointing' to the SWF file flash_fma.swf. When a user loads the index.html page, the browser plays the SWF file. In the Property inspector Window? Properties, click on Play button. Web Browsers NOTES Self-Instructional

Self-Instructional Material 90 Web Browsers NOTES Dreamweaver plays the Flash file in the Document window, showing you what site visitors will see when they view the page in a browser. In the Property inspector, click Stop to stop playing the Flash file. Save the page. Videos can be embedded into html documents known as Web pages in two different ways. One method is to use the >embed/< tag to display your media file. The embed tag does not require a closing tag. In fact, it works much like the image tag. A src attribute is defined by the correct URL either taken as local or global in order for the video file to be displayed correctly. The following code is required to embed tag with a global URL: >embed src= "http://www.abc.com/car_image.mpeg" autostart="false"/< The attributes available to the >embed/< tag includes volume, autostart, hidden and loop. A brief description about each attribute is as follows: autostart: This attribute controls

the media's ability to start without prompting. Values are taken as true or false. Volume:

This attribute set a numeric value from 0 to 100 for the loudness of your media. You may start and stop your movie files by either pressing the buttons or double clicking your mouse (continue/play). You simply place the URLof your media files into the href attribute of an anchor tag. The following table shows the video media files: Table 2.4: Video Media Files File name extension Function .swf files These file types are created by Macromedia's Flash program .wmv files These file types are Microsoft's Window's Media Video file types. .mov files These file types are Apple's Quick Time Movie format. .mpeg files These file types are set the standard for compression movie files created by the Moving Pictures Expert Group. The flash movies (.swf), AVI's (.avi) and MOV's (.mov) file extension types are supported by the embed tag.

Material 91 2.4 CONCEPTUAL ARCHITECTURE OF TYPICAL WEB BROWSERS The basic web architecture is two-tiered and characterized by a web client that displays information content and a web server that transfers information to the client. The conceptual architecture of a typical web browser depends on three key standards, which are known as HTML (for encoding document content), URLs (for naming remote information objects in a global namespace) and HTTP (for staging the transfer). 2.4.1 Hypertext Markup Language (HTML) HTML is a language for describing web pages. HTML stands for Hyper Text Markup Language. Basically, HTML is not a programming language, but a markup language. A markup language is a set of markup tags. HTML uses markup tags to describe web pages. HTML includes the basics of various features, such as linear media, hypermedia, markup, etc. The details of each of the features are described as follows. Linear media: Linear Media is built on creativity and innovation. Linear Media is
an interactive interface focused on providing broadcasters with the best cross media entertainment. It
delivers the highest quality entertainment. It deals only with audio and video resources that represent a single timeline exclusively. The resources availed by linear media can potentially consist of any number of audio, video, text, image or other time-aligned data tracks. All these tracks adhere to a single timeline, which tends to be defined by the main audio or video track, while other tracks have been created to synchronize with these main tracks. It provides a single timeline that represents the single resource. The word linear is, however, over-used, since the introduction of digital systems into the world of analog film introduced what is now known as 'non-linear video editing'. Fig. 2.18 Various Tracks Set with Linear Media If you talk linear media resource, it refers to a digital resource and therefore direct access to any frame in the footage is possible. Therefore, linear media resource will still be usable within a non-linear editing process. As a Web resource, a time-linear media resource is not addressed as a sequence of frames or samples, since these are encoding specific. The frame rate encoding is associated with it because of the resource time, track and spatial dimensions and thus without changing the resource's address. Linear media is used to specify the difference between a media resource that follows a Web Browsers NOTES Self-Instructional
Self-Instructional Material 92 Web Browsers NOTES single timeline, in contrast to one that deals with multiple timelines, linked together based on conditions, events, user interactions, or other disruptions to make a fully interactive multi-media experience. Thus, media resources in HTML5 and Media Fragments do not qualify as interactive multimedia themselves because they are not regarded as a graph of interlinked media resources, but simply as a single time-linear resource. The files created for that are known as Adobe Shockwave Flash, Silverlight or SMIL files. These can go far beyond what current typical video publishing and communication applications on the web require and go far beyond what the HTML5 media elements were created for. If your application has a need for multiple timelines, it may be necessary to use SMIL, Silverlight or Adobe Flash to create it. The linear media resources can contribute towards an interactive multi-media experience, created by a web developer through a combination of multiple media resources, image resources, text resources and web pages. When the >video< element links to a video file, it only accesses the main audio and video tracks, decodes them and displays them. The media framework that sits underneath the User Agent (UA) and does the actual decoding for the UA might know about other tracks and might even decode, such as a caption track and display it by default, but the UA has no means of knowing this happens and controlling this. We need a means to expose the available tracks inside a time-linear media resource and allow the UA some control over it. For instance, you can choose to turn on/off a caption track, to choose which video track to display, or to choose which dubbed audio track to display. A HTML page is a sequence of HTML tags delivered over HTTP to a UA. A HTML page is a web resource. It can be created dynamically and contain links to other web resources such as images which complete its presentation. A linear media resource, when regarded completely abstractly, can contain all sorts of alternative and additional tracks. For example, the existing >source< elements inside a video or audio element are currently mostly being used to link to alternative encodings of the main media resource. Hypermedia: Hypermedia is a superset of hypertext. Hypermedia documents contain links by other means of media, such as sounds, images, and movies. Images themselves can be selected to link to sounds or documents. This means that browsers might not display a text file, but might display images or sound or animations. Hypermedia
simply combines hypertext and multimedia. For example, reading a
text on the Japanese language (you select a Japanese phrase, then hear the phrase as spoken in the native tongue), and viewing a company's floor plan, you select an office by clicking on a room.

Hypermedia is a style of building systems for organizing, structuring and accessing information around a network of multimedia nodes connected together by links. The general Structure of hypermedia allowed hypermedia to be applied to a wide variety of task domains. The World Wide Web is the best and popular example of hypermedia. Web represents WWW. It refers to the client-server service. The client uses the browser to access the information from the server. There are many sites that providing information that is available at various locations on the net. The web represents a hypertext system which presents information from across the net. It was developed first time in the month of 1989 by Tim Berners Lee. He was at the European Laboratory, CERN, Switzerland. Internet is considered as to be a combination of portability, user-friendly features and flexibility of information. The web follows the client-server mechanism. Web utilizes this mechanism because for the purpose that a client program gets required information from the server.
Self-Instructional Material 93 Then the server sends the requested data to the Net through the browser. The requested data is then interpreted and displayed on the screen. The process can be explained in the following steps: ? The very first step would be to open a web browser, for example Netscape or IE. ? The requested page is opened on the web if you type the corresponding URL in the address bar. ? Then
URL then extracts the necessary information for the requested page via transfer protocol, for example HTTP. ? The web server
then transmits the requested pages sent by the clients and displays the information. HTML Markup: HTML Markup is a text-to-HTML processor that lets you quickly and easily put documents on the web. HTML markup tags are usually called HTML tags and the characteristics of the

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HTML tags are as follows: ? HTML tags are keywords surrounded by angle brackets like >html<. ? HTML tags normally come in pairs like >b< and >/b<. ? The first tag in a pair is the start tag, the second tag is the end tag. ? Start and end tags are also called opening tags and closing tags.

79% **MATCHING BLOCK 182/472** W

HTML tags are as follows: ? HTML tags are keywords surrounded by angle brackets like >html<. ? HTML tags normally come in pairs like >b< and >/b<. ? The first tag in a pair is the start tag, the second tag is the end tag. ? Start and end tags are also called opening tags and closing tags.

The
program is highly customizable and supports AppleScript. Yoc can convert hundreds of files in seconds with HTML Markup. For example, the required elements are shown in this sample bare-bones HTML document: >html< >head< >title<A Simple HTML Example>/title< >/head< >body< >h2<HTML is Easy To Learn>/h2< >p<Welcome to the world of the World Wide Web. This is the first paragraph. While short it is still a paragraph! >/p< >p<And this is the second paragraph. >/p< >/body< >/html< The required elements are the >html<, >head<, >title<, and >body< tags and their corresponding end tags. Web Browsers NOTES
Self-Instructional Material 94 Web Browsers NOTES Fig. 2.19 HTML Markup After knowing all of the features of HTML you are able to know how the home page of web site can be prepared. For this, you need to know the programming basics of HTML code. Creating home page:

57% **MATCHING BLOCK 183/472** W

Home page is the first page of web site. It keeps many hyperlinks on its page. Creation of home page means creating and launching the

57% **MATCHING BLOCK 184/472** W

Home page is the first page of web site. It keeps many hyperlinks on its page. Creation of home page means creating and launching the

web site. This is an important task as it involves arranging the web site

48% MATCHING BLOCK 185/472 W

hosting, designing and coding of web site, monitoring the performance of site and checking the web site traffic. Creating the web site includes the various factors to be implemented on the page. Launching

48% MATCHING BLOCK 186/472 W

hosting, designing and coding of web site, monitoring the performance of site and checking the web site traffic. Creating the web site includes the various factors to be implemented on the page. Launching

the web site entails the heading of name, phone, URL description and the domain details. Acomprehensive user's guide must be provided to user that gives the relevant information of the web site. The more accurate details would provide the most relevant results. Launching the web site can be done in Google and Yahoo local listing. It optimizes the search engine facilities for you web site that

90% MATCHING BLOCK 187/472 W

offers moderate list of options, searchable description and the third party data providers, such as

90% MATCHING BLOCK 188/472 W

offers moderate list of options, searchable description and the third party data providers, such as

Super pages, Yellow pages, City searches,

75% MATCHING BLOCK 189/472 W

etc. These search engines provide a great facility to show the name of your web site. They also offer a free program in which you can enter you

75% MATCHING BLOCK 190/472 W

etc. These search engines provide a great facility to show the name of your web site. They also offer a free program in which you can enter you

Web site domain area, tell the customer 'Who You Are' (WYA) facility, get reviews list hours etc.
The various factors work collectively during the time of designing and developing the web site. They are as follows: ?
Suitable keyword: In web content the keyword density is maintained to get
a good ranking in search engine results. The writer who writes the web content must determine the popular keyword for corresponding information. The targeted keyword must be placed throughout the complete content. ? Search engine optimization: Apopular web site is user-friendly and it is optimized by the search
engines. If the site optimization is done via yahoo and Google search engine then
the web site would get proper response from users and visitors. ? Proper maintenance of site: Once web site
is created, it must be maintained and updated at regular interval, because
visitors
want to see recent and updated information. ? Feedback: Feedback in HTML document is considered as an important factor in which users/
visitors can write their opinion. In this way, many valuable options are inserted to the enhanced web site.

Self-Instructional Material 95 In the above screen design user has to write the name, email id, title, comment and verification of the user by inserting the typed characters. In this instance, '4UW4' is to be written in the text box area. After feeding the text areas and clicking on required check boxes, user needs to click on Post button to send his/her opinion. For the above screen the following HTML code is required: >CENTER< >FORM METHOD="POST" ACTION="[b]You CGI mail script here[/ b]" ENCTYPE="text/plain"< >INPUT TYPE="text" NAME="username"< : Name >BR< >INPUT TYPE="text" NAME="email"< : Email >BR< comments >BR< >TEXTAREA NAME="COMMENTS" ROWS="10" WRAP="hard"< >/TEXTAREA< >BR< >INPUT TYPE="Post" VALUE="Send"< ... ... >/FORM< >/CENTER< Besides the above mentioned factors other factors, such as use (site and appropriate navigation structure), content (useful current information), structure (intelligible and straightforward organizing scheme), linkage (integrate relevant information about the web site), search (supporting tools for site searching), and appearance (visually attractive on screen) are also needed to be checked for the site design. Inserting images in HTML code is very important because it makes the site attractive. inserting images are possible in web pages with the >img< tag. It contains attributes for even closing a tag. The syntax used to define an image is as follows: Web Browsers NOTES

Self-Instructional Material 96 Web Browsers NOTES >img src="url" /< The HTML code is required to display an image file (gif or jpeg). The code is written in the following way: >IMG SRC="gerbils.gif"< The result of above code appears as follows: The following attributes can set with >img< tag. Tag Description >img< Defines an image >map< Defines an image map >area< Defines a clickable area inside an image map The following HTML code is written to insert an image in the web pages: >html< >body< >img border="0" src="/images/mountain.jpg" width="304" height="228" /< >/body< >/html< The various additional images attribute, such as LONGDESC, WIDTH, HEIGHT, ALIGN, BORDER, etc. are used with images which are to be inserted in web pages. The images can be multimedia graphics, still, motion or even animated movies etc. The two attributes in HTML coding are SRC and ALT and they come with >IMG ...< tag. The Alt tag is essentially required for >IMG< tag. The HTML code is written as follows: >IMG SRC="blue-ridge-flower.gif" ALT=blue-ridge-flower< This coding displays the following image:

Self-Instructional Material 97 The SRC attribute keeps the file name of the source image and ALT attribute displays the text if the image or picture is not shown on the page. For the site design, the various criteria are to be considered, such as goal of design, complete upgradation, aspects of design, target users, user-friendly and informative design, suitable logo and advertisement for branding, colour scheme and screen resolution, connection speed, focal point, navigation and interaction, maintenance, update, Content Management System (CMS), Search engine Optimization (SEO), inbound links, and URLstructures etc. Aweb home page constructed using HTMLhas a basic and essential structure. The page always begins with the start tag of the html elements and always terminates with the end tag of the HTML element. Home pages usually have a title that appears in the title bar that runs across the very top of the web page. The title for a web page can be created by the >title<...>/title< tags, which are themselves always nested within the >head<...>/head< tags. All text appearing after the >title< start tag and before the >/title< end tag will be displayed as your web page title. The following HTML code produces a web page titled as 'MY HOME PAGE': >html< >head< >title<MY HOME PAGE>/title< >/head< >body< >/body< >/html< 2.4.2 Adding Content to Home Page This is sample coding to add content to your web page but type text in between the >body<...>/body< tags. >html< >head< >title< My HOME PAGE >/title< >/head< >body< My HOME PAGE ! >/body< >/html< This coding produces the web home page as follows: Web Browsers NOTES

98 Material Web Browsers NOTES The mypage.htm file is saved under \Homepage directory. The above mentioned codes are the basics for creating web home page. You can add logo, animated text etc. to make your home page effective. The website design is introduced basically at the initial phase and always appeared as static website. The designing phase requires building a simple Hypertext Markup Language (HTML) document, creating the Home page for specific web site, launching the web site and tracks the hits and fine tune for the web site. The following steps are required to design the website dynamically. Some of the tasks are restricted due to the dull appearance of the pages. Dos Self-Instructional ? Use ALT tags for all graphics, especially navigation graphics ? Use black text on white background whenever possible for optimal legibility ? Use either plain-colour backgrounds or extremely subtle background patterns ? Make sure text is in a printable colour (not white) ? Place navigation in a consistent location on each page of your web site ? Use a familiar location for navigation bars ? Keep the design from scrolling horizontally ? Use one axis of symmetry for centered text on a page ? Encourage scrolling by splitting an image at the fold Do not ? Allow ALT tags to get clipped (especially an issue for small, fixed width images) ? Display static text in blue or underlined ? Use boldface or ALL CAPS for long pieces of text. This slows down the reading capacity ? Leave too much white space that reduces the scan ability ? Make the user scroll to find critical information, especially transaction buttons and navigation links ? Use horizontal rules to separate chunks of content

Material 99 ? Alternate too frequently between centered text and left-aligned text. Most text should be left-aligned ? Fix pages at larger than 800×600 pixels. Larger pages may force users to scroll horizontally There are many factors that decide a successful web site on net. If you keep the following factors in the mind and create and launch accordingly, it is helpful for the business growth. The factors are as follows:

76% **MATCHING BLOCK 191/472** W

Message board: It is a type of forum through which visitors of web site interacts with the site to enhance the popularity. Search engine: This is

76% **MATCHING BLOCK 192/472** W

Message board: It is a type of forum through which visitors of web site interacts with the site to enhance the popularity. Search engine: This is

the valuable retention tool that helps visitors to search their information. The site must be in list of famous search engines server. Polls: This option on a web site allows visitors to vote. For instance, feedback option form gives to users to send their opinion about the performance of web services. Guestbooks: This option is very useful for visitors to make contact with the organization. Web site visitors can enter their name, e-mail, comments or text.

65% **MATCHING BLOCK 193/472** W

Once this information reaches the organization, the corresponding executive can contact the visitors. Data entry forms:

65% **MATCHING BLOCK 194/472** W

Once this information reaches the organization, the corresponding executive can contact the visitors. Data entry forms:

Creation of web site must check this option for web site visitors that can place orders or can keep customer service data or can provide request information as per web site has been created. Creation of a home page requires six steps. The

95% **MATCHING BLOCK 195/472** W

steps are as follows: ? Select and register a web page domain name

95% **MATCHING BLOCK 196/472** W

steps are as follows: ? Select and register a web page domain name

The very first step is to select a suitable web site domain name for monitoring the conflict issues. Once a domain name is allotted, it is not allotted further to other organization or individual.

82% **MATCHING BLOCK 197/472** W

The registration of domain name is unique and done by Internet Corporation for Assigned Names and Numbers (ICANN)-accredited domain name registrar, such as abc.com, xyz.com etc. The free web site hosting service is also available that avails without registering a domain name. The search engine does not provide its services if any

82% **MATCHING BLOCK 198/472** W

The registration of domain name is unique and done by Internet Corporation for Assigned Names and Numbers (ICANN)-accredited domain name registrar, such as abc.com, xyz.com etc. The free web site hosting service is also available that avails without registering a domain name. The search engine does not provide its services if any

web site lacks its registered domain name. ? Select and configure a web site hosting service The hosting cost of a web site ranges from $100 to $250 every year. The cost depends on web sites featured with ecommerce facilities, special processing requirements and

79% **MATCHING BLOCK 199/472** W

high traffic volume options. At this stage, web hosting is checked for control over content, security and usage of the site. A static web site consists of a single web page. It must have 'index.html' or 'index.htm'.

79% **MATCHING BLOCK 200/472** W

high traffic volume options. At this stage, web hosting is checked for control over content, security and usage of the site. A static web site consists of a single web page. It must have 'index.html' or 'index.htm'.

The various types of software tools, are Adobe PhotoShop, Microsoft FrontPage etc. ? Promote the web site

92% **MATCHING BLOCK 201/472** W

The information is sent on the web through search engines and their related directories. The promotion scheme on the

92% **MATCHING BLOCK 202/472** W

The information is sent on the web through search engines and their related directories. The promotion scheme on the

web site must be published at regular intervals. Therefore, this factor must be introduced during creation of the web site. Promoting a web site allows visitors get updated information on the specified web site. For example, in online air ticket booking system, any promotion

87% **MATCHING BLOCK 203/472** W

scheme, such as shifting the seat arrangement from economic let to business,

87% **MATCHING BLOCK 204/472** W

scheme, such as shifting the seat arrangement from economic let to business,

changing in flight schedules etc. must be updated online so that if travelers or visitors can get quick information easily. Site launch process is done

86% **MATCHING BLOCK 205/472** W

after designing and completing the site. It is essential to finalize the layout and style of site before launching.

86% MATCHING BLOCK 206/472 W

after designing and completing the site. It is essential to finalize the layout and style of site before launching.

The domain registration of the site is required to set up the web site. The web site which has to be launched on net its domain name must be registered. Web Browsers NOTES Self-Instructional
100 Material Web Browsers NOTES Self-Instructional 2.4.3 URL Web pages are located by means of a URL which is treated as an address, beginning with http: for HTTP access.

87% MATCHING BLOCK 207/472 W

Uniform Resource Locator (URL) is a pointer that avails specified resources across the net. Resource simply means information containing files or directories. It is referenced with query to available databases via search engines, such as Google or Yahoo. An example of URL appears on address bar is as follows: http://aaa.bbb.edu/flower.html Table 2.5 specifies the URL details: Table 2.5:

87% MATCHING BLOCK 208/472 W

Uniform Resource Locator (URL) is a pointer that avails specified resources across the net. Resource simply means information containing files or directories. It is referenced with query to available databases via search engines, such as Google or Yahoo. An example of URL appears on address bar is as follows: http://aaa.bbb.edu/flower.html Table 2.5 specifies the URL details: Table 2.5:

Example of

75% MATCHING BLOCK 209/472 W

URL Details URL part Function http The protocol specifier aaa.bbb.edu The domain name flower.html The page location The http is used as protocol where information resides on domain named as aaa.bbb.edu. The information that resides on host machine is taken as flower.html. The host machine can be protocol dependent or host dependent. Component of URL is known as path component. URL is sometimes specified as 'port'. Port means it is a port number by which TCP connection is possible to the remote host machine. The default port for protocol is used if port is not specified. For example, port 80 is known as default port for HTTP. The two ports, port 20 and port 21 are used by ftp but the alternative port can be used as follows: http://aaa.bbb.edu:80/ flower.html

75% MATCHING BLOCK 210/472 W

URL Details URL part Function http The protocol specifier aaa.bbb.edu The domain name flower.html The page location The http is used as protocol where information resides on domain named as aaa.bbb.edu. The information that resides on host machine is taken as flower.html. The host machine can be protocol dependent or host dependent. Component of URL is known as path component. URL is sometimes specified as 'port'. Port means it is a port number by which TCP connection is possible to the remote host machine. The default port for protocol is used if port is not specified. For example, port 80 is known as default port for HTTP. The two ports, port 20 and port 21 are used by ftp but the alternative port can be used as follows: http://aaa.bbb.edu:80/ flower.html

That is why URL represents the full specification to a page. URL Encoding:

94% MATCHING BLOCK 211/472 W

Table 2.6 shows some specific symbols and characters used by URL. These are, in fact, URL encoding. Table 2.6: Used symbols and URL Encoding Specific Symbols and Characters URL Encoding ; %3B ? %3F / %2F : %3A # %23 & %24 = %3D + %2B $ %26 , %2C % %25 > %3C < %3E ~ %7E % %25 >

94% MATCHING BLOCK 212/472 W

Table 2.6 shows some specific symbols and characters used by URL. These are, in fact, URL encoding. Table 2.6: Used symbols and URL Encoding Specific Symbols and Characters URL Encoding ; %3B ? %3F / %2F : %3A # %23 & %24 = %3D + %2B $ %26 , %2C % %25 > %3C < %3E ~ %7E % %25 >

space< +

100% MATCHING BLOCK 213/472 W

or %20 Note: The >spacebar< is frequently used and '+' sign is reserved for its URL encoding. For example, string 'A B' in URL is encoded as either 'A%20B' or 'A+B'.

100% MATCHING BLOCK 214/472 W

or %20 Note: The >spacebar< is frequently used and '+' sign is reserved for its URL encoding. For example, string 'A B' in URL is encoded as either 'A%20B' or 'A+B'.

Material 101 If you want to search the information as 'computer graphics basics' in Google search, you just type the text as follows that has to be searched: After pressing the [Enter] key or clicking on 'Google Search' button, you can get the resulting URL in the address bar as follows: If you analyse the result of URL [http://www.google.co.in/search?hl=en&source=hp&q=computer+graphics+basics+&meta=&aq=f&oq=], the result comes as the >space< character between computer+graphics+basics in URL encoded as '+' symbol. 2.4.4 Quirk Mode and HTML Quirks mode is an option for those who render and control for all versions of Internet explorer in the old mode and prefer all browsers in 'standard compliant mode'. The browser compatibility leads to HTML errors that are caused by the various problems displayed by browsers. The web page must be error free. An HTML validator such as HTML toolbar runs almost each and every page of the web site. This toolbar provides a complete report of error pages of HTML documents. The compatibility problems are caused of browser display errors. The toolbox identifies HTML tags, elements and attributes which are found not compatible with latest version of IE or Netscape Navigator. The browser compatibility can be debugged by trial and error methods. Internet explorer has introduced an array of proprietary extensions to many of the standards, including Web Browsers NOTES Self-Instructional
Self-Instructional Material 102 Web Browsers NOTES HTML, CSS and the DOM. This has resulted in a number of web pages that appear broken in standards-compliant web browsers and has introduced the need for a quirk mode to allow for rendering improper elements meant for Internet Explorer in these other browsers. The following steps are required to track down the problem: ? Restore the original form of error web page, such as a copied page. ? Isolate the copied page. ? View the paired-down page. ? Check the original page and modify the HTML section. Browser compatibility must be checked because displaying problem in browser can impact on potential customers/visitors. Quirks means curve which separates a bead from adjoining processes. In quirk mode, the web browser renders the code which is based on non-standard code. Browser switches to quirk if no document type declaration or incomplete document type declaration, for example, Universal Resource Identifier (URI) to Document Type Declaration (DTD) is omitted. URI is a compact string of characters for identifying an abstract or physical resource. The document type declaration names the document type being used and links to or includes its definition, the DTD. The quirk mode is to be enabled for those sites which use older HTML documents. For this, web pages keep 'Quirk mode' by default and options are kept as standard mode and strict mode too. The >!DOCTYPE< directive is only capable to keep the two prime mode settings known as standard modes and quirk mode. For example, the >!DOCTYPE< directive is declared as follows in the HTML code: >!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional/ /EN"< The DTD identifies browsers and the type of the code which is being coded in the document and hence returns the congruency of modes via various versions of browser (IE). The >!DOCTYPE< directive renders the content and it is that concept in which standard mode directives are displayed in Internet explorer version 8.0 in standards mode, whereas quirks mode directives are displayed in Internet explorer version5.0 mode. Figure 2.20 shows that if Internet explorer version 6.0 is used to render the image the browser compatibility works in different mode accordingly: Fig. 2.20 (A) Standard Mode Rendering (B) Quirk Mode Rendering

Material 103 Web designers should use the correct doctype for the web document and also use a full doctype. You must ensure that the HTML code is also matched with doctype. The following code inserts a comment before doctype and after >xml< declaration that triggers quirk mode in Internet Explorer: >?xml version="1.0" encoding="utf-8"?< >!— ... Keep Internet Explorer Quirks Mode —< >!

83% **MATCHING BLOCK 215/472** W

DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd"< 2.4.5

83% **MATCHING BLOCK 216/472** W

DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd"< 2.4.5

HTTP Web browsers communicate with web servers primarily using HTTP to fetch web pages. HTTP allows web browsers to submit information to web servers as well as fetch web pages from them.
HTTP contains a set of rules to transfer the files of text, video, sound, images and multimedia files across WWW suite of protocols.
This suite is known as foundation protocols. It also incorporates how messages are prepared to transmit and how web browsers and servers respond to the issued commands. HTTP is a set of rules

88% **MATCHING BLOCK 217/472** W

for transferring files (text, image, sound, video and other multimedia files) on the

88% **MATCHING BLOCK 218/472** W

for transferring files (text, image, sound, video and other multimedia files) on the

World Wide Web. It takes the time for page loading across net.
The majority of the page load time is spent in separate HTTP requests for images, JavaScript, and style sheets. The following factors are considered while loading the pages: ? For external objects, HTTPkeepalives is turned on. ? Load only few multimedia objects, texts and graphics at a time. ? Do not load page without HTTP pipeline. ? Minimize the HTTP request size in slow bandwidth and Internet services. ? Use firebug, if you use Firefox while loading the page. ? Use .zip compressed file while sending the HTML documents to other users. The following code is required to load a document itself: >HEAD< >META HTTP-EQUIV=REFRESH CONTENT=5< >/HEAD< In the above coding CONTENT=5 means it waits for 5 seconds to load the specific
Web Browsers NOTES page. The following code facilitates you to
load visitors for other pages: >HEAD< >META HTTP-EQUIV=REFRESH CONTENT=5; "URL=http:// www.abc.com/"< >/HEAD< In the above code, the statement "URL=http:// ..... " is the specific URL of the page you want to load a visitor to. The following code is written in JavaScript >html< >head< >title<Auto Reload>/title< >script language="JavaScript"< >!— var time = null
Self-Instructional
Self-Instructional Material 104 Web Browsers NOTES
function move() { window.location ='http://abc.com' } //—< >/script< >/head< >body onload="timer=setTimeout('move()',3000)"< >p<See this page refresh itself in 3 secs.>/p< >/body< >/html< In the above coding, JavaScript loads a page in 3 seconds. The code timer=setTimeout('move()',3000) 3000 is the number of milliseconds or 3 seconds. If you want to load visitors to another page, change the URL, window.location = 'http://abc.com' to the destination.

HTTP/1.0 protocol evolved from the original version of HTTP. In HTTP/1.0, a cache revalidates an entry using the If-Modified-Since header. This header uses absolute timestamps with one-second resolution, which could lead to caching errors either because of clock synchronization errors, or because of lack of resolution. Therefore, HTTP/1.1 introduces the more general concept of an opaque cache validator string, known as an entity tag. An entity tag is opaque, the origin server uses any information it deems necessary to construct it, such as a fine-grained timestamp or an internal database pointer, as long as it meets the uniqueness requirement. Clients may compare entity tags for equality, but cannot otherwise manipulate them. HTTP/1.1 servers attach entity tags to responses using the ETag header. However, HTTP/1.0 clients do not understand the 100 = continue, responses. Therefore, in order to trigger the use of this mechanism, the client sends the new Expect header, with a value of 100-continue. HTTP/1.0 provides a challenge-response access control mechanism. The origin server responds to a request for which it needs authentication with a WWW authenticate header that identifies the authentication scheme, such as basic and realm. The client that is represented by user agent queries the user for a username and password for the realm, then repeats the original request, this time including an Authorization header that contains the username and password. Assuming these credentials are acceptable to it, the origin server responds by sending the expected content. A client may continue to send the same credentials for other resources in the same realm on the same server, thus eliminating the extra overhead of the challenge and response. HTTP/1.0 is provided with a simple caching mechanism. An origin server may mark a response, using the Expires header, with a time until which a cache could return the response without violating semantic transparency. Further, a cache may check the current validity of a response using what is known as a conditional request, for example it may include an If-Modified-Since header in a request for the resource, specifying the value given in the cached response's Last-Modified header. The server may then either respond with a 304 (Not Modified) status code, implying that the cache entry is valid, or it may send a normal 200 (OK) response to replace the cache entry. HTTP/1.0 includes a mechanism known as Pragma:no-cache header for the client to indicate that a request should not be satisfied from a cache. The HTTP/1.0 caching mechanism worked moderately well, but it had many conceptual shortcomings. It did not allow either origin servers or clients to give full and explicit instructions to caches; therefore, it depended on a body of heuristics that were not well-specified. This

Self-Instructional Material 105 led to two problems. These problems are incorrect caching of some responses that should not have been cached, and failure to cache some responses that could have been cached. The former causes semantic problems and the later causes performance problems.

The HTTP/1.1 specification states the various requirements for clients, proxies, and servers.

The structure of HTTP 1.1 is changed into various areas, such as extensibility, caching, bandwidth optimization, network connection management, message transmission, Internet address conservation, error notification, security, integrity and authentication and content negotiation. The following factors are required to make difference with HTTP 1.1:

Extensibility: The HTTP implementation is mandatory for HTTP/1.1.

It seemed unlikely that most software vendors or web site operators would deploy systems that failed to interoperate with the millions of existing clients, servers, and proxies.

Version numbers: The version number in an HTTP message refers to the hop-by-hop sender of the message, not the end-to-end sender. Thus the message's version number is directly useful in determining message-level capabilities. For example, HTTP/1.1 origin server receives a message forwarded by an HTTP/1.1 proxy.

HTTP/1.1 defines

path followed by a forwarded message. The path information includes the HTTP version numbers of all senders along the path and is recorded by each successive recipient.

The

OPTIONS method: HTTP/1.1 introduces the OPTIONS method, a way for a client to learn about the capabilities of a server without actually requesting a resource. For example, a proxy can verify that the server complies with a specific version of the protocol.

Upgrading to other protocols: HTTP/1.1 includes the new upgrade request-header and hence it is upgraded.

A client informs a server of the set of protocols it supports as an alternate means of communication. The server can choose to switch protocols.

HTTP/1.1 includes a new status code, 100 = continue, to inform the client that the request body should be transmitted. When this mechanism is used, the client first sends its request headers and then waits for a response. If the response is an error code, such as 401 (unauthorized), indicating that the server does not need to read the request body, the request is terminated. If the response is 100 = continue, the client can then send the request body, knowing that the server will accept it. Web Browsers NOTES

106 Material Web Browsers NOTES Self-Instructional Because not all servers use this mechanism the Expect header is a relatively late addition to HTTP/1.1, and early HTTP/1.1 servers did not implement it, the client must not wait indefinitely for a 100 = Continue response before sending its request body. HTTP/1.1 specifies a number of somewhat complex rules to avoid either infinite waits or wasted bandwidth. We lack sufficient experience based on deployed implementations to know if this design will work efficiently.
Compression: HTTP/1.1 makes a distinction between content coding, which are end- to-end encodings that might be inherent in the native format of a resource, and transfer coding. Compression can be done either as a content-coding or as a transfer-coding.
HTTP/1.1 had to carefully revise and extend the mechanisms for negotiating the use of
coding. HTTP/1.1 adds the Transfer-Encoding header, which indicates the hop- by-hop transfer coding used for a message. The Connection header:
HTTP/1.1 introduces the concept of hop-by-hop headers, i.e., message headers that apply only to a given connection and not to the entire path.
The use of hop-by-hop headers creates a potential problem: if such a header were to be forwarded by a naive proxy, it might mislead the recipient. Therefore, HTTP/1.1 includes the Connection header. This header lists all of the hop-by-hop headers in a message, telling the recipient that these headers must be removed from that message before it is forwarded.
2.4.6
Extended Architecture of Web Browser This basic typical web architecture serves a wider variety of needs beyond static document access and browsing.

98% **MATCHING BLOCK 219/472** W

The Common Gateway Interface (CGI) extends the architecture to three-tiers by adding a back-end server that provides services to the web server on behalf of the web client, permitting dynamic composition of web pages.

98% **MATCHING BLOCK 220/472** W

The Common Gateway Interface (CGI) extends the architecture to three-tiers by adding a back-end server that provides services to the web server on behalf of the web client, permitting dynamic composition of web pages.

Helpers/plug- ins, Java and JavaScript provide other interesting web architecture extensions. 2.4.7 Common Gateway Interface (CGI) CGI interface handles especially the dynamic documents. It follows the set of instruction to create the input for program and then desired result appears. It is, in fact, server- side script that receives the encoded information from remote clients. The browser is involved by environment variables and STDIN keyword in the programming. It produces a valid HTTP header along with body declared by STDOUT keyword. CGI protocol, in fact, works as formal agreement, which is associated with a program and a web server. The server encodes input data submitted from clients.
Fig. 2.21 Services Provided by CGI Program The programs and CGI protocol get connected with other programming languages and hence are used to develop programs for Web development. The languages are shell, Rexx, C, DCL, Smalltalk, C++, VMS, Python, and Perl. The following code is written with HTML as CGI script:
Self-Instructional Material 107 Server CGI data data HTML >FORM ACTION=”../cgi-bin/mycgi.pl” METHOD=POST<
Scripting technologies are embedded in the HTML page, and the examples are PHP, JSP, ASP, etc. The following figure shows the dynamic HTML document for the active document. Web Browsers NOTES Client Server Dynamic HTML document Fig. 2.22 Dynamic HTML Document for Active Document

88% **MATCHING BLOCK 221/472** W

In active documents, the program or script runs at the client’s side.

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In active documents, the program or script runs at the client’s side.

illustrates the concept of CGI. Form in browser Fig. 2.23 Common Gateway Interface S Run the script (S) inside the HTML document Request Server Client Dynamic HTML document Request Program

108 Material Web Browsers NOTES Self-Instructional Table 2.7 shows the various programming languages that are used to create web site using server and client-side scripting: Table 2.7: Programming Languages Used to Create a Web Site Programming Languages Server and Client-side scripting Content Management System (CMS) Drupal and Wordpress use CMS. Silverlight and XAML These markup languages are portable and are available on Windows, Mac, Linux. They help in making portable web applications. Silverlight makes use of XAML. Scriptol and PHP Scriptol is tagged with PHP. It is a modern, object-oriented and procedural language suitable for creating web sites. PHP provides a user-friendly environment to develop Web applications. RSS and XML These two provide Ara editor for PHP scripting to build and update the RSS feed of web site. Active Server Pages (ASP) This application uses VBScript and having .asp file name extension. It is developed by Microsoft. .NET Framework It was also developed by Microsoft, apart from C++ and VB.NET, ASP. NET environment uses the .aspx file extension. XML This stands for Extensible Markup Language. It was designed to transport and store data, with focus on what data is. In most web applications, XML is used to transport data. It is the most common tool for data transmission between all types of applications, and is gaining popularity in the field of storing and describing information. SQL It stands for Structured Query Language and is a widely used database language, providing means of data manipulation (store, retrieve, update, delete) and database creation. Almost all modern Relational Database Management Systems like MS SQL Server, MSDE, Microsoft Access, Oracle, DB2, Sybase, MySQL, Postgres and Informix use SQL as the standard database language. Although all those RDBMS use Sql, they use different SQL dialects. For example, MS SQL Server specific version of the SQL is called T-SQL, Oracle version of SQL is called PL? SQL, MS Access version of SQL, is called JET SQL, etc.

CGI Programming Perl language is also known as CGI and Python, UNIX shell script, AppleScript, Visual Basic, C, C++, etc. This interface allows reading the standard input and writing the standard output for the web programming part. This interface reads the data, processes the data and sends output as an HTTP response header to generate the document. It sends a blank line to separate the HTTP header and reads data via GET and POST methods.

One difference between GET and POST is that

in the GET method, the searched information appears with the URL whereas POST hides the searched query. CGI (Common Gateway Interface) is

almost always exploited by hackers and you can enable or disable it by default. The following screen shows the various types of check boxes that provides security services for CGI handlers.

Self-Instructional Material 109 Password protecting web pages: This advance feature comes if the users want to log on for getting the web page and viewing the page. For this, .htaccess is used in which usernames and passwords are created and enable users to share. If the site is FrontPage enabled the access control mechanism is built into FrontPage, which is based on .htaccess. The .htaccess file is used to configure the Apache file and falls under the category of distributed configuration file. Fig. 2.24 Web Service Stack Image Map: An image map is pointed by various browsers, such as IE, Mozilla or Netscape, and the certain image is accessed by certain spots if they are to be clicked. Image map has three components, known as image file (what the user wants to see), map file (contains the coordinates the regions of map) and an HTML file (includes images/links for the map file). In the Linux operating system, webdisk/public_html directory is made to readable by the server. Link is provided by the specific Uniform Resource Locator (URL), which

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is a pointer that avails specified resources across the net. Resource simply means information containing files or directories. It is referenced with query to available databases via search engines, such as Google or Yahoo. 2.4.8

89% MATCHING BLOCK 226/472 W

is a pointer that avails specified resources across the net. Resource simply means information containing files or directories. It is referenced with query to available databases via search engines, such as Google or Yahoo. 2.4.8

Java Java, a combination of three components (runtime environment, programming language of class library), uses applet to run programs at server as well as client site. The class library retains predefined objects to make object-oriented programming easier. Java is associated with WWW because it provides a complete framework of server-side web programming. Java programming in the form of Java applet is created to be viewed on the web. The implementation of Java applet recognizes the distribution of data manipulations between server and web browser. But it is necessary that unlimited networking and file accessing approach must be implemented in a server where Java application runs alongside to the web server. The small Java programs known as applets are run in Java virtual machine (JVM). Applets are embedded in HTMLcoding between >APPLET<... >/APPLET< tag. The applet tag is supported by some browsers but additional installations or plug-in are required to work the Java applets. Java language executes programs for website in the following sequence: Loads Java programs?Downloads internet explorer ?Controls ActiveX session in a web page? Downloads process?Verifies identities?Execute the programs. Web Browsers NOTES
110 Material Web Browsers NOTES Fig. 2.25 Applets in Web Page Almost all browsers are able to interpret Java programs. Java applets run fast with the help of ActiveX control. This language provides ideal framework for server- side web programming. The following features are provided for web programming by Java which is implemented to incorporate with World Wide Web services: Portability: Portability represents the semantics of languages and standard libraries. The Java JDK 1.1 and JDK 1.2 works with Swing GUI toolkit that facilitates portability concept. If a Java program is to be run virtually on various types of computers that are connected to the Internet,
it refers portability. In the case of Java applet, various OSs, CPUs and browsers are connected to the Internet. The same Java code can work in all the computers showing portability. Platform Independence: The platform independence represents the bytecode interpretation. A Java code shows the platform independence due to its flexibility operations working on various types of operating systems. Secure Runtime Model: This feature includes the array bound checks, bytecode verification and automatic garbage collection etc. Java maintains security features at initial stage to enable the applets (when applet loads) by safely downloading and executing the client computers.

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import java.awt.*; import java.applet.*; public class rect extends Applet { public void paint(Graphics g) {

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import java.awt.*; import java.applet.*; public class rect extends Applet { public void paint(Graphics g) {

public void paint(Graphics g) { g.drawRoundRect(10,100,80,50,10,10); g.fillRoundRect(20,110,60,30,5,5); } } Self-Instructional The coding of rect.html is as follows: >APPLET CODE = “rect.class” WIDTH = 300 HEIGHT = 400< >/APPLET< Java Browser

Material 111 The result of the Java coding is as follows: Java applications Java applications are considered as Java programs that run under installed programs. The application is itself a standalone program launched normally by the command line. Running applications in Java can access local resources using file security permissions. The file security permissions are set by local system administrator. Basically the jar files in Java contain the Java applications placed in a local computer. The main program can be executed within the jar. If the application is associated with java 'jar' files, the file system browser runs the applications in Java virtual machine (JVM). The jar stands for Java ARchive. This file format contains zip file format that is used to aggregate the popular ZIP file format. It aggregates many files into one. The jar file contains the java applications and programs. The Java application requires the following steps to execute the coding successfully. ? Creating source file? A source file represents Java coding file. It is easy to understand for programmers. Many text editors are used to create and edit the source files. ? Compiling source file into the .class file? The Java compiler creates a file with extension name as .javac that translates the coding into instructions. These instructions are understood by Java virtual machine. The JVM code is also known as bytecode. ? Running the coded program? The launcher tool of Java uses JVM to run the coded program. Basically, the Java application follows a template that is used for constructing a simple Java application program. The Java template is as follows: import list class name { Web Browsers NOTES main method { declarations of constants declarations of variables program statements } } Self-Instructional
112 Material Web Browsers NOTES To create Java application, you first start the editor, for example, notepad. In a new document, type in the following code: /* The WelcomeToJava class implements an application that prints 'Welcome To Java World!' on the standard output. */ class WelcomeToJava { public static void main(string[] args) { System.out.println("Welcome To Java World!"); //Displays the String } } Self-Instructional The result of the preceding coding is as follows: The following table shows the differences between Java applets and application. Table 2.8: Differences between Java Applications and Java Applets Java Application Java Applets An application is a Java program that runs by itself. An applet is a Java program that run on web page. The security feature of Java application considers the machine itself. Security is not logged with Java applets. They cannot be trusted when downloading code. Browsers are not required for applications. Browsers support Java to load the applets. Java applications require main() method because a Java application invokes Java where compatible interpreter loads a main() method containing file. The life cycle of application starts from here. Java applets do not use main() method. Java application has a power to access the unrestricted host system. Applet programs run with web browser or applet viewer. Java application reads or writes files which are present on
the host system. Applet does not read or write files on the host system.
Java application runs by itself. Applets are able to communicate with other applets which run on the same virtual machine. Applications run as command line arguments. Applets run on the web page. An applet cannot read, write or delete files. Java application does not require port services. It can not use any privileged port, i.e., ports below and including port 1024. The Java application implements a security policy allowing sensitive operations in a security context. The application might allow or disallow the operation. An applet cannot circumvent the security restrictions by registering a SecurityManager object. A Java application Can run a program from the local system unit. A Java Application Cannot run a program from the local system unit. Other servers can communicate with Java applications. Other servers cannot communicate with Java applets.
Self-Instructional Material 113 The following java code shows a simple applet programming: import java.awt.Graphics //Importing class Graphics import javax.swing.JApplet //Importing class JApplet public class welcomeApplet extends JApplet { //Draw background of Applet public void paint(Graphics g) { //Calling paint() method using superclass super.paint(g); g.drawString("Welcome to Java Programming!", 25, Web Browsers NOTES 25); //Draw String at x co-ordinates as 25 and y co-ordinates as 25 }//End of paint() method }//End of welcomeApplet class The result of the preceding program is as follows: In this coding, paint() method is used to call all applets. When you create applets, it is better to import the JApplet class. This class resides into package javax.swing. The class JApplet is defined as 'what it means to be an applet.' The statement extends JApplet inherits methods. The browser or appletviewer creates an object of public class welcomeApplet. The paint() method draws graphics on screen. The keyword void returns the value when it finishes task. The paint() method gets parameter automatically because Graphics object used by paint. The Java coordinate systems are measured in pixels if the picture elements are defined. The upper left is considered as (0, 0). The body of paint()method contains drawString() method that is used to display the string on the screen. The object g is called by dot(.). The appletviewer only understands >APPLET< ... >/APPLET< tags. The applet is executed by issuing the command at command prompt as follows: C:\<Appletviewer welcomeApplet.html

114 Material Web Browsers NOTES Figure 2.26 shows how Java applet runs in the web browser. Fig. 2.26 Running the Applet in Web browser Graphics is the process and art of combining text and graphics and communicating an effective message in the design of logos, graphics, brochures, newsletters, posters, signs and any other type of visual communication. Today, graphic designers often use desktop publishing software and techniques to achieve their goals. Java graphics and text contain a lot of methods representing Graphics environment variables. The paint() method draws the graphics or text on the output screen. The resized browser window can update the screen automatically. For example, the paint() method contains the template of Java applets. public void paint (Graphics g) { Screen drawing statements are written here. } The coding follows the above parameters with argument 'g' as follows: public void paint(Graphics g) { g.drawLine(100, 150, 325, 72); } Self-Instructional In the above code, the drawing instruction is started with character 'g'. In the paint() method, the body are of paint()method is defined as follows: Graphics g = getGraphics(); g.drawOval(300, 120, 100, 75); //Define four co-ordinates of drawOval() method The above statement creates graphic environment variable for screen graphics mode setting. The co-ordinate system The co-ordinate system defined for the output screen in Java graphics and text is shown in Figure 2.27.

Self-Instructional Material 115 Fig. 2.27 Co-Ordinate System Basically the colour resolution setting is same for both Java graphics and texts. Each unit is treated as one pixel wide and the entire screen is about 600 units wide and about 400 units high. The coordinate measures provide the flexibility in Java programs because values can be increased for co-ordinates setting. The co-ordinates (0, 0) refers to origin on the screen and set in top-left corner in the Java applet window. The maximum co-ordinates values maintain a standard on the size of the applet window which is determined by the applet if called by web page. The following code is an example. >applet code= "MyFirstApplet.class" width= "150" height= "150"< >/applet< Lines, ovals, rectangles and arcs The graphics environment contains the following syntax is found for drawing lines, ovals, for example, ellipses including circles, rectangles and arcs: g.drawLine(100, 100, 420, 312); g.drawRect(72, 160, 200, 35); g.drawOval(300, 120, 100, 75); g.drawArc(250, 250, 100, 100, 0, 180); The statement g.drawRect(72, 160, 200, 35); draws the figure on the output screen in the following way: The width and height of the rectangle has top corner at (72,160) and width of 200 and height of 35. Its bottom-right corner is at (72+200,160+35) that is 272 and 195. The statement for drawing oval g.drawOval(300, 120, 100, 75);has four numbers representing coordinates. The four values represent the top-left co-ordinates of the rectangle and its width and height respectively. This mean that the oval drawn has top-left co-ordinate is at (300,120) and whose bottom-right co-ordinate is at (400,195). The width of the oval at its widest point is 100 pixels, whereas height is at its maximum point is 75. Web Browsers NOTES

116 Material Web Browsers NOTES Filled shapes The filled shapes in Java are drawRect, drawOval and drawArc as follows: g.fillRect(72, 160, 200, 35); g.fillOval(300, 120, 100, 75); g.fillArc(250, 250,100, 100, 0, 180); The fillArc method generally shows the pie-slice effect. Strings: Strings are specified by placing them within double quotation marks and output comes in the same graphics output mode. The drawString () method has three parameters, where the first parameter is the specified string or text that is to be displayed on the screen. The rest two parameters represent the top-left corner of the string. The second parameter specifies the y-co-ordinate of a line on which the text is fixed and appeared as output. Note: Some alphabets, such as 'g' or 'y' appears below the imaginary line. This line is specified on the displaying screen for text or string output. Colour setting with graphics and text: Java uses the default colour of black to draw the shapes and colours. The Java graphics colour coding is declared as follows: g.setColor(color.blue); g.setColor(Color.orange); The following list of colour coding can be set with Java Graphics and text: Black, Gray, Orange, Yellow, Blue, Green, Pink, Cyan, LightGray, Red, darkGray, Magenta and White. Example, setBackground(Color.cyan); The following code shows the program for Java text that appears in Graphics mode:

import java.

drawString("JAVA", 20, 20); } } The html code is written as follows for disp.html. The file will be saved >APPLET CODE = "disp.class" HEIGHT = 300 WIDTH = 400< >/APPLET< Self-Instructional

Self-Instructional Material 117 The result of this applet coding is as follows: Web Browsers NOTES JavaScript JavaScript came into existence after the joint effort done between Sun Microsystems and Netscape Communication. It is an object-based, client-side scripting language which can be edited in Dreamweaver HTML editor and hence is used to make a web page more dynamic. JavaScript tracks the mouse events after hovering the different types of assigned objects. JavaScript code embedded into HTML pages can enhance them with many interesting elements, from swapping images when you move a cursor over them, to multi-level drop-down menus. You can create application-like pages with the help of JavaScript. You do not need any special software other than a text editor and a Web browser and also you do not need access to a Web server. You can create and test all your JavaScript code right on your own computer. The main difference between Java and JavaScript is that Java is a real programming language and you can create real programs with it, whereas JavaScript is a scripting language. You could even say that JavaScript is rather an extension to HTML than a separate computer language. It is so tightly integrated with HTML that you could call it 'JavaScript markup language'. The popularity behind JavaScript is due to associate with Java applets. The JavaScript is object base that uses items known as objects; it is client side because runs in the client (software) and that could be a web browser. It runs in the browser by being added directly into an existing HTML document. The JavaScript code is written within >SCRIPT< ... >/SCRIPT< tags. >HTML< >BODY< This tag tells the browser that JavaScript follows >SCRIPT language=*JavaScript*< document, write (*This writes text to the page*); >/SCRIPT< This line writes the text inside the quote marks on the page >/BODY< >/HTML< This line tells the browser that this is the end of the script Fig. 2.28 JavaScript Code between >SCRIPT< ... >/SCRIPT< Applet Standard
118 Material Web Browsers NOTES Self-Instructional In Figure 2.28, you can check the statement which is written between >SCRIPT language= "JavaScript"< tells the browser that JavaScript coding is started. The tag >/SCRIPT< instructs the browser that this is the end of the script. The
site layout refers to the designing phase of basic structure of
web site layout. It contains web pages, images, scripts and databases of files. The layout creates a structure in which folders and files are linked together. The actual layout of a web site depends on use and size for which it follows basic principles. Web sites are consisted of three types of web pages. These types are known as the home page, Intermediate pages and content pages. This three tier design is shown in web site layout in Figure 2.29. Fig. 2.29 Three-Tier Design Layout For small to medium size websites the layout the general design will generally be two-tier but the larger websites which are generally more than 25 pages having the three-tier layout. All pages should link back to the home page. The following characteristics are found in the design layout: ? Any page should be a maximum of two clicks away, i.e., 2 links. ? Try not to have more than 20 links per page. ? A link to a contact page should be included on each page. Web pages can contain text, pictures, audio, video and scripts. Fig. 2.30 Folders for Images and Scripts
Self-Instructional Material 119 Folders make the web page organization easier and can also be used for applying security for private areas, however; only create additional folders were necessary. The layout of your website should enable the visitor to easily navigate your web site. Navigation for most websites consists of a navigation menu/bar at the top, side or bottom with many having several navigation options. It is always a good idea to use plain text navigation menus when possible as it makes it easier for search engines. Home page?Starting page Contact?Your contact details usually minimum email address Site map?List of the important web pages Resources/Links?Links to other sites and useful resources. The home page menu option should not be included on the home page itself. If you use Cascading Style Sheets and/or JavaScript then always use external ones were possible. Using external ones makes them easier to change as only one page needs to be edited to effect the entire web site and it is also much better for the search engines. When you begin designing your pages, keep in mind, your visitors may enter your site from pages other than your main. Make sure you include good navigational links on every page. Place your navigational links together at the top, bottom, left or right side of the page. An external JavaScript file is a text file that contains code and saved as .js file extension. The external scripts are added by src (source) attribute to the opening SCRIPT tag. The statement in HTML coding is written for calling the external JavaScript file as follows: >SCRIPT language="JavScript" scr="Java_Script_file.js"< >/SCRIPT< A JavaScript web server would expose host objects representing a HTTP request and response objects, which could then be manipulated by a JavaScript program to dynamically generate web pages. The following code shows how JavaScript code is tagged with HTML code: >html< >head< >script type="text/javascript"< function show_alert() { alert ("Hello! I am an alert box!"); } >/script< >/head< >body< >input type="button" onclick="show_alert()" value="Show alert box" /< >/body< >/html< The result comes as follows: Web Browsers NOTES

120 Material Web Browsers NOTES Drop down list and javaScript The following HTML code is written to create drop down list using JavaScript: >FORM name= “guideform”< >SELECT name=”guidelinks”< >OPTION SELECTED value=”jex6.htm”<Page 1 >OPTION value=”jex7.htm”<HTML >/SELECT< >INPUT type=”button” name=”go” value=”Go!” onClick= “window.location=document.guideform.guidelinks.options[document. guideform.guidelinks.selectedIndex].value”< >/FORM< The result comes as follows: 2.4.9 Mozilla Firefox Mozilla Firefox is a web browser with benefits such as faster browsing, real privacy and security and smarter searching. It is cross-platform and hence can be used in Windows operating system, Linux, Mac OS and other small type of operating system. Firefox is free, simple to switch to and extremely easy to use. The Firefox Download web site will always provide you with the latest version download of Mozilla Firefox as well as the most helpful information on how to get the most out of your new browser. Firefox is supported and developed by the Mozilla project, which is sponsored by the non-profit Mozilla Foundation. Fig. 2.31 Firefox Browser Screen Self-Instructional

Self-Instructional Material 121 Mozilla Firefox provides a way to easily clear the address bar as well as the browser’s cookies, cache, etc. The following steps are required to clear the history of browsing files. Select the Tools menu and select Clear Recent History. The Time range to clear option at the top allows you to specify how far back in time you would like Firefox to clear files. Import into Firefox Mozilla Firefox allows you to easily import your settings and favourites from other web browsers with its Import Wizard. The following steps are required to import into Firefox: Select the File? Import menu. The Import Wizard appears as below. Select the browsers you want to import your data from and click on Next button. Web Browsers NOTES

122 Material Web Browsers NOTES Self-Instructional Select the data you want to import into Firefox and click on Next button Firefox quickly imports your data. Click on Finish button. Mozilla Firefox includes a feature called about:config that gives you access to many options not available under the standard Tools-Options window. Many of the tips we offer involve using about:config to access these options. Follow the step below to access about:config in Firefox. Either you type or copy and paste about:config without quotes into the address bar and press the [Enter] key. There are many other Firefox about commands. Try typing or copying and pasting some of the commands below without quotes into the address bar.

Material 123 ? about:mozilla ? about:credits ? about:cache ? about:plugins ? about:buildconfig Mozilla Firefox offers several options to make it even faster. Follow the steps below to speed up Firefox on a broadband connection. ? Either you can type or copy and paste about:config without quotes into the address bar and then press the [Enter] key. ? Either you can type or copy and paste network.http.pipelining into the filter bar. ? Double click on the network.http.pipelining listing that appears to set its value to true. ? Double click on the network.http.pipelining.maxrequests listing that appears. ? Delete the current value and replace it with the number 8. ? Click on OK button. Fire FTP Plug-in FireFTP is a free, secure, cross-platform FTP client for Mozilla Firefox which provides easy and intuitive access to FTP servers. FireFTP is an FTP client that installs right into Firefox and is fully functional. When firing up FireFTP, you would notice that it is the familiar dual pane view with the commands executed at the bottom. The following steps are required to set up the FireFTP. It is like an FTP client application. First, setup your sites you want to connect to by clicking Manage Accounts in the top left corner. Click New..., to define a regular FTP connection. The first tab on the Account Manager screen asks for your account name, host, ID login, and password. If you want to login anonymously, click the checkbox and you are on your way. The Connection tab goes more into the details of how you want your FTP connection to behave. The options are configured in this tab. Web Browsers NOTES Self-Instructional

Self-Instructional Material 124 Web Browsers NOTES The Advanced tab provides server encoding, attaching a web host and/or prefix, or selecting different upload/download options for your file transfers. When you are finished with your settings, select your account and click Connect off to the right of the account list. Your remote and local list will load into each window. Use the arrows in the middle to transfer files back and forth. As you transfer files, commands at the bottom scroll by to show your actual progress and history.

Self-Instructional Material 125 Configuration of FireFTP FireFTP has two locations for configuring options. One location is on Tools?Add- Ons, where you can click the FireFTP extension and press the Options button. The second location is when you actually activate FireFTP. You can click this button and select Options. The options are broken into the following tabs: ? General: Provides the ability to control server messages, memorize sessions details, and manipulate the file view ? Interface: Determine the layout, adjust how you want FireFTP to start up, and how to handle logging ? Connections: Proxy Settings, Active settings, and Recovery Settings ? Downloads/Uploads: Details of how you want to handle your file transfers (Automatic, Binary, ASCII), duplicate file names, and time stamps The FireFTP configuration options make it a portable FTP client. The following steps are required to use the FireFTP: ? Download and install the FireFTP plug-in by going to the FireFTP web page. After installing the FireFTP, it will show up under the Tools Menu in your Firefox browser. After you click the FireFTP option in tool menu, a screen will pop up showing two panels. One panel contains all the files on your local computer, and the other panel will contain the files on the remote location. Web Browsers NOTES

Self-Instructional Material 126 Web Browsers NOTES ? The first time you connect to a server as your remote location, you need to click on Manage Accounts, and then select New. You only need to do this once; after you create this New account, you will be able to use it whenever you want to access that particular webspace. ? When you select New from the Manage Accounts menu, a dialog box will pop up. You need to enter the name of this account and you need to enter the name of the remote server, your username and password. This information should be provided by the administrator for your webspace. ? Now you should see the new account show up in the Accounts box, and you can click on Connect to connect to your account. Bookmarking in Firefox With the help of bookmarks, Firefox remembers your favourite sites for you. To bookmark a page in Firefox, select Bookmarks?Bookmark This Page. This option is also available if you press [Ctrl+D] key combination. The 'Add Bookmark' dialog will open, asking you where you want to save the new bookmark.
Self-Instructional Material 127 Select the folder that you want to save the bookmark to from the dropdown menu and click on OK. If you want to save the bookmark to the Bookmarks Toolbar, select Bookmarks Toolbar folder as the target. If you want to add a new folder, click on New Folder and enter the folder name. Firefox will create the new folder below the highlighted folder. Firefox's Bookmarks Toolbar is a good place to save your most commonly used bookmarks. The easiest way to create a bookmark on your toolbar is to mark the site address, i.e., URL and drag and drop it to the toolbar. To do that, select the URL, hold down the left mouse button and move it to the position on the toolbar where you want the bookmark to appear. Alternatively, you can also add a bookmark to the toolbar by using the 'Add Bookmark' dialog. In this example, you have created a toolbar for CNN.com. If you want to rearrange the order of your toolbar bookmarks, simply drag and drop the bookmark from its old position to a new one. To do that, click on a bookmark and do not release the left mouse button until the arrow is where you want the bookmark to be. Web Browsers NOTES
Self-Instructional Material 128 Web Browsers NOTES As you can see, the 'CNN.com' and 'The Mozilla Help Site' bookmarks have traded places. When you right-click on a toolbar bookmark, you can easily access the context menu. Options marked in orange are for the bookmark you just clicked on, options in grey affect all bookmarks on the toolbar. Individual bookmark options are as follows: Open: This opens the bookmark in the current browser tab/window. Open in New Window: This will open the bookmark in a new browser window. Open in New Tab: This opens the bookmark in a new browser tab. Cut: This will remove the bookmark from the toolbar and copy it to the clipboard and you can paste the copied material to other application. Copy: This will copy the bookmark to the clipboard. Delete: This wil delete the selected bookmark. Properties: This opens the bookmark properties dialog. In Firefox's bookmark properties window, you can enter or edit the following:
Self-Instructional Material 129 Name: This is the bookmark's name that will appear on the toolbar. It is pre-filled with the page's title. Since the title is sometimes a bit on the long side, it is a good idea to edit the bookmark name to free up space on the toolbar. Location: This is the web address (URL) of the site/page you bookmarked. Keyword: Using a keyword is a great way to easily access your favorite sites. You can enter 'news' as the keyword for your favorite news site. Once you have done this, simply typing 'news' in Firefox's address bar where you would normally enter the site's address will then take you to this site. Description: You can enter a description for your site here. This can be useful when you have many bookmarks or the site's address or name don't indicate what the site is about. Load this bookmark in the sidebar: When checked, this will make the bookmarked page load in Firefox's sidebar instead of in the browser window. This option is especially useful for live bookmarks, but perhaps less useful for the majority of sites. Firefox's Bookmark Manager is a very useful tool when it comes to managing your bookmarks. It allows you to rearrange, automatically sort, edit and to import or export bookmarks. To open Bookmark manager, select Bookmarks?Manage Bookmarks. The Bookmark Manager window will open. Moving and Editing Bookmarks Firefox's Bookmark Manager has several buttons that will allow you to edit and move bookmarks: New Bookmark: This allows you to manually add a new bookmark. Web Browsers NOTES
130 Material Web Browsers NOTES Self-Instructional New Folder: This allows you to create a new bookmark sub-folder. New Separator: This will allow you to add a new separator. The new separator will be placed above the bookmark/folder that you have selected in Bookmark Manager. In this example, we have added a new separator to our Bookmarks Toolbar. Separators can help distinguish different bookmark categories from each other. Move: This will allow you to move the bookmark to a new position/folder in your bookmarks file. When clicking on this button, a 'choose folder' dialog will appear: Select the folder you wish to move the bookmark to and click on OK. Properties: This opens the bookmark properties dialog. Rename: This will allow you to rename the bookmark, i.e., change the name that appears in the bookmark list. Delete: This will delete the selected bookmark. Sorting bookmarks Firefox's Bookmark Manager allows you to sort your bookmarks, as well. There are two ways to do this:

Self-Instructional Material 131 ? You can manuallysort bookmarks by dragging and dropping them to a new position. ? You can use Bookmark Manager's automatic sort function. To access the automatic sort function, select View in Firefox's Bookmark Manager. Unlike for the Mozilla Suite, this will only rearrange the bookmark order in Bookmark Manager. If you want to rearrange the order in which they appear when you select Bookmarks, right-click on any bookmark in the browser window not in Bookmark Manager and select Sort By Name. Live Bookmarks are a very useful Firefox feature. As the name implies, these bookmarks offer dynamically updated links/content like in the example below: In the above figure, the headlines are constantly updated, i.e., when you select 'Latest headlines' at a later time, you should see new headlines. Already, many sites like Yahoo News or BBC News support live bookmarks by offering RSS or Atom feeds. Firefox uses the icon for live bookmarks. This allows you to easily tell which bookmark is a regular (static) or live (dynamic) bookmark. Adding live bookmarks When a site that offers RSS feeds lets Firefox know that it does, adding a live bookmark is easy: You can tell that a site offers an RSS feed when you see the live bookmark icon in the lower right hand corner of Firefox's browser window. Web Browsers NOTES

Self-Instructional Material 132 Web Browsers NOTES If you want to add a live bookmark for that site, simply click on the icon and then on Subscribe to... Select where you want to save the live bookmark and click on OK button. Firefox has now added a new live bookmark for BBC News. Click on it to see their latest headlines. Manually creating a new live bookmark If the site does not tell Firefox that it offers RSS feeds, you can manually create a live bookmark. Usually, these site have links that say 'RSS feed' or 'Atom feed'. Right-click on the link and select 'Copy Link Location'. Next, open Firefox's Bookmarks Manager and select File?New Live Bookmark.

Material 133 Enter a name for the live Bookmark under 'Name'. Then, right-click into the 'Feed Location' field and select Paste. Click on OK and you have manually created a new live bookmark. Importing bookmarks If you have previously used a different browser or want to import your bookmarks from a memory stick or other media, Bookmark Manager's Import function is what you are looking for. To open Import, select File?Import in Firefox's Bookmark Manager Window. Web Browsers NOTES Anew window will appear, asking you where you want to import your bookmarks from. Exporting bookmarks The Firefox Export function provides you to export the bookmark manager. To open Export, select File?Export in Firefox's Bookmark Manager. A dialog window will appear asking you where you want to save the file to. Self-Instructional

Self-Instructional Material 134 Web Browsers NOTES 2.5 SUMMARY In this unit, you learnt that: ? Web browsers are used to interpret hypertext mark up language, Java applet and JavaScript to embed the text, graphics, figures, multimedia documents, etc. and they can appear on the web page in the given and desired format. The popular web browsers are Internet explorer, Netscape Navigator, Mozilla Firefox, Google Chrome, Lynx, Opera, Apple's Safari, etc. frequently used by users. The components of web browser refer to controller, client programs, interpreters, etc. ? The anatomy of a web browser includes the toolbars, such as back button, forward button, home button, reload or refresh button, print button, stop button, search button etc. The FTP reuse mechanism allows you to use one connection to get different files from the same site. The HTTP Streaming Protocol Extensions (SPE) streaming starts after transmitting fewer protocol messages if RTSP is used, for example, if using HTTP Streaming, streaming can start with only two HTTP GET requests. The HTTP authentication uses server and client authentication for authorization of users. The firewall, a set of related programs, located at a network gateway server, which protects the resources of a private network from users. ? Plug-ins are software programs that enhance the capabilities of a web browser. They are designed to work specifically with a browser like Netscape Navigator, Internet explorer, etc. With plug-in you can hear audio voice and music, watch video, animation, movies, 3-D virtual reality, etc. The helper applications are worked as shareware and used to enhance the working ability of browsers. These abilities let you automaticallydecompress downloaded applications, listen music, playvideo games, watch movies, etc. ? The Firefox protects online security and personal information. It provides secured features and scrutinizes the outdated plug-in detection, private browsing, instant web site ID, etc. 2.6 KEY TERMS ? Hypertext: It is populated by World Wide Web (WWW) in which a block of text is tagged as a hypertext link. This link is activated to view other connected pages as hypertext documents. ? Web protocol: A protocol that is used to enable the connection, communication and data transfer between two places on a network, for example, HTTP, FTP, HTTPS, etc. ? Remote procedure call (RPC): A protocol in which one program can request a service from a program located in another computer in a network without having to understand network details. It uses the client/server model in which the requesting program is a client and the service-providing program is the server. ? Graphics user interface (GUI): A type of interface that controls all the inbound and outbound traffic on all adapters and network interfaces, if system unit is connected with the Internetworking facility.

Self-Instructional Material 135 ? File protocol program (FPP): It is a network protocol. It is used to exchange and manipulate files over a TCP/IP based network, for example, Internet. ? Premaster secret key (PSK): A key, which is used to authenticate the user on basis of the session key. This session key is used to encrypt and decrypt all data traffic sent between the client and the server across network. ? Institute of Electrical and Electronics Engineers (IEEE): One of the world's leading technical professional associations, which fosters innovation through publications, conferences and standards development. ? >param< tag : An HTML tag, which is used to define parameters or variables for an object or applet element. ? Motion picture expert group-2 (MPEG-2): A standard on which products such as digital television set top boxes and DVD are based. ?
Linear media: An interactive interface focused on providing broadcasters with the best cross media entertainment. ? User agent (UA): A client application implementing a network protocol used in communications within a client-server distributed computing system. ? Home page: The first file or Uniform Resource Locator (URL) that automatically loads when a web browser starts or when the browser's 'Home' button is pressed. ? Bookmark: A saved link to a web page. If a user visits a particular web site or home page and want to be able to quickly get back to it later, you can create a bookmark for it. Web Browsers NOTES 2.7 ANSWERS TO 'CHECK YOUR PROGRESS' 1. The controller obtains input from the keyboard or the mouse to access web pages with the help of a client program. The function of controller starts after accessing the web pages. It
uses one of the interpreters to display the web pages on the host screen. 2. Client
programs are used to establish TCP sessions with the web server or the proxy server. To accomplish this task, the client programs make use of HTTP, FTP, Gopher or Telnet. 3. Interpreters are used to display the web pages on the web user's screen. The interpreters which are used to translate web pages on the client's screen are HTML, CGI and JAVA. Such interpreters depend on the type of document. The HTML, which is a markup language and which allows the browser to change the format of the web pages, is used for scripting web pages. 4. A web browser is a client software program, which is supported by a TCP/IP client and used to access the web documents on web servers. The browser program basically retrieves the hypertext pages that provide advanced features of the web, such as virtual memory, memory caching, etc. Browsers support the transfer of the hypertext document, for example, playing sound files, transferring images and implementing the interactive programs, etc. 5. Internet protocol (IP) also known as web protocols is one of the most dominant protocols, such as TCP/IP protocol located at the network layer. The network layer is used to deliver the data packets. These data packets are safely sent from

Self-Instructional Material 136 Web Browsers NOTES source location to destination location between devices or networks. They are sometimes interconnected arbitrarily in the Internetwork. Internet protocol is used for sending and communicating data from one device to another on TCP/IP networks. The primary job of IP protocol is to deliver datagrams across an Internetwork of connected networks. The packet of data passed across a network is known as datagram. Internet Protocol has proved to be a boon in incalculable ways. 6. The two data link protocols Point to Point Protocol (PPP) and Serial Line Internet Protocol (SLIP) are popularly used to interact with Internet protocol. For example, the fragment large block of data matches with the physical networks so that the recipient rebuilds the connection as needed. 7. Internet protocol is known as 'unreliable protocol' because if datagram are sent from device A to device B, A sends each data as packet and then moves to the next. IP does not maintain the tracks of earlier sent data. It even does not provide service quality or reliability, such as error protection for sending data, retransmitting data of lost datagram and flow control. IP thus is known as best-effort protocol. It makes 'no guarantee' where exactly data would be delivered. 8. In client-server computing, client sends an RPC message to a server and server waits on receive for the message. The client handles the user interface and translates the desired protocol. It sends then user's request to the server. Then it waits for the server' response. It translates the response into human readable result and presents the result to user, whereas server hears the client's query. The query is sent to be processed. It returns the result back to the client. 9. The features of RTSP are as follows: ? RTP packets can stream over UDP or over TCP. If the client can tolerate packet loss, streaming over UDP can be more efficient than TCP because UDP does not incur the overhead of retransmitting lost packets. ? Streaming with RTSP fails if a firewall separates the client and server, and the firewall blocks the ports and protocols that RTSP uses. This problem is especially common with home Internet gateways. Even if the gateway has a built-in RTSP NAT, streaming might fail at times. 10. HTTP authentication, also known as RFC 2617 represents the HTTP protocol in which client and server communicates between each other via HTTP protocol. It basically considers two factors userid and password to authenticate the users/ clients. Sometimes, userid might be user's email-id also. Both values are sent to authenticate without encryption and hence they are not considered as secure method of authentication in cryptography. In this mechanism, client sends Base64- encoded userid and password in HTTP header. If data is sent through SSL/TLS connection therefore, it is not altered or stolen during transmission. The malicious server can not disguise itself as genuine web server and also not steal the password of user. For client authentication, SSL/TLS certificate is used to obtain an appropriate digital certificate before connecting to the server. A client generates the private key/public key pair to obtain the client certificate. The private key is kept as secret key and protected by passphrase. The passphrase works as password with added security. It is a sequence of word to control access to the system. The application does not maintain the database of userid and password. It verifies the certificate that is signed by trusted CA.

Self-Instructional Material 137 11.

The characteristics of firewall are as follows: ? All Internet traffic

must be passed via firewall. It the foreign accessing approaches to the local network. ?

Only authorized traffic is to be allowed to pass. It filters traffic with the help of allotted IP address and also takes help of TCP port number. ? It hosts the server software, such as Web or mail service. It also monitors security-related events. ? It provides a platform for IPSec that includes a network address translator, audits

and alarms. The limitations of firewall are as follows: ? Some of the complex types of attacks are not protected by firewalls. Sometimes, it does not protect against threats. ? It can not protect virus infected programs and not able to scan the incoming files, messages for viruses, emails, etc. 12. The cryptographic system is used by secure sockets layer because it encrypts data with two keys either public key or private key. If SSL Digital Certificate is installed on a web site while the time of money transaction through PayPal or other third party, users can see a padlock icon at the bottom area of the navigator. The Ebay can be taken as an example to understand the complete scenario. When user chooses the items they click on the auction title and view the details on the item, on this page, and they are able to view the pictures, descriptions, payment options and shipping information. 13. The functions and working principle of web browser do not work and provide various error messages. You can troubleshoot if you know the mechanism and meaning of error message. The common browser error messages appear as follows: ? Server Does Not Have a DNS Entry. ? 503 service unavailable. ? 403.9 Access Forbidden. 14. The network of Interface Message Processor (IMP) is used to demonstrate the Telnet protocol that culminates with TCP specification. This technology predates the IP packets and TCP transport layers through internetworking. The graphics capabilities are generally not provided with most of the Telnet implementations. 15. The format of an email message is as follows: Envelop:

Contains the sender's and receiver's

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addresses. Message: Contains the body and header. The header contains the sender, receiver, the subject of the information and some other information. The body of the message contains the relevant information readable by the recipient. The role of User Agent (UA) is triggered by the user

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addresses. Message: Contains the body and header. The header contains the sender, receiver, the subject of the information and some other information. The body of the message contains the relevant information readable by the recipient. The role of User Agent (UA) is triggered by the user

while sending or receiving a message. If a user has new

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mail, the UA informs the user with a notice. If the user is ready to read the mail, a list is displayed with each line

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mail, the UA informs the user with a notice. If the user is ready to read the mail, a list is displayed with each line

that contains the

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summary of the information about a particular message in the mailbox. The summary usually includes the sender's mail address, the subject and the time of server when the mail was sent or received.

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summary of the information about a particular message in the mailbox. The summary usually includes the sender's mail address, the subject and the time of server when the mail was sent or received.

Web Browsers NOTES
138 Material Web Browsers NOTES Self-Instructional 16. The various features included by plug-ins and helper application are as follows: S/MIME functionality: It offers to sign up the encrypted messages. It examines the message formats and prepare the enveloped data (contains encrypted content and keys for recipients), signed data. IPSec: It provides security services in the layer of IP selection. It uses security services in the layer of IP selection. It uses two protocols known as authentication protocol and authentication header. Encapsulating Security Payload (ESP): ESP provides confidential services for data packets and data filtering during the transmission of requested data across net. It supports sequence number (32 bits), security parameter index (32 bits), payload data (variable), pad length (8 bits) padding (0-255 bytes) and authentication data (variable).
The main feature of plug-ins is that it helps the browser to perform specific functions, such as viewing special graphic formats or playing multimedia files. 17. The World Wide Web is the best and popular example of hypermedia. Web represents WWW. It refers to the client-server service. The client uses the browser to access the information from the server. There are many sites that providing information that is available at various locations on the net. The web represents a hypertext system which presents information from across the net. It was developed first time in the month of 1989 by Tim Berners Lee. He was at the European Laboratory, CERN, Switzerland. Internet is considered as to be a combination of portability, user-friendly features and flexibility of information. The web follows the client-server mechanism. Web utilizes this mechanism because for the purpose that a client program gets required information from the server. 18. HTML markup tags are usually called HTML tags and the characteristics of the

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HTML tags are as follows: ? HTML tags are keywords surrounded by angle brackets like >html<. ? HTML tags normally come in pairs like >b< and >/b<. ? The first tag in a pair is the start tag, the second tag is the end tag. ? Start and end tags are also called opening tags and closing tags. 19.

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HTML tags are as follows: ? HTML tags are keywords surrounded by angle brackets like >html<. ? HTML tags normally come in pairs like >b< and >/b<. ? The first tag in a pair is the start tag, the second tag is the end tag. ? Start and end tags are also called opening tags and closing tags. 19.

The
various factors work collectively during the time of designing and developing the web site. They are as follows: ? Suitable keyword: In web content the keyword density is maintained due to get the good position of good ranking in search engine result page.
The writer who writes the web content writing must determine the popular keyword for corresponding information. The targeted keyword must be placed throughout the complete content. ? Search engine optimization: The popular web site is user-friendly and it is optimized by the search
engines. If the site optimization is done via yahoo and google search engine then
web site would become proper response from the users and visitors. ? Proper maintenance of site: Once web site is created, it must be maintained and updated at regular interval. Because
visitors
want to set the recent and updated information. ? Feedback: Feedback in HTML document is considered as an important factor in which users/
visitors can write their opinion and send to the organizer. In this way, many valuable options are inserted to the enhanced web site.
Self-Instructional Material 139 20. Mozilla Firefox is a popular web browser with benefits such as faster browsing, real privacy and security and smarter searching. It is cross-platform and hence can be used in Windows operating system, Linux, Mac OS and other small type of operating system. The Mozilla Corporation created the famous Firefox browser. Firefox is free, simple to switch to and extremely easy to use. Web Browsers NOTES 2.8 QUESTIONS AND EXERCISES Multiple Choice Questions 1. Each browser consists of three parts known as: (a) Controller, client protocol and interpreters (b) Compiler, linker and interpreter (c) Web protocol, file transfer protocol, Internet protocol (d) TCP/IP and UDP 2. Which bar is used to move web page left or right : (a) Status bar (b) Scroll bar (c) Access indicator (d) Menu bar 3. Which of the two ports are frequently used by FTP: (a) port 130 and port 131 (b) port 67 and port 68 (c) port 20 and port 21 (d) port 519 and port 520 4. Which of the following systems supports retransmission of lost RTP packets sent over UDP: (a) Advanced Streaming Format (ASF) (b) Warehouse Management System (WMS) (c) Forward Error Correction (FEC) (d) Hypertext Transfer Protocol over Secure Socket Layer (HTTPS) 5. The firewall consists of two systems, known as: (a) A network and a user (b) A userid and a password (c) System and networking (d) A bastion-host and a packet filtering router. 6. Which server is used to translate the URL into the IP number so that computers can understand and after it does that the browser can go to the site: (a) DNS server (b) Port server (c) Client server (d) Mail server 7. HTML stands for: (a) Hyper Text Markup Linear (b) Hypermedia Markup Language
140 Material Web Browsers NOTES Self-Instructional (c) Hyper Text Markup Language (d) Hyper test and Manipulative Language 8. Which attribute keeps the file name of the source image that is used in HTML coding: (a) SRC attribute (b) ALT attribute (c) Class attribute (d) id attribute 9. Which of the following attributes is set with >img< tag: (a) >map< and >area< (b) >area< and >tag< (c) >map< and >tag< (d) >tag< and >img< 10. Which of the following options

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is a type of forum through which visitors of web site interacts with the site to enhance the popularity: (

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is a type of forum through which visitors of web site interacts with the site to enhance the popularity: (

a) Message boards (b) Search engines (c) Polls (d) Guest books 11. The registration of domain name is: (a) General (b) Common (c) Unique (d) Manuscript 12. Which of the following port is known as the default port for HTTP: (a) port 110 (b) port 220 (c) port 25 (d) port 80 13. Which of the following headers
lists all of the hop-by-hop headers in a message, telling the recipient that the headers must be removed from that message before it is forwarded: (
a) The Animation header (b) The Forward header (c) The Connection header (d) The Recipient header 14. The scripting technologies are embedded in the HTML page: (a) PHP, JSP and ASP (b) C, C++ and Java (c) SQL, MySQL and Oracle (d) FORTRAN, NetLogo and Object Pascal 15. Which of the following options is available in Option tab and used to configure the FireFTP: (a) General, Credits, Example (b) Interface, Connections, Downloads/Uploads (c) Client, Server, Workstation (d) New, Edit, Delete
Self-Instructional Material 141 Answers: 1. (a), 2. (b), 3. (c), 4. (b), 5. (d), 6. (a), 7. (c), 8. (a), 9. (a), 10. (a), 11. (c), 12 (d), 13 (c), 14 (a), 15 (b) Fill in the Blanks 1. The network layer is used to deliver the . 2. Internet protocol permits the transmission of data crossing to underlie network with __ ___ __ __ _____ _. 3.
FTP refers to to exchange the files between computers across net. 4.
Firewall software is considered as an effective means to protect the Internet from _ ___ _ and _ _ . 5.
Secure sockets layer uses a cryptographic system that encrypts data with two keys either __ or _. 6. Ebay is an original and primary _ that one can browse through from various categories such as antiques, clothing and accessories Boats, computers and networking, jewelry and watches, etc. 7. The RFC 854 supports specifications. 8. The plug-ins are part of the , which are platform specific. 9. The two tags known as and are used in HTML coding to add the plug-ins to the web page. 10.

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The multimedia objects can be installed by element that includes multimedia content with HTML document. 11.

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The multimedia objects can be installed by element that includes multimedia content with HTML document. 11.

The standard Institute of Electrical and Electronics Engineers (IEEE) 802.11e provides multimedia wireless network that simulates software to add new function known as ..... It includes contention-free and contention-based OPtimum NETwork performance (OPNET). 12. The two attributes in HTML coding are SRC and ALT and they come with _____ _____tag. Web Browsers NOTES 13. The title for a web page can be created by the _____ _____ __ _____ tags, which are themselves always nested within the >head<...>/head< tags. 14. HTTP/1.0 includes a mechanism known as header for the client to indicate that a request should not be satisfied from a cache. 15. The is used to configure the Apache file and come to the category of distributed configuration file. Answers: 1. Data packets, 2. TCP/IP stack, 3. Application protocol, 4. malfunctions, networked-based security threats, 5. public key, Remote system, 6. Online auction site, 7. TELNET protocol, 8. Browser binary tree, 9. >PLUGINSPAGE<, >PLUGINURL<, 10. OBJECT, 11. Hybrid Coordination Function (HCF), 12. >IMG ...<, 13. title<...>/title<, 14. Pragma:no-cache, 15. .htaccess file.
Self-Instructional Material 142 Web Browsers NOTES State Whether TRUE or FALSE 1. Image map has three components, known as image file (what the user wants to see), map file (contains the coordinates the regions of map) and an HTML file (includes images/links for the map file). 2. The browser program basically retrieves the hypertext pages that provide advanced features of the web, such as virtual memory, memory caching etc. 3. Each browser consists of two parts, a controller and client protocol. 4.

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FTP also works on a client/server principle where an FTP client program is used to make a request to an FTP server.

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FTP also works on a client/server principle where an FTP client program is used to make a request to an FTP server.

The files can be stored on computers are generally referred to as FTP servers. 5. In the era of Windows operating system, the command line interface is accessed by typing the command clr at run prompt. 6. The first home GUI computer was declared as the Apple Mac released in 1984. 7. The OS along with GUI is populated WIMP (Windows, Icons, Menus and Pointers) interfaces. 8. Virtual web browser makes FTP requests and able to download pages/programs that have been requested. For this, you need to login on FTP server. The files are easily available because of anonymous FTP. 9. File transportation protocol is also prime Internet service that acts as protocol and transfers files over TCP/IP network (Internet, UNIT, etc.). 10. The Real-Time streaming protocol does not allow controlling multimedia streams delivered through RTP. 11. RTSP is designed to leverage existing web infrastructure, for example, inheriting authentication and PICS from HTTP and works well both for large audiences as well as single-viewer media-on-demand. 12. RTP packets can not stream over UDP or over TCP. 13. The description of the ASF file, called ASF encapsulated in SDP, is proprietary. 14. The role of SSL record header is to compress the message that is later used to append the encrypted message. 15. In the client and server computing, the MAC operation is used. Answers: 1.
True, 2. True, 3. False, 4. True, 5. False, 6. True, 7. True, 8. True, 9. False, 10. False, 11. True, 12. False, 13. True, 14. True, 15. True
Self-Instructional Material 143 Match Column A with Column B Column A Column B 1. By default, SSL uses a number of ports A For authentication. 2. National Institute of Standards and Technology (NIST) standard recognized the DSS standard that basically uses the B In data transmission. 3. User name and password provides C Only installation. 4. DS is based on D 443, 643, 1443 and 2443. 5. The checksums provide a form of authentication where an invalid checksum E Deliver the multimedia objects across net. 6. CRC is used primarily F TCP specification. 7. Certification Authority (CA) is third party authority that issues digital certificates G Secure Hash Algorithm (SHA). 8. Using a keyword is a great way to easily access H Authentication. 9. The Mozilla Corporation created the famous I Remote system. 10. The new separator will be placed above the bookmark/folder that you have selected in J In download. 11. Telnet is virtual terminal facility which facilitates users to connect the K Favorite sites. 12. The network of interface message processor (IMP) is used to demonstrate the Telnet protocol that culminates with L Bookmark Manager. 13. There is no configuration involved with Plug- ins, M Public key encryption. 14. The RealPlayer is a live player for RealVideo and RealAudio on-demand and functions with no delay N Is not recognized. 15. The HTML elements Area, Applet, Img, Map, bgsound, Embed and Sound are used to O Firefox browser. Answers: 1. (D), 2. (G), 3. (H), 4. (M), 5. (N), 6. (B), 7. (A), 8. (K), 9. (O), 10. (L), 11. (I), 12. (F), 13. (C), 14. (J), 15. (E) Short-Answer Questions 1. What is HTML? 2. What is access indicator? 3. What is HTTPS? 4. List any four advantages of e-mail. 5. What is cyclic redundancy check? 6. Write the operations involved in digital signature? 7. What is bookmarking? 8. What is CGI? 9. What is the importance of address bar in web browser? 10. Write the importance of about:config command. Long-Answer Questions 1. Write two characteristics of digital signature? 2. Which computer languages support CGI programming? 3. Explain the format of record header. Web Browsers NOTES
Self-Instructional Material 144 Web Browsers NOTES 4. What is the anatomy of web browser? Describe any four frequently used toolbars in web browser? 5. Explain with the help of example how public and private key works. 6. Write the short note on the about: command used in Mozilla Firefox. 7. Describe the configuration process of FireFTP. 8. Explain the options provided by individual bookmark. 9. What is Rockbox? Why it is used? What is the function of disabling plug-in? 10. Explain multimedia networks. Write the role played by bandwidth that helps in transmitting the multimedia data. 2.9 FURTHER READING Black, Utyless D. Computer Networks. USA: Prentice-Hall. 1993. Stallings, W. Data and Computer Communications. New Delhi: Prentice-Hall of India. 1997. Tanenbaum, Andrew S. Computer Networks. USA: Prentice-Hall PTR. 2002. Zhi-Hua Zhous & Shaowu Liu (2021) Machine learning 2.10 LEARNING OUTCOMES ? Know the basics of web browser ? Understand the functioning and working principle of web browsers ? The technologies used in the working of web browsers
Material 145 UNIT 3 INTRODUCTION TO CLIENT-SERVER COMPUTING Introduction to Client-Server Computing NOTES Structure 3.0 Introduction 3.1 Unit Objectives 3.2 Client Server Computing 3.3 Types of Client-Server Systems 3.3.1 Middleware 3.3.2 N-Tiered Systems 3.3.3 2-Tier/3-Tier/4-Tier Systems 3.4 Fat Clients versus Fat Servers 3.5 Summary 3.6 Key Terms 3.7

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Answers to 'Check Your Progress' 3.8 Questions and Exercises 3.9 Further Reading 3.10 Learning Outcomes 3.0 INTRODUCTION In this unit, you will learn about the

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Answers to ‘Check Your Progress’ 3.8 Questions and Exercises 3.9 Further Reading 3.10 Learning Outcomes 3.0 INTRODUCTION In this unit, you will learn about the

technologies involved in client-server computing, which describes the relationship between two computer programs in which one program, the client, makes a service request from another program and the server,
which fulfills the request as per clients’ requests. You will also learn about types of client-server computing systems, fat client versus fat server. The computer transactions using the client-server system are very common, such as to check your bank account from your computer. A client program in your computer forwards your request to a server program at the bank. Then that program might in turn forward the request to its own client program that sends a request to a database server at another bank computer to retrieve your account balance. The balance is returned back to the bank data client, which in turn serves it back to the client in your personal computer, which displays the information in the era of network computing. You would also learn that one server, sometimes called a daemon, is activated and awaits client requests. Relative to the Internet, the web browser is a client program that requests services and send the web pages or files from a web server, if it is requested. The web server technically is called a Hypertext Transport Protocol or HTTP server. Similarly, your computer with TCP/IP installed allows you to make client requests for files from File Transfer Protocol (FTP) servers in other computers on the
Internet. 3.1

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UNIT OBJECTIVES After going through this unit, you will be able to: ?

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UNIT OBJECTIVES After going through this unit, you will be able to: ?

Know about
client-server computing basics ? Understand the types of client-server systems ? Describe the middleware Self-Instructional
Self-Instructional Material 146 Introduction to Client-Server Computing NOTES ? Understand the N-tiered systems? ? Know about 2-tier/3-tier/4-tier systems? ? Create the home page for your web site? ? Understand fat clients versus fat servers? ? Know the concept of security features involved in client-server computing system? 3.2 CLIENT SERVER COMPUTING Client-server computing is based on the logical extension of modular programming. Modular programming has as its fundamental assumption that separation of a large piece of software into its constituent parts known as modules. This creates the possibility for easier development and better maintainability. Client-server computing takes this a step farther by recognizing that those modules need not all be executed within the same memory space. With this architecture, the calling module becomes the ‘client’ as it requests the service, and the called module becomes the ‘server’ as it provides the service. The logical extension of this is to have clients and servers running on the appropriate hardware and software platforms for their functions. For example, database management system servers running on platforms specially designed and configured to perform queries or file servers running on platforms with special elements for managing files. Client-server describes the relationship between two computer programs in which the client is defined as a requester of services and a server is defined as the provider of services. A single machine can be both a client and a server depending on the software configuration. For instance, the user of a web browser is effectively making client requests for pages from servers all over the web. The browser itself is a client in its relationship with the computer that is getting and returning the requested HTML file. There are two types of processes involved in client-server computing. They are known as client process and server process. They are described as follows: Client process: The client process (program) sends a message to a server process (program), requesting that the server perform a task (service). Client programs usually manage the user-interface portion of the application, validate data entered by the user, dispatch requests to server programs, and sometimes execute business logic. The client-based process is the front-end of the application that the user sees and
interacts with. The client process contains solution-specific logic and provides the interface between the user and the rest of the application system. The client process

also manages the local resources that the user interacts with such as the monitor, keyboard, workstation CPU and peripherals. One of the key elements of a client workstation is the graphical user interface (GUI). Normally a part of operating system, i.e., the window manager detects user actions, manages the windows on the display and displays the data in the windows. Server process: The server process (program) fulfills the client request by performing the task requested. Server programs generally receive requests from client programs, execute database retrieval and updates, manage data integrity and dispatch responses to client requests. Sometimes server programs execute common or complex business logic. The server-based process might run on another machine on the network. This server could be the host operating system or network file

Self-Instructional Material 147 BROWSER Browser sends request to the server The browser displays the data The server locates the CGI program and passes the request information. The CGI program processes the request and sends data to the server The server sends the data to the browser server; the server is then provided both file system services and application services. The server process acts as a software engine that manages shared resources such as databases, printers, communication links, or high powered-processors. The

server process performs the back-end tasks that are common to similar applications. 3.2.1 Server-side Technologies The Web employs a connection-less protocol, which means that after every client- server interaction the connection between the two is lost. Let us now examine the client-server inter-communication with three models. Introduction to Client-Server Computing NOTES Fig. 3.1 Client-Server Architecture through Static HTML Pages The client (browser) requests for an HTML file stored on the remote machine through the server software. The server locates this file and passes it to the client. The client then displays this file on your machine. In this case, the HTML page is static. Static pages do not change until the developer modifies them. Fig. 3.2 Client-Server Architecture through CGI Scripts The scenario is slightly different for CGI applications. Let us suppose you come across a searchable form on a web page that runs a CGI program. Let us also suppose you type in the word ‘computers’ as the search query. Your browser sends your request to the server. The server checks the headers and locates the necessary CGI program and passes it the data from the request including your search query BROWSER Browser requests for a particular HTML file The browser displays the file The server locates the file and sends it to the browser

148 Material Introduction to Client-Server Computing NOTES computers. The CGI program processes this data and returns the results to the server. The server then sends this formatted in HTML to your browser which in turn displays the HTML page. Thus the CGI program generates a dynamic HTML page. The contents of the dynamic page depend on the query passed to the CGI program. Self-Instructional Fig. 3.3 Client-Server Architecture through Server Side Scripting Technologies The third case also involves dynamic response generated by the use of server side technologies. There are many server side technologies as follows: Active Server Pages (ASP): A Microsoft technology. ASP pages typically have the extension .asp. Personal Home Pages (PHP): An open source technology. PHP pages typically have .php, .phtml or .php3 file name extensions. Java Server Pages (JSP): .jsp pages contain Java code. Server Side Includes (SSI): Involves the embedding of small code snippets inside the HTML page: An SSI page typically has .shtml as its file extension. With these server technologies it has become easier to maintain web pages and this is especially helpful for a large web site. The developer needs to embed the server- side language code inside the HTML page. This code is passed to the appropriate interpreter which processes these instructions and generates the final HTML displayed by the browser. The embedded server-script code is not visible to the client as the server sends Only the HTML code. Letus look at PHP as an example. A request sent for a PHP page from a client is passed to the PHP interpreter by the server along with various program variables. The interpreter then processes the PHP code and generates a dynamic HTML output. This is sent to the server which in turn redirects it to the client. The browser is not aware of the functioning of the server. It just receives the HTML code, which it appropriately formats and displays on your computer. Client-server system has distributed application architecture that distributes the tasks between service requesters known as clients and service providers known as servers. In this system clients and servers are connected using a computer network using separate machines. These are independent logical entities working together when connected through a network to perform a task. Server machine, normally called server, runs many server programs and share resources with clients. These servers are high-performance hosts having a wide variety of server programs running BROWSER Browser sends request to the server The browser displays the document The server checks the file and executes the embedded scripts The final formatted document

Self-Instructional Material 149 on them. A host machine that runs only one server program is also a server. Clients do not share any resource, but request server for service functions or contents. Clients thus initiate communication sessions and servers wait to receive requests from clients. Many systems having different architectures but connected together are also viewed as client-server. Thus, client is a machine that requests for service and server, after accepting such requests gives service. In client-server model, sockets are used for reading as well as writing. A user develops a program for reading and writing from a socket. This is somewhat like reading or writing from a file and is very simple. A socket provides connection oriented service and protocol that is used for the purpose of transmission is well known protocol known as transmission control protocol (TCP). Flow of data is in the form of bytes. Microsoft developed Windows NT specifically for supporting architecture of client/server. This architecture divides the burden of data handling as separate processes one at server side and another at client-side. Characteristics of client-server system Client-server is a computing architecture which separates a client from a server. It is almost always implemented over a computer network. The most basic type of client-server architecture employs only two types of nodes: clients and servers. This type of architecture is sometimes referred to as two-tier. It allows devices to share files and resources. Server provides the service. Client is considered the customer requesting the service. The server service can be shared among a number of clients. Clients must request or initiate the service. The location of the server in the network is transparent to clients. Transaction between client-server is message- passing based. The client-server architecture is scalable as horizontally (more clients can added) and vertically (more servers can be added). The server is centrally maintained whereas clients are independent of each other. The characteristics of architecture of client-server system are as follows: ? The combination of a client or front-end portion that interacts with the user, and a server or back-end portion that interacts with the shared resource. The client process contains solution-specific logic and provides the interface between the user and the rest of the application system. The server process acts as a software engine that manages shared resources such as databases, printers, modems, or high powered processors. ? The front-end task and back-end task have fundamentally different requirements for computing resources such as processor speeds, memory, disk speeds and capacities, and input or output devices. ? The environment is typically heterogeneous and multivendor. The hardware platform and operating system of client and server are not usually the same. Client and server processes communicate through a well-defined set of standard application program interfaces and RPC's. ? An important characteristic of client-server systems is scalability. They can be scaled horizontally or vertically. Horizontal scaling means adding or removing client workstations with only a slight performance impact. Vertical scaling means migrating to a larger and faster server machine or multiservers.

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150 Material Introduction to Client-Server Computing NOTES 3.2.2 Functions of Client-Server The computer handling the request and sending back the HTML file is a server. Client-server computing is a type of distributed computing application where information (works) is exchanged between the service providers (server) and the service requesters (clients). Clients and servers both operate on a computer network with their own specified functions to form client-server computing or networking. In this computing, client sends the request to the server and waits for the server response and presents the results to the user. The client's responsibility comprises the following functions: ? It handles the user interface. ? It translates the user's request into the desired protocol. ? It sends the request to the server. ? It waits for the server's response. ? It translates the response into human-readable results. ? It presents the results to the user. The server's functions include the following functions: ? It listens for a client's query. ? It uses processes to query. ? It returns the results back to the client. The functions of a client-server interaction are as follows: ? The user runs client software to create a query. ? The client connects to the server. ? The client sends the query to the server. ? The server analyses the query. ? The server computes the results of the query. ? The server sends the results to the client. ? The client presents the results to the user. Self-Instructional Fig. 3.4 Client-Server Mechanism SERVER CLIENT NODE CLIENT NODE CLIENT NODE CLIENT NODE

Material 151 Figure 3.4 illustrates the client-server computing technology. If the user needs information from a shared address file, the required information is sent to check the database. The function of database search is composed on the client computer, where the user interface for the database software is running. Then the information is sent to the server. The server processes the search and returns the requested information to the client. The client-sever model is not limited only to traditional computers. A network that handles an automated teller machine (ATM) is also a client-server model in which customers use an ATM as client that interfaces a server for managing accounts for a bank. This server is connected to servers of other banks that enable a user to withdraw money from a bank where user has no account. User interface is available at ATM and server(s) kept in the bank gives services, such as checking for balances and to transfer money between accounts. Typical functional units in a Client/Server system are known as user interface, business logic and shared data. ATM is basically a dedicated-connection switching technology that organizes digital data into 53-byte cell units and transmits them over a physical medium using digital signal technology. Individually, a cell is processed asynchronously relative to other related cells and is queued before being multiplexed over the transmission path. Because ATM is designed to be easily implemented by hardware rather than software, faster processing and switch speeds are possible. The prespecified bit rates are either 155.520 Mbps or 622.080 Mbps. Speeds on ATM networks can reach 10 Gbps. Along with synchronous optical network (SONET) and several other technologies, ATM is a key component of broadband ISDN (BISDN). Introduction to Client-Server Computing NOTES Classification of clients Fig. 3.5 ATM There are different types of clients in client-server systems. They are discussed of follows: ? Non-GUI client: Such applications generate requests and have minimum human interaction. Non-GUI clients do not use graphic user interface. These are of two types non-GUI clients without multi-tasking such as cellphone and Automatic Teller Machines (ATM) and non-GUI clients who require multi- tasking such as ROBOT , GUI clients and OOUI clients ? GUI clients: Such applications have occasional requests with human interaction using a GUI (Graphic Use Interface) such as Windows 3.x and NT 3.5. Self-Instructional

Self-Instructional Material 152 Introduction to Client-Server Computing NOTES ? OOUI clients: Such applications are highly-iconic that provide an object- oriented user interface (OOUI) providing seamless access, in visual format, for retrieving information such as Windows 95/NT and MAC OS. 3.2.3 Types of Servers Just as there are types of clients that make requests, there are types of servers that respond to request by clients. The types of servers are file servers, database servers, transaction servers, network server, groupware servers, object servers, Web servers, and print server, multimedia server, etc. File servers: This type of server is useful in sharing of files over a network. Clients send requests to one or more file servers on the network for files. The operating system works as file server if the network file server (NFS) is set up and configured with the system. It works as client server computing. In client-server computing, many applications are processed on a computer. The system unit is worked as client-side which can be obtained in application services, such as database services received from various computers. The client-server computing describes the relationship between information and programs. Basically client-server computing creates the following queries: ? Uses of multiprogramming and time sharing ? Development of less expensive personal computers ? Collecting the centralized resources of collecting and storing data representing corporate database ? Uses ARPANET and need for LANs and Internet ? Uses of communication protocols between computers progressing through globalization. The main computing part is taken as client machine that interacts with user and provides mechanisms to communicate with server, whereas server decides where data is located and how it is computed. The remote procedure call (RPC) is another communicating method used in client-server computing. In this mechanism, client sends an RPC message to a server and server waits on receive for the message. The client handles the user interface and translates the desired protocol. It sends then user's request to the server. Then it waits for the server' response. It translates the response into human readable result and presents the result to user, whereas server hears the client's query. The query is sent to be processed. It returns the result back to the client. The NFS are used for various applications in which various processors are used for powerful onboard hardware and software for audio and video compression files. These resources use 28.8 Kbps modems and telephone lines for demanding applications. It also contains hardware compression engine that communicates with text, graphics, animations and video. The NFS uses streaming data transmission to get the effect of multimedia applications. Servers increases

the scope of multimedia devices, such as audio devices, personal digital assistant (PDA)s, cellular phones, network camera, set top boxes. For this, it sometimes uses network- integrated multimedia middleware (NMM), which offers internetworking architecture. The middleware is considered as an integral part of network to make intelligent use of devices over the network. The combination of powerful and richer presentation for Web sites NFS uses network server uses the various technologies, such as H.323, Video-on-Demand, application server, file server etc.

Self-Instructional Material 153 Network server: Network server provides connectivity between client and server and the protocols that they use to communicate. The Internet provides connectivity between systems that function as clients, servers or both. Many services used on the Internet are based on client/server computing model. File transfer protocol (FTP) for example uses client-server interactions to exchange files between systems. An FTP client requests a file that resides on another system. An FTP server on the system where the file resides handles the client's request. The server gets access to the file and sends the file back to the client's system. Network server requires vector data, for example route optimization that supports multimedia functionalities. It also provides authoring system that provides multimedia based spectrum. Authoring system comprises preprogrammed elements useful in interacting with multimedia applications. It also supports character animations and humanizes the objects, for example, toothbrush advertisement, coke bottles advertisement, etc. The audio applications, such as setting music of the human mood, special sound effects (squeaky doors, make specific points etc.) are used with the help of authoring system. The server provides a high-speed technical support for digital data transmission across network for multimedia purpose. The network server also supports high availability of multimedia data backup, high data rates and low jitter. It also reduces the cost of operation and maintenance of multimedia applications. For this it uses multimedia server concepts. Various transmission technologies and network management are controlled by network server that provides a suitable framing structure for sending and receiving data packets for multimedia applications in corresponding network layers. It also maintains synchronization mechanism for switching and redundant connections. Network server controls timestamp tagged with sending and receiving data packets. Database server: This type of server handles clients' requests in form of SQL messages returning results of such requests across the network. Database servers use their processing power for finding requested data instead of sending these to clients for finding their own data. This provides results that make efficient use of distributed processing power. The database server is also known as SQL engine. Transaction server: With this type of server clients invoke remote procedures residing on a server with SQL database engine. Such remote procedures on transaction server execute a group of SQL statements. The exchange, done on network, has only one request/reply message. Executions of such SQL statements are atomic in nature and either all fail or all succeed. Groupware servers: Such servers manage semi-structured information; textual matters, images, mails, bulletin boards and flow of work. A client server system using such a server brings people in direct contact. Object server: In this type of server, client/server application is created as communicating objects and a client object communicates with server objects by use of ORB (object request broker). The process goes like this: a method is invoked by client on some remote objects. ORB finds an instance of the class of the object server and invokes requested method and then sends results to client object. A server object has to support for sharing and concurrency. ORB brings it all together. Introduction to Client-Server Computing NOTES Self-Instructional Material 154 Introduction to Client-Server Computing NOTES Web server: This is considered a new client-server model consisting of thin and portable 'universal' clients talking to superfat servers. Putting things simple, you may say that a web server sends documents when asked by clients by name. Communication between clients and servers takes place with the use of HTTP that is a protocol like RPC (remote procedure call). Print server: A print server lets computers on a network all access a network printer. Print servers are therefore useful even on very small networks, since they avoid having to move files from computer to computer before printing. Print servers are frequently packaged with routers. Advantages ? It allows any number of users to share the same printer. ? It avoids having to move files to a computer that is the only way to reach a printer that is connected directly to it. Disadvantages ? Most of the features of multi-function printers, such as FAX and photocopying are not supported by print servers. ? Some printers, such as GDI printers, use proprietary commands which make them unusable by print servers. ? Printers that are designed to return their status to computers cannot do this through a print server although printing still works. Multimedia server: Multimedia server is necessary to deliver data streams and manage multimedia objects as per user requests on net. It provides online help services to communicate with telephony services and add multimedia objects. The streaming multimedia server sends multimedia data as per client request. This server is viable to online access of information sources. These sources are categorized as e-books, images, scientific data, and multimedia presentation. The data compression technology, for example, MPEG and video files are transferred over networks. This server contains sensory interface that controls sequence and pace of the information. The multiple media can be integrated with voice, image, video and data with IP multimedia services supported by transport engines. The architecture is designed with multimedia server via high-speed networks. The deliverables services to the clients of heterogeneous networks. The features of multimedia server are as follows: ? Adequate bandwidth delivers isochronously the data streams along with specified rate and observable non-delay services. ? The client subsystems receive multimedia data streams. ? Media segments along with application programs manage retrieval and navigation of data. ? The storage subsystem considers buffering, indexing and retrieving multimedia applications. ? Real-time online delivery of multimedia presentation support client satisfaction.

Self-Instructional Material 155 Storage device Storage device Storage device Storage device Storage device Device interface Device interface Control processor Introduction to Client-Server Computing NOTES Fig. 3.6 Setup for Multimedia Streaming Server Table 3.1 shows the hardware setup for multimedia requirement. Table 3.1 Hardware Requirement for Multimedia Server Figure 3.7 shows how various storage devices accumulate with device interfaces to the control, processors. The control processors contain controllers to navigate the data from multimedia server to network server. Fig. 3.7 Multimedia Hardware Setup In Figure 3.7, data of multimedia files travel via controllers. The performance of I/ O subsystem is influenced by controllers' performance. The main function of the I/ O subsystem is to enhance the storage capacity and accessing time. The device Live Broadcast Client Network Stored Content Network Client

156 Material Introduction to Client-Server Computing NOTES requires 10MB/s bandwidth, whereas applications require 0.5MB/s bandwidth for supporting more than twenty instances of the multimedia files. The multimedia server architecture is connected to client sites. For this, a high-speed network is required. Multimedia applications need multiple streams of audio and video items. Multimedia server stores multimedia objects to deliver real- time data streams if requests are sent from clients or users. The multimedia content might range from sequentially accessed video to multiple media segments, such as image, animated text. The server is considered as a fast server and as a predecessor of network file server that minimizes the latency of display and issuing request. It supports continuous displaying of multimedia documents at guarantee rates. The main problem comes with sequential multimedia documents that cover playback bandwidth and large storage space. A multimedia server stores the data provided by input devices, such as video display, speaker, camera, microphone, so that it prevents buffer overruns. The retrieved information from the buffer is prior to playback music files. The network server delivers path to multimedia server that is reachable to individual clients and transportable to media objects. Sometimes, long latency is accessed by large clients then large audio and video files are streamed so that uninterrupted services must be sent to the clients by servers. Alone raw bandwidth is not enough for multimedia server instead corresponding network server along with disk scheduling and special processor are also required to this so that bandwidth is shared for effective delivery of video and voice information. The special processor and disk scheduling mechanisms are needed because of the reading of disk blocks can be delivered to the network perfectly on time. Generally video stream is delivered to ensure which playback is going to start and end without jitter. For smooth processing of overall technology network servers and communication protocols are required. Self-Instructional Fig. 3.8 Multimedia Server and Network Middleware: Middleware serves the purpose of a network between components of a client-server system and as such has to run on both, on client machine as well as on the server machine. It has all the things needed for receiving requests from a client and sending these to a server and subsequently getting the response of

the server back to the client. Middleware facilitates communication between different types of computer systems and enables cross-platform

computing in a client-server environment allowing many types of clients for accessing same data. Server portion always holds data whereas client portion has user interface. Application logic, determining the way it should act on the data, is distributed between server and client. Functions such as web access, database access and email exchange have been built on client-server model. A web browser resides on a client computer and hence is a client program and can access information residing on a web server. Users who access banking services using their computer activate a web browser Simple multimedia server Simple multimedia server Simple multimedia server Network To client Simple Simple multimedia multimedia server server

Self-Instructional Material 157 client for sending a request to the web server of a bank. This server of the bank may be a client when it forwards request to some database server of another bank for retrieval of the account information. Account balance of the user is sent back to the bank database client that further sends it to the web browser client and displays results to user. Client-server model has been adopted in network computing and this is also used in many applications related to business environment. The same hold true for main application protocols of the Internet such as HTTP, SMTP, DNS, Telnet, etc. Every instance of client software may send requests to more than one server and on accepting these requests servers do processing of such requests and pass requested information to the client. This concept is applied to different kinds of applications, but fundamentally the architecture remains the same. Basic client-server architecture has only clients and servers as two types of hosts and is known as two-tier architecture and permits devices for sharing files and resources. In such 2-tier architecture, clients act as one tier and application, combined with server is another tier. Sequence diagram is used to describe interaction between client and server and such diagrams are standardized in unified modeling language (UML). 3.2.4 Client and Server Devices With the growth and popularity of PCs client/server model of networking also grew and became popular. What was being done using older mainframe computers could be done using PCs. Desktop computers and mobile devices such as cell phone can also function as clients. A server device has many files and databases along with more complex applications such as web sites. Server devices are mostly central processors having high power, larger disk drives to impart high storage capacity with much more memory than clients. The advanced serial device servers are the best choice for connecting async devices, such as modems, POS, printers and industrial equipment to serial based COM port, UDP or TCP socket based applications. Client-server model distinguishes applications and devices. A network client makes requests to server and this request comes in form of messages. A server responds to its clients by acting on such requests and returns results. One server is capable of supporting many clients, and many servers may be networked for handling increased load of processing with growing number of clients. Client computers and server computers are two devices separate from each other with customization of each for designed purpose. A web client needs screen display for its working and larger the display better is the working. Web servers, on the other hand do not require display at all and these may be found anywhere in the world. There are cases in which a device may function both as client as well as server for the same application. Also, a device acting as server for one application may also act simultaneously as client to other servers, for some different applications. The monitoring and protection of high-value distributed I/O assets involves more than simple access to its data in the client-server system, it also involves the protection and control of its physical environment along with the ability to take corrective action when necessary. Digital and analog sensors, proximity and mechanical switches, relays, pushbuttons, temperature and humidity sensors can assist in determining the integrity of the asset's local environment. Information from these sent back to a central support location over a network can help an enterprise react more quickly to an important event or failure. IOLAN DS I/O Device Servers are ideal for these applications. Introduction to Client-Server Computing NOTES

Self-Instructional Material 158 Introduction to Client-Server Computing NOTES Features and benefits Universal digital I/O, analog input, RTD/thermocouple temperature sensor input and EIA/RS-232/422/485 offers flexibility for a wide range of applications for client- server system. They are listed as follows: ? Dual processor architecture represents 87 MIPS main processor along with a 16 MIP I/O co-processor for the best performance on the market. ? Digital I/O extension provides a cable replacement solution by transmitting digital input signals to a remote output peer over an IP/ Ethernet network. ? Models with AES or 3DES encryption are also available and hence useful in client-server computing system. Security features in client-server computing The concept of security features forms the basis and foundation of Internet programming/application development. The concepts are as follows: Authentication: This process is used to determine the identity of the user. The two prime credentials, such as password and username are required to log in the specific web page. The credentials are first authenticated by the list of users which are maintained by admin side in a backend database server. Authorization: If the user is authenticated by the name and password the process goes to the authorization approach. In this approach, user is able to click on the events that are performed as per actions. Actions involve the operations of viewing files and support the mechanism to retrieve information from the specific database. Opening a file in Windows is used to be checked for submitting the order, purchasing online order, introducing the users for promotion scheme and assigning the project. The permissions, for example, identity permission, code permission and role-based permissions are specified to authorize a user. Impersonation: It checks the configuration to maintain an account and to keep track of the files. This process runs with separate identity and different permissions via specified Windows. Authentication and authorization are to be considered as two cornerstones that are used to create a secure and hassle-free site. An efficient analogy is supported by Windows operating system and even Linux/UNIX. If computer is turned on to be booted, you are supplied two prime requirements known as username and password and hence users are authenticated to the system unit. At this stage, every time user is interacted with restricted sources. These sources offer registry key, files, databases etc. Windows OS supports to check the authorization for ensuring the user account that provides necessary rights. Internet Internet is also a client-server system in which all types of information as well services are available as a household tool on World Wide Web. This has been accomplished by keeping system user friendly. The Internet makes use of web browsers as GUI clients for searching, navigating and sharing information on the web that has location transparency. Hypermedia links are provided in this for connecting documents and information. In the Internet, TCP/IP is the backbone, used as a protocol stack. IP delivers data and TCP keeps track of such data packets Material 159 as messages to ensure correct routing. UDP also works with IP and UDP/IP is a protocol having primary use in broadcasting messages across networks. It exchanges datagrams directly on IP networks. Above IP stack lie application protocols such as Network file system protocol, file transfer protocol (FTP), RPC) and Simple Mail Transfer Protocol (SMTP). World Wide Web is at the top layer interacting directly with IP stack or with middleware specific to World Wide Web. Such middleware is composed of web browsers, web servers, and web gateways as its components. The Internet applications, in fact, deals with 'working online and providing services and information as per client requests'. The various native Internet applications are available in .NET are C#, VB, JScript, whereas the third-party languages are known as COBOL, Eiffel, Smalltalk, Perl, Mercury, Python, etc. The whole concept can be explained with the help of small examples. Suppose you have an appointment with the doctor, book a flight to Bangkok, or check the balance on your saving account, you can complete all the tasks on the Web using Internet applications. These applications are accessed through web browsers along with human interaction. The total approach incorporates with the client-server technology in which various levels of security features are maintained. The main issue dealt in Internet application is how the security options restrict the unauthorized users and malfunctions. The air-ticket reservation system uses services as Simple Object Access Protocol (SOAP), accessible to the ticket broker. Another important application on Web services is B2B integration which connects the Internet applications with diverse organization. The applications invoke services through SOAP and passes under firewall, which has been installed with the software system. Internet applications are also associated with B2B integration. The B2B integration maintains an agreement between XML, Web Services Description Language (WSDL), User Datagram Protocol (UDP), SOAP and Universal Description Discovery and Integration (UDDI) and hence considered to be as 'five pillars'. UDDI uses WSDL to interact with the described interfaces of Web services. Generally Internet applications keep the following syntax for XML. For example, to check the bank account, XML coding would be written as follows: >Account type="checking"<>/Account< And this coding used with reference to SOAP is as follows: >soap:Envelope Xmlns:soap= http://schemas.xmlsoap.org/soap/envelope/< >soap:Body< - - - >/soap:Body< >/soap:Envelope< Technology used in Internet: Streamline business processes are used to create dynamic database driven web sites, back office systems and online shopping. The Internet connection is enabled either via cables or set as wireless. People who install the Internet connections utilize the ISP configuration process step-by-step. The tower is activated for connecting the Internet via web browser, which lets you browse the information by preinstalled programs, such as Safari, Explorer, Firefox etc. A wireless Introduction to Client-Server Computing NOTES Self-Instructional

Self-Instructional Material 160 Introduction to Client-Server Computing NOTES Internet tower is placed to transmit the signals to expand and provide the fast accessing of Web. Electromagnetic emission, microwave from radar or cellular phone is usually fenced by using the tower. If you know the concept of tower of Internet, you must know the concept of DNS hierarchy and network server. A good Internet tower works at a speed of 250 Kbps in which you can enjoy the download speeds of up to 1 Mbps. In peak hour, the speed can vary up to 70 Kbps to 80 Kbps. If Virtual Private Network (VPN) is run for the satellite service, the data speed can be reduced up to 50 to 75 per cent. The tower of Internet considers the maximum speed that figures out even actual speed. The tower Internet has a wide variety of customers to work from VPN connections. A tower server is to be considered as an Internet server. The two prime concepts of Internetworking are known as DNS and network server. The features of Internet tower are as follows: ? It helps to provide online video-conferencing with greater clarity. ? It supports VoIP technology, ISP, broadband services, etc. Bluetooth used in client-server computing Bluetooth is used in Wireless Personal Area Networks (WPANs). It connects and exchanges the information between devices, such as mobile phones, laptops, personal computers, printers, digital cameras and video game consoles via a secure, globally unlicensed short-range radio frequency. The word 'Bluetooth' is derived from the 10th century Danish king Harald Bluetooth. Bluetooth technology has been designed to connect both mobile devices and peripherals that currently require a wire. The services of Bluetooth are provided by wireless in which no setup is needed. The transfer speed of data is 1.0 Mbps. It holds radio frequency chips, which are plugged into the devices. It maintains 2.45 GHz frequency. It uses a technique called spread- spectrum frequency hopping. A wireless solution is given for the Bluetooth to reduce the cable net in the peripherals. It is a type of replacement for Infrared Data Association (IrDA). It is also considered as complementary technology for Apple Airport and valid for 802.11b, 802.11g and 802.11n. It uses about 2.4 GHz radio technologies which are used to eliminate the cables between various devices, such as computers, laptops, phones, mouse, printers and other equipment. The bi- directional radio transmission is used in Bluetooth to deliver automatic wireless connections. Bluetooth is a standard for tiny, radio frequency chips that are plugged into devices. These chips are designed to take all of the information that wires are normally sent and transmitted at the special frequency by Bluetooth chip. Creating Bluetooth server and client applications is similar to creating server and client applications for TCP communication. A Bluetooth server uses the Service Discovery Protocol (SDP) to broadcast the availability of the services the server contains and listens for inbound connections. A client creates an outbound RFCOMM connection to a server. Once the client and server connect to each other, they exchange data until the client or server terminates the connection or until the connection is lost. The Bluetooth client-server computing is basically supported by Wi-Fi connectivity. Bluetooth and Wi-Fi: The Wi-Fi stands for wireless fidelity. It is used for wireless devices. The Wi-Fi Alliance represents the wireless standard protocol and basically non-profit organization. This supports interoperability features for wireless devices. It connects networking systems without cables. But for this, Wi-Fi and Self-Instructional Material 161 regular ISP services are needed. The Bluetooth technology has been designed to connect both mobile devices and peripherals that currently require a wire. The services of Bluetooth are provided by wireless in which no setup is needed. It uses a technique called spread-spectrum frequency hopping. The Bluetooth and wireless networking are closely related to Wi-Fi connectivity through radio waves. But the basic difference between Bluetooth and Wi-Fi is that Bluetooth replaces cables at the primary stage, whereas Wi-Fi is completely considered to be wireless technology. In these days, much Bluetooth community uses Wi-Fi protocol. Introduction to Client-Server Computing NOTES Buttons Connector Paired Profile SDP Protocols Feature Operation Service Capabilities Communication Protocols Profile Bluetooth Address SDP Protocols User Interface Optional Feature Required Feature Signal Type Profile Software uP Radio uP Radio Profile Software Bluetooth Device Company A Bluetooth Device Company B Fig. 3.9 Bluetooth Technology In Figure, the companies 'A' and 'B' are connected with Bluetooth devices in which radio signal is provided with paired and Bluetooth address. The user interface is recommended by Bluetooth address. The communication protocols are used to connect online links between the organizations. The manufacturers of Wi-Fi Alliance build the various devices for 802.11 standards. Approximately 205 companies joined to the Wi-Fi Alliance and almost 900 products have been certified to the interoperable system. These companies give assurance that the Wi-Fi devices are connected by physical layer in reference models. The Wi-Fi Protected Access solution (WPA) was added recently to the Wi-Fi standard. The physical and access control layer implement the extra enhanced features, such as internet security. The Wi-Fi can be grown by leaps and bounds because it is connected via spectrum. It uses unlicensed 24 GHz and 5 GHz bands. It provides data throughput for most uses. The prime equipment of required for Wi-Fi connection is Wi-Fi PC card. It is a common way connecting the computer to the Internet without wires. Wi-Fi PC card is technically known as Personal Computer Memory Card International Association (PCMCIA). The two prime solutions included by the Wi-Fi device during data transmission are as follows: ? You can work almost anywhere by mobile Wi-Fi device to connect to the Internet without wires when away from your home or office. ? You can free yourself from the need to drill holes and attach wires by creating a network at the home or office using Wi-Fi devices.

162 Material Internet DSL cable etc.... Modem Wi-Fi access point Router Wired network client Wireless Wired network client Wi-Fi devices Wi-Fi devices Introduction to Client-Server Computing NOTES Fig. 3.10 A Wi-Fi Zone A hotspot means an area in which Wi-Fi users can connect to the Internet. Three approaches are used to make the searching for hotspots possible. ? You can use the search tool provided by organization. Branches are hosted by Wi-Fi hotspots, such as Starbucks chain across the world. ? If you have signed with Wi-Fi provider, you can search via ISP. ? You can search many cross provider directories that are available with the Web. Wi-Fi hotspots are created around the antennas to outlet the radio waves of wireless networking. It is confined to almost 10,000 hotspots in crowded areas, such as airport lounges, cafes, etc. A series of antennas are set up into city-wide zones. The Internet connection is facilitated through Wi-Fi chips. The long calls possible in Wi-Fi are by bypassed network and VoIP technologies. The Wi-Fi assembled mobiles and laptops can be connected to these hotspots and the amount is paid after using this technology by credit card on the login page provided by Web browser. Users can hold their accounts provided by service providers, such as BT Openzone, Skypezone, Ninetendo Wi-Fi, T-Mobile, O2, etc. Self-Instructional Fig. 3.11 Wi-Fi Network Setup Wi-Fi Zone made up from a group of hotspots

Self-Instructional Material 163 In Figure 3.11, the Wi-Fi access point is interconnected with Wi-Fi devices that are configured with router. Modem is also used to make connection between router and Internet DSL cable. The main role of router is to connect the Wi-Fi access point and wired network clients. The Voice-over IP (VoIP) software enables data, fax calls and voice across IP networks and represents Internet telephony allowing a communication between two PCs over packet switching Internet. It works by encoding voice information. Then it is changed to digital format. It provides cost benefits by converging data and voice over IP network into the mobile phones. Many of the latest mobiles are connected with Wi-Fi via VoIP technology. Between the Internet connection and Wi-Fi access point there needs to be hardware designed to connect with the Internet and share the internetworking connectivity. The following guidelines are required for connecting the Wi-Fi with a system unit: ? The WPA2 encryption is required for communications. ? The shared keys and certificates are encrypted. ? The Service Set Identification (SSID) should be used for broadcasting and changed as 89cyr65g6vwe or n08345cvb4wq. ? The MAC address authentication must be used for specific system that accesses the Wi-Fi link. ? The infrastructure mode must be used for Internet connectivity. After getting the Wi-Fi connection, you can know about your shared WPA2 key, MAC address and SSID. The infrastructure mode is used to set the wireless network card and firewall. Introduction to Client-Server Computing NOTES Fig. 3.12 Selected Uses for Radio Spectrum The connection of Internet via Wi-Fi involves the following equipments: ? Wi-Fi device (the client), ? A Wi-Fi broadcast unit (the access point), ? Network connectivity hardware (router and modem), ? Fast Internet connection (usually via cable or DSL). AM radio Baby monitor FM radio Wildlife tracking collars 535 KHz-1.7 MHz 49 MHz 85-108 MHz 215-220 MHz Free/Unlicensed 2.39-2.417 GHz Cell Phones 824-840 MHz Aeronautical navigation 5-5.25 GHz Free/Unlicensed 5.47-5.95GHz Upward to risible light Satellite (fixed) 5.025–7 GHz

164 Material Introduction to Client-Server Computing The Wi-Fi technology is best known for its fast connectivity and speed. The following figure shows the various wireless standards along with their speed: NOTES Throughput (in Mbps) .38 6 10 11 24 54 Self-Instructional Fig. 3.13 Speed of Wireless Standards In Figure 3.13, various wireless connections are set with speed respectively, for example 802.11b Wi-Fi is 11 Mbps and 802.11g is Wi-Fi is 54 Mbps. Firewall configuration for Wi-Fi connection: The firewall is configured for the Internet security. It is deployable by the following configuration: ? The default admin password is needed. ? Large DHCP zone is needed. ? Secure Socket Layer (SSL) encryption is not needed. ? No login option is needed. ? The admin console is needed for external port. Better methods are used for Wi-Fi vulnerabilities and foreign programs as follows: ? The Wi-Fi connection must be locked, if connection is not needed. ? The Wi-Fi connection must be secured with wireless firewall security. ? The Wi-Fi connection is restricted for preconfigured users for accessing the Internet. Bottom of form To keep your network private, you can use one of the following methods: ? Wi-Fi Protected Access (WPA) is a step up from WEP and is now part of the 802.11i wireless network security protocol. WEP stands for Wired Equivalent Privacy. This is a security protocol for Wi-Fi networks. WEP uses Temporal Key Integrity Protocol (TKIP) encryption. As with WEP, WPA security involves signing on with a password. Most public hotspots are either open or use WPA or 128-bit WEP technology, though some still use the vulnerable WEP approach. ? Media Access Control (MAC) address filtering is a little different from WEP or WPA. It does not use a password to authenticate users it uses a computer's physical hardware. Each computer has its own unique MAC address. MAC address filtering allows only machines with specific MAC addresses to access the network. You must specify which addresses are allowed when you set up Bluetooth 802.116 Wi-Fi (actual estimated) 10 Baset Wired Ethernet 802.116 Wi-Fi (theoretic) 802.11 a Wi-Fi (theoretic) 802.11g Wi-Fi (theoretic)

Self-Instructional Material 165 your router. This method is very secure, but if you buy a new computer or if visitors to your home want to use your network, you would need to add the new machines' MAC addresses to the list of approved addresses. The system is not foolproof. A clever hacker can spoof a MAC address, that is, copy a known MAC address to fool the network that the computer if user belongs on the network. Introduction to Client-Server Computing NOTES 3.3 TYPES OF CLIENT-SERVER SYSTEMS Several years ago, many computing environments consisted of mainframes hooked to dumb terminals that were only processed at the mainframe. Over the years, personal computers started to replace these dumb terminals. The client-server technology was evolved out of this movement for greater computing control and more computing value. Client-server refers to the way in which software components interact to form a system that can be designed for multiple users. This technology is a computing architecture that forms a composite system allowing distributed computation, analysis and presentation between PCs and one or more larger computers on a network. Each function of an application resides on the computer most capable of managing that particular function. There is no requirement that the client and server must reside on the same machine. In practice, it is quite common to place a server at one site in a local area network (LAN) and the clients at the other sites. The client is the requesting machine and the server, a LAN file server, mini or mainframe, is the supplying machine. Networks provide connectivity between client-server and the protocols that they use to communicate. The Internet provides connectivity between systems that function as clients, servers, or both. Many services used on the Internet are based on client-server computing model. The first generation systems are 2-tiered architectures where a client presents a graphical user interface to the user, and acts according to the user's actions to perform requests of a database server running on a different machine. The main types of client server system are 1-tier system, 2-tier system, 3-tier system, 4-tier system and N-tier system. 1-Tier or Single-Tier architecture is the simplest and we are all familiar with it. This is equivalent to running of applications on user's personal computer. By business logics we mean formulas for performing business processes. A business has some logic. Required components as necessary to run applications reside on it. All components, user interface, applications for business logic and database that stores data, are kept on the same machine. Such a system is designed easily but has little scalability. Such systems do not form part in a network and can not be used to design applications for the web. Here, user is the client that accesses the server for using one software application for handling data, use an interface and business logic. For example, MS Excel that is a spreadsheet application resides on the server having an interface, data and business logic. Basic architecture in Client-Server system is 2-tier in which Client is one end and Server is the other end and connected through some application interface. In such a system server provides services for use by many clients. In communication, clients lead. In such a type of system user accesses server using two application layers of software, front-end and back-end. Front-end applications contain business logic and interact with users. Java and VB are examples of front-end applications. Back-end applications store data. MS SQL and Oracle servers are examples of back-end applications.

166 Material Introduction to Client-Server Computing NOTES Self-Instructional 3.3.1 Middleware Middleware is a layer, an interface between distributed applications and operating system. It acts transparently by hiding heterogeneity and complexity of distributed system. It also bridges the gap between low-level commands of operating system and high level abstraction of programming languages. Thus, it provides program for common abstraction as infrastructure for use by distributed applications without going into the system complexity. When applied in context of client server computing, middleware is viewed as distributed software that provides support for interaction between clients and servers. This serves the purpose of a link between servers and clients. Middleware has been classified in many ways. Two broad classes of middleware are known as general and service-specific. Fig. 3.14 Middleware Services In Figure 3.14, you find that middleware supports transport stack, such as TCP/IP and service specific that supports peer-to-peer directory and distributed files. General middleware: This class of middleware contains distributed directories, communication stacks, authentication services, Queuing services, network time, RPC (Remote Procedure Calls), and some services based on extensions of network OS such as print services and distributed file services. Service-specific middleware: As the name implies, this class of middleware is service specific and hence, it is required for accomplishing a particular type of service as per type of Client/Server system that includes: ? Database specific middleware ? Groupware specific middleware ? Object specific middleware ? On-line Transaction Processing (OLTP) specific middleware ? System management specific middleware and ? Internet specific middleware Hurwitz's classification organizes middleware on the basis of scalability and recoverability, as follows: ? Remote procedure call: In such a system client gives calls to procedures running on remote systems. This may be synchronous or asynchronous. ? Message oriented middleware: In this system messages that are received by client, are stored until executed. Client continues with other processing. Three types of such services are there. These are: ? Java Message Service ? IBM MQSeries ? Web Services ? Object oriented middleware: This type of middleware sends objects and requests for services in an object-oriented system.

Self-Instructional Material 167 ? Event-based middleware: This is an interface that acts as a middleware between applications and database servers. ? Reflective middleware: These are Object Oriented Middleware combined with interfaces for reflection. Remote procedure call This method of interaction is synchronous and very quick. In such a system, it is possible for a client to control standalone programs on another machine from a remote location. A client process initiates a process on a remote server by issuing defined parameter and waits until it gets the results back from server. Run-time software of RPC collects values for the parameters, forms a message and sends it to the remote server. On receiving the request from clients unpacks the parameters, calls the procedure and sends the reply back to the client. RPCs relieves programmer from the challenges of the Network designers by supplying the development tools and run-time environments. Remote programs may fail for the reason of unpredictable or uncertain network problem. Nature of RPC is synchronous. Client after making request through RPC for server procedure does not return control to its initiator until function is completed. This limitation may be removed by employing advanced RPC that provides asynchronous callbacks. Following steps are needed for development of RPC application: ? Specify the protocol for client server communication ? Develop the server program ? Develop the client program Message-oriented middleware (MOM) Communication is established by messaging. Messages are stored in queues. There is optional message server between client and server. This focuses on exchanging messages for increased interoperability, portability, and flexibility of an application by distributing the application over heterogeneous platforms. In this type of middleware complexity is reduced by development of applications, spanning over network protocols and multiple operating systems. This is done by creating an abstraction that insulates application developer from internal details of network interfaces and different operating systems. MOM provides interfaces for application programs extending over diverse networks and platforms. MOM is essentially a software package residing on both the parts of client/server architecture, supporting asynchronous calls between applications running at client and server end. If destination program is busy or not connected, messages are queued and stored temporarily. This reduces application developers' involvement in the complexity of master-slave nature of the client/server mechanism. MOM is a category of software of inter-application communication and relies on asynchronous message-passing and not of a request-response metaphor. Such middleware has a message queue system, but in certain implementations broadcast or multicast messaging systems are also used. Advantages of such a communications protocol are due to its ability to store, route or transform messages in the process of delivery. Storage: Persistent storage is provided by MOM systems to back up the message transfer medium. Thus, sender and receiver are not required to remain connected to the network at the same instant. This is especially useful when dealing with intermittent connections such as timed connections or unreliable networks. Introduction to Client-Server Computing NOTES

168 Material Introduction to Client-Server Computing NOTES Self-Instructional Even if receiver application fails for any reason, senders can continue sending messages. These messages will get stored for later processing when the receiver restarts. Routing: Message-oriented middleware (MOM) offers another advantage in its ability to route messages within middleware layer itself. Middleware messaging can deliver one message to many recipients either by multicast or broadcast. Transformation: MOM system having built-in intelligence is capable of transforming messages following a route that matches requirements of sender and recipient both. Utilizing combined facilities of routing and broadcasting/multicasting, an application can send messages in its native format, and each of the other applications receives a copy in their own native format. Modern MOM systems have sophisticated tools for message transformation allowing programmers to set transformation rules for application to a simple GUI drag-and-drop operation. But disadvantage lies in their requirement of extra component in the architecture, known as message transfer agent or message broker. Like any other system, addition of another component may lead to reduced performance and reliability. This may also cause system to be more difficult and expensive to maintain. Further, many communications from one application to another, have a synchronous aspect in which sender waits for a reply before continuing further. Message-based communication functions asynchronously and hence may not fit well in such situations. Java message service (JMS): JMS is a specification for Application Program Interface to use MOM implementations. There are two modes of operation in this MOM interface, point-to-point, and one-to-one communication using queues. Servers using JMS Server use this API. Java objects are serialized to JMS messages. IBM MQSeries: This is another interface under MOM. This provides one- to-one and reliable message passing system that uses queues. This is used both in persistent and non-persistent messages. Messages are queued and priorities can be set. A program, Queue Managers (QM) manages queues. The queue manager transfers messages from input to output queues and keep routing tables. This also has Message Channels (MC) that creates and maintains reliable connections between queue managers. IBM MQSeries uses commands like MQopen for opening a queue, MQclose for closing a queue, MQput for queuing the message, MQget to retrieve messages from local queue. Web services: This system makes use of well-known web standards in distributed computing. It establishes communication through message written in XML (eXtended Markup Language). It uses both synchronous and asynchronous communication using a protocol known as Simple Object Access Protocol (SOAP). It is language-independent and open standard. It offers both OOM and MOM-style of communication. It makes synchronous request/reply as is found in OOM as well as asynchronous messaging like MOM. It supports Internet transport protocols (http, smtp, ...). It makes use of XML Schema for marshalling types to/from programming languages. Object oriented middleware: It this interface objects and its references can be local or remote. It supports object-oriented programming model having objects, methods, interfaces, encapsulation, exceptions etc. It provides location transparency. Common object request broker architecture (CORBA): This is an open standard defined by the object management group (OMG). It is independent of platform and language. It uses object request broker (ORB). It uses general inter-

Self-Instructional Material 169 ORB protocol (GIOP) for communication. It uses interoperable object references (IOR) for object location and interfaces IDL (interface definition language). Object request broker (ORB): This is applicable in distributed computing. An object request broker (ORB) enables programmers to make calls for programs, via a network, from one computer to another. This promotes interoperability of distributed object systems. ORBs transform in-process data structures to and from the byte sequence, transmitted over the network and known as marshalling or serialization. Some ORBs which are CORBA-compliant make use of an Interface Description Language (IDL) for describing the data in response to remote calls. The standard known as (CORBA) is defined by the Object Management Group (OMG). CORBA enables different components of software written in different computer languages running on multiple computers to work together. Thus, there is support for multiple platforms. ORBs has many features over and above marshalling data such as distributed transactions, directory services or real-time scheduling. Event-based middleware: Its working style is known as publishing and subscribing. Publishers do advertisement and publish events. Events are sending or receiving of messages. Subscribers show interest in events by use of subscriptions. Events can have arbitrary content (typed) or name/value pairs. The event-based middleware is an asynchronous communication in which publishers and subscribers are loosely coupled. There is many-to-many interaction between pubs and subs. It can be expanded to make large-scale systems. Publishers need not know subscribers, and vice-versa. Reflective middleware: As already told, these are Object Oriented Middleware combined with interfaces for reflection. In this system objects can keep a track on behaviour of middleware. It enables user having some knowledge of computer system to customize interfaces. It has dynamic reconfiguration suited to environment and can handle different protocols with Quality of Service (QoS) . It uses different marshalling strategy for unreliable wireless links. Classes of middleware Based on arrangement of distributed architecture there are three classes of middleware: Presentation middleware: Remote presentation software such as Motif/X windows allows presentation logic to carry execution at a location remote from presentation manager. Database middleware: Database gateways that support an application program interface ODBC provides remote database access. Application middleware: This has flexibility in design and programming flexibility in comparison to other categories. It permits communication in a way that suits the developer. Middleware in distributed multi-tiered applications Depending upon the way distributed communication is established between work station and servers, configurations are different. This is shown in Figure 3.15. Introduction to Client-Server Computing NOTES
170 Material Introduction to Client-Server Computing NOTES Workstation Network Server Remote presentation Distributed logic Remote data access Fig. 3.15 Arrangement of Workstation, Network and Server Self-Instructional 3.3.2 N-Tiered Systems The 3-tier system can be extended to N-tiers when the middle tier provides connections to various types of services, integrating and coupling them to the client and to each other. Partitioning the application logic among various hosts can also create an N-tiered system. Encapsulation of distributed functionality in such a manner provides significant advantages such as reusability, and thus reliability. As applications become web-oriented, web server front ends can be used to offload the networking required to service user requests, providing more scalability and introducing points of functional optimization. The advantages of N-tiered system are as follows: ? Different aspects of the application can be developed and rolled out independently in N-tiered system. ? In N-tiered system, the servers can be optimized separately for database and application server functions. ? The servers can be sized appropriately for the requirements of each tier of the architecture. ? The server horsepower can be deployed in the N-tiered system. In the 3-tier system, the client sends HTTP requests for content and presents the responses provided by the application system. On receiving requests, the web server either returns the content directly or passes it on to a specific application server. The application server might then run CGI scripts for dynamic content, parse database requests or assemble formatted responses to client queries, accessing dates or files as needed from a back-end database server or a file server. Presentation Manager Presentation Logic Application Logic Data Logic Data Manager Presentation Middleware Presentation Middleware Presentation Manager Presentation Logic Application Logic Application Middleware Data Logic Data Manager Application Middleware Presentation Manager Presentation Logic Application Logic Data Logic Data Manager Database Middleware Database Middleware
Material 171 Introduction to Client-Server Computing NOTES Fig. 3.16 Web-Oriented N-Tiered Architecture If the web server layer is the bottleneck as shown in Figure 3.17, multiple Web servers can be deployed, with an appropriate server load-balancing solution to ensure effective load balancing across the servers. Fig. 3.17 Four-Tiered Architecture with Server Load Balancing Benefits of N-Tiered System There are many business benefits to N-Tier system, for example, a small business can begin running all tiers on a single machine. As traffic and business increases, each tier can be expanded and moved to its own machine and then clustered. This is just one example of how N-Tier architecture improves scalability and supports cost- efficient application building. ? N-Tier model also makes applications more readable and reusable. It reduces the amount of spaghetti code. Custom tag libraries and enterprise JavaBeans (EJBs) are easier to port to readable applications in well-maintained templates in N-Tier system. Reusability multiplies developer productivity and improves application maintainability. It is an important feature in web applications. Self-Instructional Tier 4 Tier 3 Tier 2 Tier 1 Tier 3 Tier 4 Tier 2 Tier 1

172 Material Introduction to Client-Server Computing NOTES Self-Instructional ? N-Tier system makes application more robust because there is no single point of failure. Tiers function with relative independence. For example, if a business changes database vendors, they just have to replace the data tier and adjust the integration tier to any changes that affect it. The business logic tier and the presentation tier remain unchanged. Similarly, if the presentation layer changes, this will not affect the integration or data layer. In 3-Tier architecture all the layers exist in one and affect each other. A developer would have to pick through the entire application code to implement any changes. Again, well-designed modules allow for applications or pieces of applications to be customized and used across modules or even projects. Reusability is particularly important in web applications. ? N-Tier system offers innovations in the standard client-server technology that spawned the Internet itself. It is but one of many web application frameworks. These are used to develop dynamic web sites, web applications or web services. They provide database access libraries, templates, and, as previously stated code re-use. Most web application frameworks follow the Model View Controller (MVC) which separates the user interface, the business rules and the data model. They provide authentication and authorization to provide security. This allows the web server to restrict user access based on pre-determined criteria. Web application frameworks also provide a unified API (Application programming Interface). This allows web application to work with various databases without requiring any code change. These frameworks also maintain a web template system. Most of the application programs contain three main layers. Presentation layer lies at the top providing user interface for human/machine interaction. This layer takes input from users through keyboard, mouse or other devices and displays output on screen. Application containing business logic lies in the middle and contains functionality according to business rules followed in a given enterprise. Bottom layer, the third layer offers generalized services as may be needed by other layers. Such services can be file services, communications services, print services and database services. Thus, first layer is presentation tier, the front-end, the client or front-end for interaction with users. Clients do the processing of inputs received from users and make request to server. After receiving results from server, passes this to the user. A client is composed of many dynamic HTML pages accessed using a web browser. Second layer is application tier, middleware, the server that makes processing of the clients' requests. This is the web application performing all functionalities that are specific to it. But persistent data is stored by it. Database server is contacted when there is need for data. Third layer is database tier containing DBMS for managing persistent data that needs processing. A client-server system is told to have N-tier architecture when user accesses the server for using 3 layers of applications that are, front-end, component and back-end. Front-end applications such as Java and VB are for interaction with users. A component is an application that is used for writing business logic. Microsoft ActiveX and Sun JAVA beans are components used for writing and developing business logic. Back-end applications find use in storing data. Oracle servers and MS SQL are back-end applications. In client-server system, a user interacts with front-end applications only in 2- and 3- tier architectures. A component is a binary code capable of being reused. Components of MS ActiveX have mainly two

Material 173 technologies, COM and DCOM that stand for component object model and distributed component object model, respectively. Every model contains many controls. COM finds use in local applications whereas DCOM is for remote applications. Microsoft Data bound grid is an example of COM. Example of DCOM is Winsock control. This is used for developing client-server application with VB. VB has mainly two components, DLL and ActiveX object control. VB imparts facility for development of components that are programmer defined and stored using the extension 'DLL'. OCX components are defined by Microsoft. Such business logic defined by programmer for developing new components are registered in the Windows folder named System32. Such components defined using VB are used with all tools such as Visual C and ASP offered by Microsoft. In N-tier architecture, changes can be accommodated by making changes in the business logic and also by splitting the application and for this reason, this has great popularity. Programmers can just replace the old component(s) when business logic needs change with no change required to be made in the front-end and back-end applications. For this reason programmers prefer to select methodology that is based on CBD (component based development). Word processing application, MS Word by Microsoft can be cited as best example for CBD. For upgrading a component of MS Word, Microsoft Corporation has to simply replace an old component with that of a new one. For example, if some enhancement is made in spell checker, only that component needs replacement. CBD offers three advantages mainly: ? Easy for upgrading any application when change is demanded by customers. ? Components reuse. Once a component has been developed it is reused for applications that are similar. ? Built-in components may be used by programmers instead of developing from scratch. Two standards are mainly available for reusing components as given below: ? CORBA ? RMI (Remote Method Invocation). CORBA was developed by Object Management Group as standards. A programmer may give call to a remote application component that has been developed using a different programming language. A programmer may be developing an application with ASP and can make a call to a component from an application that has been developed in 'C'. CORBA has two major limitations in which a programmer: ? Is required to learn interface definition language (IDL) to give call to components. ? May use only few types of data posing problem in giving to call to Java components and reuse these. Because of these two main limitations of CORBA, RMI standard was developed and using RMI, JAVA components can be called. RMI and CORBA permit communication between components developed using different programming languages that provides interoperability. In such architecture, business logic tier gets pulled out of the presentation tier as its own and controls functionality of an application by way of doing detailed processing on it. For example, a business logic Introduction to Client-Server Computing NOTES Self-Instructional
174 Material Introduction to Client-Server Computing NOTES tier finishes authorization of a credit card and calculates cost of shipping and sales tax. Tools used for encapsulating business logic of an application in its own layer have custom tags, web services and few stored procedures. In object oriented programming encapsulation is the ability of an object to hide its data as well as methods. This technique enables applications to establish communication with business logic tier or data tier such that it is intelligible to every node. Encapsulated objects only allow external interfacing for user and there is no need to understand internal specifications. Thus, users can make call for every kind of services by making call to the custom tag and need not know the details of code. Encapsulation in the integration tier frees the network from being vendor specific. This integration tier makes N-Tier Architecture vendor independent. The final application tier is the data tier. It usually consists of database servers. It keeps data neutral and independent from application servers or business logic. Giving data to its own tier also improves scalability and performance. As it grows, it is easily moved to another, more powerful machine. 3.3.3 2-Tier/3-Tier/4-Tier Systems The 2-tier, 3-tier, 4-tier systems of client-server computing system are as follows: 2- tier system Client-server applications started with a simple, 2-tiered model consisting of a client and an application server. The most common implementation is a fat client server architecture, placing application logic in the client. The database simply reports the results of queries implemented via dynamic SQL using a Call Level Interface (CLI), such as Microsoft's Open Database Connectivity (ODBC). Fig. 3.18 Traditional Fat Client-Server Deployment An alternate approach is to use thin client-fat server waylays that invokes procedures stored at the database server. The term thin client generally refers to user devices whose functionality is minimized, either to reduce the cost of ownership per desktop or to provide more user flexibility and mobility. In either case, presentation is handled exclusively by the client, processing is split between client and server, and data is stored on and accessed through the server. Remote database transport protocols such as SQL-Net are used to carry the transaction. In this, the network transaction size and query transaction speed is slowed by this heavy interaction. Self-Instructional

Material 175 Fig. 3.19 Thin Client-Server Deployment The various development tools that generate 2-tiered fat client implementations include PowerBuilder, Delphi, Visual Basic and Uniface. The fat server approach, using stored procedures is more effective in gaining performance, because the network footprint, although still heavy, is lighter than that of a fat client. The advantages of 2-Tier system are as follows: ? It has good application development speed. ? Most tools for 2-tier are very robust. ? Two-tier architectures work well in relatively homogeneous environments with static business rules. 3- tier system Inserting a middle tier in between a client and server achieves a 3-tier configuration. The components of three-tiered architecture are divided into three layers and they are known as a presentation layer, functionality layer and data layer, which must be logically separate. The 3-tier architecture attempts to overcome some of the limitations of 2- tier schemes by separating presentation, processing and data into separate distinct entities. The middle-tier servers are coded in a highly portable, non-proprietary language, such as C. Introduction to Client-Server Computing NOTES Fig. 3.20 3-Tiered Application Architecture The client interacts with the middle tier via a standard protocol, such as DLL, API and RPC. The middle-tier interacts with the server via standard database protocols. The middle-tier contains most of the application logic, translating client calls into database queries and other actions, and translating data from the database into client data in return. The advantages of 3-Tier architecture are as follows: Self-Instructional Tier 3 Tier 2 Tier 1

176 Material Introduction to Client-Server Computing NOTES Self-Instructional ? It supports RPC calls that provides greater overall system flexibility than SQL calls in 2-tier architectures ? The 3-tier presentation client is not required to understand SQL. This allows firms to access legacy data and simplifies the introduction of new data base technologies. ? It also provides for more flexible resource allocation. ? The 3-tier systems such as Open Software Foundation's Distributed Computing Environment (OSF/DCE) offer additional features to support distributed applications development. The 3-tier can have following layer through which it transmits the data between clients and servers: Presentation layer: Presentation Layer is the layer responsible for displaying user interface. Business tier: Business Tier is the layer responsible for accessing the data tier to retrieve, modify and delete data to and from the data tier and send the results to the presentation tier. This layer is also responsible for processing the data retrieved and sent to the presentation layer. BLL and DAL: Often this layer is divided into two sub layers: the Business Logic Layer (BLL), and the Data Access Layers (DAL). Business Logic Layers are above Data Access Layers, meaning BLL uses DAL classes and objects. DAL is responsible for accessing data and forwarding it to BLL. Data tier: Data tier is the database or the source of the data itself. The benefits of the 3-tier model are as follows: Scalability: The key 3-tier benefit is improved scalability since the application servers can be deployed on many machines. Also, the database no longer requires a connection from every client and it only requires connections from a smaller number of application servers. In addition, TP monitors or ORBs can be used to balance loads and dynamically manage the number of application server(s) available. Better re-use: The same logic can be initiated from many clients or applications. If an object standard like COM/DCOM or CORBA is employed (as discussed in tool dependence), then the specific language implementation of the middle tier can be made transparent. Improved data integrity: Since all updates go through the middle tier, the middle tier can ensure that only valid data is allowed to be updated in the database and the risk of a rogue client application corrupting data is removed. Improved security: Security is improved since it can be implemented at multiple levels (not just the database). Security can be granted on a service-by- service basis. Since the client does not have direct access to the database, it is more difficult for a client to obtain unauthorized data. Business logic is generally more secure since it is placed on a more secure central server. Reduced distribution: Changes to business logic only need to be updated on the application servers and do not have to be distributed to all the clients. Improved availability: mission-critical applications can make use of redundant application servers and redundant database servers. With redundant servers, it is possible to architect an application so that it can recover from network or server failures.

Material 177 Hidden database structure: since the actual structure of the database is hidden from the caller, it is possible that many database changes can be made transparently. Therefore, a service in the middle tier that exchanges information/ data with other applications could retain its original interface while the underlying database structure was enhanced during a new application release. Types of 3-tier systems The 3-tier system is of three types known as 3-Tier with message server, 3-Tier with application server and 3-Tier with an Object DBMS. They are described as follows: 3-tier with message server: In this architecture, messages are processed and prioritized asynchronously. Messages have headers that include priority information, address and identification number. The message server links to the relational DBMS and other data sources. Messaging systems are alternative for wireless infrastructures.

Messaging provides still another technology to implement 3-tier computing. It is available today from companies such as IBM, DEC, Sybase, and Oracle. A messaging server can be thought of as a kind of 'second generation' TP monitor and provides the same funneling process. Messages are processed asynchronously with the appropriate priority level. And, like a TP monitor, a messaging server provides connectivity to data sources other than RDBMS. A message is a self contained object that carries information about what it is, where it needs to go, and what should happen when it reaches its destination. There are at least two parts to every message. They are known as the header, which contains priority and the address and an ID number. The body of the message contains the information being sent, which can be anything including text, images or transactions. A primary difference from TP Monitors is that message server architecture is designed around intelligence in the message itself as opposed to a TP monitor environment which places the system intelligence in the monitor or the process logic of the application server. In a TP monitor environment the transactions are simply dumb packets of data. They travel over a pre-existing and pre-defined connection to the TP Monitor. The TP Monitor interrogates and processes the transaction, usually submitting the request to a server tier application. If the TP Monitor does not understand the data, it does not get processed. Similarly, the TP Monitor needs to know as much about the transaction as the server tier does. Contrasting with this, in a message-based architecture there is intelligence in the message itself. The message server just becomes a container of messages and their stored procedures. The operations performed by the message server on the message are communications related, e.g., encrypt message over one service and decrypt message sent over another service. For the most part, messages are treated as discrete objects. The message contains all the information needed to transverse network services, i.e., network addresses, both logical and physical). Because the message contains the intelligence, the middle tier of a message-based system is more flexible than a TP monitor. For one kind of message, the middle tier may simply serve as a routing point between two kinds of network services. For another kind of message, the middle tier may execute a stored procedure or business rule as directed by the message. This abstraction of the middle- tier away from the contents and behavior of the information flowing through it makes the system more portable to different environments and networks. The specifics of communicating the information are hidden underneath the messaging service. Messaging systems are designed for robustness. By using store and forward Introduction to Client-Server Computing NOTES Self-Instructional
Self-Instructional Material 178 Introduction to Client-Server Computing NOTES logic, they provide message delivery after and around failures. They also provide independence from the enabling technologies such as wired or wireless or protocols. They do not require a persistent connection between the client and server. They are robust because message delivery can be programmed to occur after or around failures. Because messaging systems support an emerging wireless infrastructure, they should become popular for supporting mobile and occasionally connected workers. Fig. 3.21 3-Tier with Message Server 3-
tier with application server: This architecture allows the main body of an application to run on a shared host rather than in the user system interface client environment. The application server shares business logic, computations and a data retrieval engine. In this architecture applications are more scalable and installation costs are less on a single server than maintaining each on a desktop client.
The approach of putting 3-tier with an application server offers a number of important advantages to the application designer: ? When less software is on the client, there is less worry about security since the important software is on a server in a more controlled environment. ? The resulting application is more scalable with an application server approach. While a server could be a single Pentium based Compaq or Dell, it could also be a symmetric multiprocessing Sequent, with 32 or more processors or it could be a massively parallel UNIX processor like IBM's SP2. ? The support and installation costs of maintaining software on a single server is much less than trying to maintain the same software on hundreds or thousands of PC's. ? With a middle application server tier it's much easier to design the application to be DBMS agnostic. If you want to switch to another DBMS vendor, it is more achievable with reasonable effort with a single multithreaded application than with thousands of applications on PC's. ? Most new tools for implementing a 3-tier application server approach offer 'after the fact' application partitioning. This means that code and function modules can be reallocated to new servers that have been built. This offers important flexibility and performance benefits, e.g., this technology is available today in toolsets from Dynasty technologies and Forte Software. MESSAGE BASED CLIENT/SERVER STACKABLE HUB EXE EXE EXE DBMB MESSAGE SERVER SERVER

Material 179 ppropriate multimedia data wi The major downside to an application server approach to client/server computing is that the technology is much more difficult to implement than a 2-tier approach. Introduction to Client-Server Computing NOTES Fig. 3.22 3-Tier with Application Server 3-tier with an Object DBMS: A variation on this theme of application server is the idea of using an object DBMS (ODBMS) as the middle layer. This is illustrated in the figure entitled 3-Tier with an Object DBMS. In this sense, the ODBMS acts as an accelerator or 'hot cache'. Data in a relational DBMS is usually stored in normalized fashion across many tables and for access by different applications and users. This generalized form of storage may prove inadequate (performance wise) for the needs of any one particular application. An ODBMS can be used to retrieve the data from the common store, assemble it for efficient usage by your application, and provide a persistent store for that data as long as your application might need it. Since extended data types like video or voice are not typically supported in today's RDBMS, those data types might also be stored in the ODBMS, which could then associate the a th the data retrieved from the RDBMS. Fig. 3.23 3-Tier with an Object DBMS Self-Instructional 3 TIER APPLICATIONS STACKABLE HUB PRESENTATIONLOGIC ON LITE CLIENT DBMB SERVER 3 TIER WITH AN ODBMS STACKABLE HUB PRESENTATIONLOGIC ON LITE CLIENT DBMB SERVER

Self-Instructional Material 180 Introduction to Client-Server Computing NOTES 3-tier with Data Warehousing: 3-tier architecture is also useful for data mining or warehouse types of applications. These applications are characterized by unanticipated browsing of historical data. The databases supporting this type of application can sometimes be huge up to a few terabytes. According to W.H. Inmon, known as the father of the data warehouse concept, 'A data warehouse is a subject oriented, integrated, non-volatile and time-variant collection of data in support of management's decisions. The approach to support this browsing is then to make data copies available for that browsing and to organize the data in those copies in the best supporting fashion. For cost, management, security, and other reasons, it makes sense to load this data copy on its own server rather that leaving it on the mainframe. Often this server is called OLAP on-line analytical processor. In other circumstances this server can be a symmetric or massively parallel processor running an RDBMS. Since the OLAP server is typically a UNIX or PC-based technology, the MIPS costs are much lower than the same cycles executed on a mainframe. Fig. 3.24 3-Tier with Data Warehousing 3.4 FAT CLIENTS VERSUS FAT SERVERS As we know, essential parts of a Client/server system are clients, servers and middleware. There are different types of clients, servers and middleware. A part in a system is considered 'fat' if it contains a huge amount of logic in an application. It is called 'thin' if less responsibility is given to it. A client is called 'fat' if bulk applications are run on it and a server is 'fat' when more responsibilities are assigned in the application logic for the server. Thus, web servers and groupware systems are fat servers. A client is fat in a system such as database systems that put more responsibilities on client side. Fat clients are used in development of personal software and in decision support system. A fat server attempts to minimize network interchanges and creates more levels of abstraction for providing services.

Material 181 3.4.1 Fat Clients A fat client is a computer in client/server architecture that provides rich functionalities, independent of central server. A thin client system heavily depends on server applications. A fat client requires minimum periodic connection in the network to a central server but has capability of performing various functions even without such connection. As a contrast to this, a thin client has little processing to do and has to rely on server access every time when input data needs processing or validation. While designing a client/server application, a decision has to be taken on assignment of the task. Decision has to be taken as to which portions of the task are to be executed on client machine and which parts on server machine. Such a decision is crucial as it affects cost of the client/server system, security of an application as a whole, its robustness as well as design flexibility in performing modifications at a later stage and portability. User interface is important as its characteristics usually force changes in decision by the designer. For example, a drawing package may download an image from a server permitting local edits and return revised image back to the server after completing editing. This needs fat client and will have quick-editing but take long time in starting and stopping. On the other hand if we use a thin client that just downloads visible parts of drawing in the beginning and subsequently sending every change, back to server for updating the image. This has small time for start-up, but has long timed editing process that is slow and tedious. Basic driving force behind adoption of thin client computing was cost considerations as PCs and CRT terminals were quite costly. Under this scenario thin client in client/server architecture enabled deployment of desktop computing to most of the users. With growth in technology and decrease in prices of PCs and further drop in the cost of software licensing, fat client was found more promising. Users found fat client device as a platform that is more responsive with betterGUI in comparison to an environment having thin client. Advantages of fat clients A fat client or thick client offers certain advantages that are given below: ? Fewer server requirements: A client/server system having fat client have no requirement for high performance level as is needed in case of a client/server system with thin client. Many application processing are performed on client machines in case of fat clients hence, cheaper servers could be employed. ? Offline working: Fat clients do not need a dedicated connection with the central server as much of the working is done in offline mode. ? Better multimedia performance: Fat clients offer advantages over thin clients in applications that handle multimedia. Such applications would require high bandwidth if most of the applications are run on server. Fat clients are also suited for video gaming. ? Increased flexibility: Some operating systems have software products, designed for PCs having own resources available locally. It will not be easy to run such software products on thin clients. ? Use of existing infrastructure: Today more and more efficient PCs are becoming available with fast processing speed and as such infrastructure is already available for running fat clients without spending more. Cont. ... Introduction to Client-Server Computing NOTES Self-Instructional

Self-Instructional Material 182 Introduction to Client-Server Computing NOTES ? Higher capacity for servers: Since more work is carried at client side, load on server per user is less and thus servers can support more users. This results in increased capacity of servers. 3.4.2 Fat Servers Such servers perform all or most of the application processing with very little on client machine. A fat server is usually combined with a thin client. A fat server has most of the program codes residing on it instead on Client machine. Web server is a good example of a fat server where codes for giving response to requests by a browser lie on the server. In a client/server system having fat servers with thin clients offer advantage of easy software updates. It only requires changing code on server side instead of changing codes on so many clients accessing the server. Applications on fat servers are easier in its management and deployment over the network since codes run on servers. A fat server minimizes network interchanges with creation of more levels of abstraction for services. Data encapsulation is done by object servers and transaction servers. Procedures that act on data are exported and not the raw data. Every client/server model is useful. Different models co-exist in one application and complement each other. An imaging application using a groupware require a server for combining file with database servers, object servers and transaction servers. Fat servers find use in applications that are mission-critical. This opens a new area for PC-Based client/server computing. In the two tier architecture, the business services layer may be implemented in one of the ways, such as by using the fat client, by using the fat server and by diving the business services between the user services and the data services. The following table shows the differences between fat client and fat servers: Table 3.2 Differences between Fat Client and Fat Server Fat client Fat server In the case of fat clients, the business services layer is combined with the user services layer. Clients execute the presentation logic and enforce business rules. The server stores data and processing transactions. In the two tier architecture in the fat server, the business services layer is combined with the data services layer. As business services are stored on the server, most of the processing takes place on the server. Fat clients are the more traditional form of client-server. Fat server applications are easier to manage and deploy on the network because most of the code runs on the servers. The bulk of the application runs on the client side of the equation. Fat servers try to minimize network interchanges by creating more abstract levels of service. Transaction and object servers, for example, encapsulate the database. In both the file server and database server models, the clients know how the data is organized and stored on the server side. The client in the fat server model provides the GUI and interacts with the server through remote procedure calls or method invocations. Fat clients are used for decision support and personal software. Fat servers are used for mission-critical applications; represent the new growth area from PC-based client-server computing. They provide flexibility and opportunities for creating front-end tools that let end- users create their own applications. They provide rigid rules.

Material 183 Rich client A rich client is also a fat client having richer solutions to problems. Usually it provides a framework of plug-ins and modules adding ability to expand. Many Frameworks are now available offering a Rich Client Platform (RCP). Such platforms provides a basis in which user can add plug-ins/modules with rearrangement as may be needed. It is possible for programmers to build own applications using existing platforms. Thus, programmers need not write an application completely from scratch and can derive benefit by using tested and proven features of such frameworks that this platform provides. This enables faster development of applications as well as integration. The burden of cross-platform is taken by developers of the platform. Also a rich client offers an advantage over a normal fat client since it is easier for distribution and updates. Characteristics Followings are characteristics of a rich client: ? Adaptability to end user ? Adaptability to various devices of different types ? Can run both on-line or off-line ? Simple distribution for end users ? Simple actualization of clients ? Complex user surface A Rich Client has all advantages that a fat client offers. Over and above this it also has some features of thin client. Rich client is also known by another name of smart client. Introduction to Client-Server Computing NOTES 3.5 SUMMARY In this unit, you learnt that: ? The client-server computing basic is a message-based and modular infrastructure that is intended to improve on centralized, time sharing mainframe computing. A client is defined as a 'requester of services' and a server is defined as the 'provider of services'. A single machine can be both a client and a server depending on the software configuration and the functions it is performing. ? Client-server computing architecture is consists of two types of nodes client and server. This system is used for sharing files among servers and clients. There are several kinds of client-server system. ? The client-server system include both two-tier, where clients talk directly to servers, and three-tier, where a third software component provides interface services between the clients and the servers. Three-tier architectures are further categorized by the type of middleware employed. Multi-tier is used to describe architectures with multiple layers or types of middleware. Client-server architectures are in contrast to a mainframe architecture where the processing is self-contained. Self-Instructional

Self-Instructional Material 184 Introduction to Client-Server Computing NOTES ? The fat server model places more function on the server. The fat client does the reverse. Fat clients are the more traditional form of client-server. The bulk of the application runs on the client side of the equation. In both the file server and database server models, the clients know how the data is organized and stored on the server side. Fat clients are used for decision support and personal software. They provide flexibility and opportunities for creating front- end tools that let end-users create their own applications.? ? Fat Server applications are easier to manage and deploy on the network because most of the code runs on the servers. Fat servers try to minimize network interchanges by creating more abstract levels of service.? 3.6 KEY TERMS ? Personal digital assistant (PDA): Any small mobile hand-held device that provides computing and information storage and retrieval capabilities for personal or business use, often for keeping schedule calendars and address book information handy. ? H.323: A standard that provides a foundation for audio, video and data communications across IP-based networks, including the Internet. It is an umbrella recommendation from the International Telecommunications Union (ITU) that sets standards for multimedia communications over LANs. ? SQL engine: A database engine is the core service for storing, processing, and securing data. It provides controlled access and rapid transaction processing to meet the requirements of the most demanding data consuming applications within the organization or enterprise. ? Object request broker (ORB): It is involved in routing a request from client to object, and routing the response to its destination. The ORB is also the custodian of the Interface Repository (IR), which is an Object Management Group (OMG)-standardized distributed database containing OMG IDL interface definitions. ? Datagram: An independent, self-contained message sent over the network whose arrival, arrival time, and content are not guaranteed. ? Simple object access protocol (SOAP): A simple XML-based protocol to let applications exchange information over HTTP. ? Universal description, discovery and integration (UDDI): A registry service for web services and for other electronic and non-electronic services. This registry service is basically a web service that manages information about service providers, service implementations and service metadata. ? Wireless personal area networks (WPAN): It is a low-range wireless network which covers an area of only a few dozen metres. It is generally used for linking peripheral devices, such as printers, cell phones, and home appliances or a personal assistant to a computer, without using a hard-wired connection. Its main technology is Bluetooth. ? Oracle: A relational database management system (RDBMS) that is commonly referred to as Oracle RDBMS or simply as Oracle. It is a produced and marketed by Oracle Corporation. Material 185 ? Queue managers: It is a system program that provides queuing services to applications. It provides an application programming interface so that programs can put messages on, and get messages from, queues. ? XML schema: An XML-based alternative to DTD. It describes the structure of an XML document. The XML Schema language is also referred to as XML schema definition (XSD). ? Rich client platform (RCP): A new way to build Java applications that can compete with native applications on any platform. Introduction to Client-Server Computing NOTES 3.7 ANSWERS TO 'CHECK YOUR PROGRESS' 1. Client-server computing is based on the logical extension of modular programming. With this architecture, the calling module becomes the 'client' basically it refers to request the service, and the called module becomes the 'server' and it basically it refers to provides the service. 2. The two functions performed by clients are as follows: ? It translates the user's request into the desired protocol. ? It sends the request to the server. 3. ATM supports network that follows the client-server model in which customers use an ATM as client that interfaces a server for managing accounts for a bank. This server is connected to servers of other banks that enable a user to withdraw money from a bank where user has no account. User interface is available at ATM and server(s) kept in the bank gives services, such as checking for balances and to transfer money between accounts. 4. OOUI clients are highly-iconic that provide an object-oriented user interface providing seamless access, in visual format, for retrieving information, such as Windows 95/NT and MAC OS. 5. The functions of network server are as follows: ? This server provides a high-speed technical support for digital data transmission across network for multimedia purpose. ? This server also supports high availability of multimedia data backup, high data rates and low jitter. It also reduces the cost of operation and maintenance of multimedia applications. 6. The groupware server manages semi-structured information; textual matters, images, mails, bulletin boards and flow of work, whereas object server refers to client-server application, which is created as communicating objects and a client object communicates with server objects by use of ORB (Object Request Broker). 7. The advantages of print server are as follows: ? It allows any number of users to share the same printer. ? It avoids having to move files to a computer that is the only way to reach a printer that is connected directly to it. 8. The features of multimedia server are as follows: ? Adequate bandwidth delivers isochronously the data streams along with specified rate and observable non-delay services. ? The client subsystems receive multimedia data streams. Self-Instructional

Self-Instructional Material 186 Introduction to Client-Server Computing NOTES ? Media segments along with application programs manage retrieval and navigation of data. ? The storage subsystem considers buffering, indexing, retrieving multimedia applications. 9. The performance of I/O subsystem is influenced by controllers' performance. The main function of the I/O subsystem is to enhance the storage capacity and accessing time. The device required 10MB/s bandwidth, whereas applications require 0.5MB/s bandwidth for supporting more than twenty instances of the multimedia files. 10. Authentication and authorization are to be considered as two corner stones that are used to create a secure and hassle-free site.

A person or information is authenticated on the computer by using various techniques. User name and password provides authentication. If user logs on the system unit or application, user name and password will be asked for checking authentication. Generally the two

types of password authentication are provided to user in which two prime fields, such as 'User Name and Password' are required to access the system. 11. To check the bank account, Internet applications keep the following syntax for XML. >Account type="checking"<>/Account< 12. The main types of client server system are 1-tier system, 2-tier system, 3-tier system, 4-tier system and N-tier system. 13. The Middleware is a layer, an interface between distributed applications and Operating System. The functions of middleware are as follows: ? It acts transparently by hiding heterogeneity and complexity of distributed system. ? It also bridges the gap between low-level commands of operating system and high level abstraction of programming languages. 14. The mechanism used in run-time software of RPC is that it collects values for the parameters, forms a message and sends it to the remote server. On receiving the request from clients unpacks the parameters, calls the procedure and sends the reply back to the client. RPCs relieves programmer from the challenges of the Network designers by supplying the development tools and run-time environments. 15. Message-oriented middleware (MOM) offers another advantage in its ability to route messages within middleware layer itself. Middleware messaging can deliver one message to many recipients either by multicast or broadcast. 16. The advantages of 2-Tier system are as follows: ? It has good application development speed. ? Most tools for 2-tier are very robust. ? Two-tier architectures work well in relatively homogeneous environments with static business rules. 17. In 3-Tier with an object DBMS, the client handles the user interface and translates the desired protocol. It sends then user's request to the server. Then it waits for the server' response. It translates the response into human readable Material 187 result and presents the result to user, whereas server hears the client's query. The query is sent to be processed. It returns the result back to the client. The client-server computing works as French restaurant in which user presents the menu of choices that uses the waiter (client). The waiter jots down the menu of choices translates to the French chef (server). In essence, the client- server computing supports a total mechanism that facilitates computing task. 18. A Rich Client is also a Fat Client having richer solutions to problems. Usually it provides a Framework of plug-ins and modules adding ability to expand. Many Frameworks are now available offering a Rich Client Platform (RCP). Such platforms provides a basis in which user can add plug-ins/modules with rearrangement as may be needed. It is possible for programmers to build own applications using existing platforms. 19. A fat server has most of the program codes residing on it instead on Client machine. Web server is a good example of a fat server where codes for giving response to requests by a browser lie on the server. In a C/S system having fat servers with thin clients offer advantage of easy software updates. It only requires changing code on server side instead of changing codes on so many clients accessing the server. 20. The advantages of N-Tier system over other tier systems are as follows: ? Different aspects of the application can be developed and rolled out independently in N-tiered system. ? In N-tiered system, the servers can be optimized separately for database and application server functions. ? The servers can be sized appropriately for the requirements of each tier of the architecture. ? More overall server horsepower can be deployed in the N-tiered system. Introduction to Client-Server Computing NOTES 3.8 QUESTIONS AND EXERCISES Multiple Choice Questions 1. Client-server computing is a type of distributed computing application where information (works) is exchanged between the: (a) Service providers (Server) and the service requesters (Clients) (b) Loader and Linker (c) Protocol and standard (d) Internet service provider and Internet protocol 2. Which of the following options is not included in the server's function: (a) It listens for a client's query. (b) It does not send the queried result. (c) It returns the results back to the client. (d) It uses processes to query. 3. If the user needs information from a shared address file, the required information is sent to check the: (a) .exe file (b) .txt file (c) .rar file (d) .obj file Self-Instructional

Self-Instructional Material 188 Introduction to Client-Server Computing NOTES 4. Which of the following systems is considered as an integral part of network to make intelligent use of devices over the network: (a) Firmware (b) Middleware (c) Dataware (d) Hardware and software 5. Network server controls timestamp tagged with sending and receiving: (a) Datagrams (b) Datasheet (c) Data structure (d) Data packets 6. What is the other name of data server: (a) SQL engine (b) Port engine (c) DNS engine (d) Mail engine 7. Which of the following servers is used to manage the semi-structured information, textual matters, images, mails, bulletin boards and flow of work: (a) Transaction server (b) Port engine (c) Groupware server (d) Object server 8. Which cable is used by multimedia over coaxial alliance (MOCA) to distribute audio, video and data with target speed greater than 100 Mbps: (a) Coaxial (b) Ordinary (c) Power (d) Twisted pair 9. Which of the following two prime credentials is required to log in the specific Web page: (a) IP address and computer name (b) Virtual network computing (VNC) and virtual private network (VPN) (c) Password and user name (d) Server name and client name 10. Which technology is placed to transmit the signals to expand and provide the fast accessing of Web: (a) Wireless networking (b) 3G wireless (c) Wireless electromagnetic wave (d) Wireless Internet tower 11. Who invented 'Bluetooth': (a) King Louis Bluetooth (b) Cahrles Bluetooth (c) Harald Bluetooth (d) James Bluetooth 12. The Wi-Fi stands for: (a) Wireless file (b) Wireless folder (c) Wireless floppy (d) Wireless fidelity
Self-Instructional Material 189 13. Which of the following options is used in Wi-Fi connection to mean an area in which Wi-Fi users connect to the Internet: (a) Extension (b) Certification (c) Hotspot (d) Header 14. Which software enables data, fax calls and voice across IP networks and represents Internet telephony allowing a communication between two PCs over packet switching Internet: (a) Voice-over IP (VoIP) (b) Service Set Identification (SSID) (c) Session Initiation Protocol (SIP) (d) Secure Socket Layer (SSL) 15. Which of the following protocols is used by Bluetooth server to broadcast the availability of the services the server contains and listens for inbound connections: (a) File protocol (FP) (b) Service discovery protocol (SDP) (c) Server protocol (SP) (d) Client protocol (CP) Answers: 1. (a), 2. (b), 3. (c), 4. (b), 5. (d), 6. (a), 7. (c), 8. (a), 9. (c), 10. (d), 11. (c), 12 (d), 13 (c), 14 (a), 15 (b) Fill in the Blanks 1. A single machine can be both depending on the software configuration. 2. The main problem comes with sequential multimedia documents that cover and . 3. The main issue dealt in Internet application is how the security options restrict the unauthorized users and . 4. Client-server describes the relationship between two computer programs in which the client is defined as a requester of services and a server is defined as the . 5. A socket provides connection oriented service and protocol that is used for the purpose of transmission is well known protocol known as . 6. The contain controllers to navigate the data from multimedia server to network server. 7. Sequence diagram is used to describe interaction between client and server and such diagrams are standardized in . 8. The B2B integration maintains an agreement between XML, Web Services Description Language (WSDL), User Datagram Protocol (UDP), SOAP and Universal Description Discovery and Integration (UDDI) and hence considered to be as . Introduction to Client-Server Computing NOTES
Self-Instructional Material 190 Introduction to Client-Server Computing NOTES 9. The two prime concept of Internetworking are known as and . 10. The bi-directional radio transmission is used in Bluetooth to deliver the . 11. Two broad classes of middleware are known as _____ and . 12. Nature of RPC is . 13. The __ ___ ___ __ ____ transfers messages from input to output queues and keep routing tables. 14. The is an asynchronous communication in which publishers and subscribers are loosely coupled. 15. A _ attempts to minimize network interchanges and creates more levels of abstraction for providing services. Answers: 1. A client and a server, 2. Playback bandwidth, large storage space, 3. Malfunctions, 4. provider of services, 5. transmission control protocol (TCP), 6. Control processors, 7. Unified modeling language(UML), 8. 'Five pillars', 9. DNS, network server, 10. Automatic wireless connections,11. General, service-specific, 12. Synchronous, 13. Queue manager, 14. Event-based middleware, 15. Fat server. State Whether TRUE or FALSE 1. The first generation systems are 2-tiered architectures where a client presents a graphical user interface to the user, and acts according to the user's actions to perform requests of a database server running on a different machine. 2. Data encapsulation is done by object servers and transaction servers. 3. Remote presentation software such as Motif/X windows does not allow presentation logic to carry execution at a location remote from presentation manager. Each browser consists of two parts, a controller and client protocol. 4. Inserting a middle tier in between a client and server achieves a 3-tier configuration. 5. The application server does not share business logic, computations and a data retrieval engine. 6. The long calls possible in Wi-Fi are by bypassed network and VoIP technologies. 7. IBM MQSeries uses commands like MQopen for opening a queue, MQclose for closing a queue, MQput for queuing the message, MQget to retrieve messages from local queue. 8. A message is a self contained object that carries information about what it is, where it needs to go, and what should happen when it reaches its destination. 9. ODBMS does not act as an accelerator or 'hot cache'. 10. Web servers and groupware systems are not fat servers. 11. Rich Client is also known by another name of Smart Client. 12. Partitioning the application logic among various hosts can not create an N- tiered system.

Self-Instructional Material 191 13. In the 3-tier system, the client sends HTTP requests for content and presents the responses provided by the application system. 14. If the Web server layer is the bottleneck multiple Web servers can be deployed, with an appropriate server load-balancing solution to ensure effective load balancing across the servers. 15. A client-server system is told to have N-tier architecture when user accesses the server for using 3 layers of applications that are, front-end, component and back-end. Answers: 1.
True, 2. True, 3. False, 4. True, 5. False, 6. True, 7. True, 8. True, 9. False, 10. False, 11. True, 12. False, 13. True, 14. True, 15. True Match Column A with Column B Column A Column B 1. ATM is basically a dedicated-connection switching technology that organizes digital data into 53-byte cell units and transmits them over a physical medium using A Temporal Key Integrity Protocol (TKIP) encryption. 2. Non-GUI clients do not use B Personal computer memory card international association (PCMCIA). 3. The NFS uses streaming data transmission to get the effect of C Message-passing based. 4. Wireless high definition (HD) makes transmission of uncompressed digitizing video at data rates D Digital signal technology. 5. Digital I/O extension provides a cable replacement solution by transmitting digital input signals to a remote output E Application system. 6. Wi-Fi PC card is technically known as F .shtml as its file extension. 7. WEP uses G Graphic use interface. 8. Speeds on ATM networks can reach H Multimedia applications. 9. In the case of fat clients, the business services layer is combined with the I Presentation tier. 10. Fat Server applications are easier to manage and deploy on the network because most of the code J Server machine or multiservers. 11. Business Tier is the layer responsible for accessing the data tier to retrieve, modify and delete data to and from the data tier and send the results to the K 10 Gbps 12. Custom tag libraries and Enterprise JavaBeans (EJBs) are easier to port to readable applications in well-maintained templates in L Runs on the servers. 13. An SSI page typically has M Up to 5 frequency. Gbps in the 60-radio 14. Vertical scaling means migrating to a larger and faster N Peer over an IP/ Ethernet network. 15. In the 3-tier system, the client sends HTTP requests for content and presents the responses provided by the O User services layer. Answers: 1. (D), 2. (G), 3. (H), 4. (M), 5. (N), 6. (B), 7. (A), 8. (K), 9. (O), 10. (L), 11. (I), 12. (F), 13. (C), 14. (J), 15. (E) Introduction to Client-Server Computing NOTES
Self-Instructional Material 192 Introduction to Client-Server Computing NOTES Short-Answer Questions 1. Define client-server computing process. 2. How does a server process act? 3. What are the characteristics of client-server architecture? 4. What are distributed object management systems? 5. What is a client process? 6. What is a server process? 7. What is the difference between BLL and DAL? 8. Define briefly presentation and data tier. 9. How data warehousing is useful in the types of client-server computing. 10. What are the characteristics of rich clients? Long-Answer Questions 1. Differentiate between client process and server process. 2. What prime solutions are considered by the Wi-Fi device during data transmission: 3. Explain with the help of example how server side technologies are helpful in client-server system? 4. Write the required steps involved in firewall configuration for Wi-Fi connection. 5. How is CGI script helpful in client-server architecture? 6. Many services used on the Internet are based on client-server computing model. Explain briefly. 7. How are various layers useful to the 3-tier through which it transmits the data between clients and servers? 8. Describe the benefits of N-tiered system. 9. How is business services layer helpful in 2-tier system? 10. Write any two differences between fat client and fat server. 3.9 FURTHER READING Lowe, Doug. Client/Server Computing for Dummies. New Jersey: John Wiley & Sons Inc. 1995. Yadav, Subhash Chandra and Sanjay Singh. An Introduction to Client/Server Computing. Delhi: New Age International. 2009. 3.10 LEARNING OUTCOMES ? Know about client-server computing basics ? Understand the types of client-server systems ? The middleware
Self-Instructional Material 193 UNIT 4 WEB SERVERS Structure 4.0 Introduction 4.1 Unit Objectives 4.2 Web Services and Web Server Functionality 4.2.1 Web Services 4.2.2 Web Services Architecture 4.2.3 Web Services Usage Style 4.2.4 Web Services Reliability and Functionality 4.2.5 Web Server 4.2.6 Web Server Functionality 4.3 Web Server Composition 4.4 Registration 4.5 HTTP 4.5.1 Overview of HTTP; 4.5.2 HTTP Operation; 4.5.3 HTTP Message 4.5.4 Method Definitions; 4.5.5 HTTP Message Headers; 4.5.6 Some Other Features 4.6 IP Addresses 4.6.1 IPv4 Addressing 4.6.2 Classification of IPv4 Addresses 4.6.3 Subnetting for IP Addresses 4.7 DNS and Ports 4.7.1 Domain Name Space; 4.7.2 Distributed Name Space; 4.7.3 DNS in the Internet 4.7.4 Resolution; 4.7.5 DNS Messages; 4.7.6 DNS Records 4.7.7 Dynamic Domain Name System (DDNS); 4.7.8 DNS Ports 4.8 Conceptual Architecture of A Typical Web Server Like Apache 4.8.1 Apache Web Server Basics; 4.8.2 Apache Web Server Architecture 4.8.3 Extensibility of Apache 4.9 Summary 4.10 Key Terms 4.11 Answers to 'Check Your Progress' 4.12 Questions and Exercises 4.13 Further Reading 4.14 Learning Outcomes Web Servers NOTES 4.0 INTRODUCTION In this unit, you will learn about web servers and the various services provided by them. Web services have the capacity to change the applications into web applications. You will learn about the two methods for writing web services. You will also learn about the composition of web servers. The web server composition can be defined with the help of various system components and alternatives, such as hardware alternatives, software alternatives and communication alternatives. You will learn the importance of registration of servers. The Domain Name System (DNS) is a client/server identification application that uniquely identifies each individual host on the Internet. All the user names are methodized in a hierarchical fashion in DNS.

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The Hypertext Transfer Protocol is designed to allow the transfer of Hypertext Markup Language (HTML) documents.

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The Hypertext Transfer Protocol is designed to allow the transfer of Hypertext Markup Language (HTML) documents.

It is a based on a request–response activity. Finally, in this unit you will learn that Apache is web server software that has a key role in the World Wide Web and is mainly used for both static content and dynamic web pages on the World Wide Web.
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Material Web Servers NOTES 4.1 UNIT OBJECTIVES After going through this unit, you will be able to: ?

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Material Web Servers NOTES 4.1 UNIT OBJECTIVES After going through this unit, you will be able to: ?

Define
web servers and the services offered by them ? Describe the architecture of the of the web services ? Understand the reliability and functionality of the web services ? Explain the features of web servers ? Describe the composition and configuration of web servers ? Define the registration of the web services and its importance. ? Understand the significance of IP protocol and addresses ? Describe how messaging works in DNS ? Know the various domains in the DNS ? Understand the HTTP protocol ? Describe the meaning of Apache and its web server architecture 4.2 WEB SERVICES AND WEB SERVER FUNCTIONALITY Self-Instructional 4.2.1 Web Services Web services have the capacity to change applications into web applications. The essential platform for web services is XML + HTTP. XML gives a language to be used between different specified platforms and programming languages for expressing complicated messages and functions. The HTTP protocol is the protocol that is typically used by Internet. The following are the elements for web services platform: ? SOAP (Simple Object Access Protocol) ? UDDI (Universal Description, Discovery and Integration) ? WSDL (Web Services Description Language) Simple Object Access Protocol (SOAP): SOAP is an XML-based protocol for accessing a web service and to exchange information on HTTP using specific applications. SOAP is, ? A communication protocol ? A format to send messages ? A design for communication via Internet ? Platform independent ? Language independent ? Based on XML ? Simple and extensible ? A function that permits the user to get around firewalls ? A W3C standard Web Services Description Language (WSDL): WSDL is also an XML-based language and is used to locate and describe web services. WSDL is, ? Based on XML ? Used for describing web services
Material 195 ? Used for locating web services ? A W3C standard Universal Description, Discovery and Integration (UDDI): UDDI is specifically used as a directory service for companies so that they can register there and then explore web services. UDDI is, ? A directory to store information about web services ? A directory of web service interfaces as per WSDL specifications ? Communicates via SOAP ? Built into the Microsoft .NET platform Design methodologies The following are the two methods to write web services: Bottom up method: This is a simple approach. The implementing class is first written in a programming language and then a WSDL generating tool is used to expose the methods for a web service. Top down method: This is complex approach but creates effective designs. In this method, the WSDL document is first written and then a code generating tool is used to create the class skeleton to be completed later as per the specifications. 4.2.2 Web Services Architecture
Web services are considered as application programming interfaces (API) or web APIs which can be easily accessed on the Internet and also implemented on a remote system to host the requested services.

Basically, this term is used to refer clients and servers to facilitate communication over the Hypertext Transfer Protocol (HTTP) required on the web. These services are included either with Big Web Services or with RESTful Web Services. 'Big Web Services'need Extensible Markup Language (XML) messages followed by the Simple Object Access Protocol (SOAP) standard and is accepted by the conventional enterprises. All these systems support a machine-readable explanation of the procedures documented in the services defined in the Web Services Description Language (WSDL). Though WSDL is not required by a SOAP endpoint, it is required as a precondition for automatic code generation of client-side in various Java and .NET SOAPframeworks, for example Spring, Apache Axis2 and Apache CXF are the significant exceptions. Web services in a service-oriented architecture: REpresentational State Transfer (REST) web services are used with PUT, GET and DELETE HTTP methods along with POST and are frequently integrated with HTTP and web browsers than SOAP-based services. The XML messages or WSDL service-API definitions are not required. Web API is advancement in web services and emphasis on direct Representational State Transfer (REST) style communications is increased from Simple Object Access Protocol (SOAP) based services. Web APIs permit the composition of various web services into fresh new applications termed as mashups. When web API is used with reference to web development, it is typically considered a set of defined Hypertext Transfer Protocol (HTTP) request messages that also includes the structure and definition of the response messages which are generally expressed in an Extensible Markup Language (XML) or JavaScript Object Notation (JSON) format. When composite web services are used then each sub service is considered independent or autonomous. These services are not controlled by any user. Further, the web services Web Servers NOTES Self-Instructional

196 Material Web Servers NOTES Self-Instructional are not always reliable/dependable because the service provider can be removed, changed or update the provided services without informing the users. The dependability and error tolerance is not properly supported. Errors may occur during the execution process. The World Wide Web Consortium (W3C) describes that web service is a software system specifically designed for supporting interoperable machine-to-machine interaction across a network. It is an interface defined in a format that is machine-processable specially Web Services Description Language (WSDL). Additional systems can interact with the web service in a prescribed manner using description of SOAP messages which are characteristically communicated using HTTP along with an XML serialization in concurrence with other web-related standards. The W3C can also identify two main classes of web services, REST-compliant Web services that manipulates XML representations of Web resources utilizing a consistent set of 'stateless' procedures; and arbitrary Web services that can depict an arbitrary set of operations. Specification profiles: To enhance the interoperating ability of web services, the Web Services Interoperability (WS-I) has published profiles. Basically, a profile is a set of core specifications for SOAP, WSDL, etc. with a specialized version such as SOAP 1.1, UDDI 2, etc. along with certain additional constraints for restricting the usage of the core specifications. The WS-I has also published test tools to be used only as indicator of profile compliance of web services. The profile specifications guidelines recommended and implemented by WS-I to develop interoperable web services are as follows: ? WS-I Basic Profile ? WS-I Basic Security Profile ? Simple Soap Binding Profile More additional specifications are being developed to extend the capabilities of web services. Generally, these specifications are referred as WS-* and are as follows: WS-Security: It defines the usage of XML Encryption and XML Signature in SOAP for secured message exchange. It is an alternate or extension to use HTTPS for securing the channel. WS-Reliability: It is an OASIS standard protocol used to reliablyexchange messages between two web services. WS-Transaction: It is a method to handle transactions. WS-Addressing: It is a standard method for inserting address in the SOAP header. W3C supports some of these additional specifications. Various web service extensions, including Web Services Resource Framework and WSDM have been standardized by OASIS. 4.2.3 Web Services Usage Style A set of tools is used for various web services in different ways. Remote Procedure Calls (RPC), Service Oriented Architecture (SOA), Web Services Description Language (WSDL) and REpresentational State Transfer (REST) are the most commonly used styles. A simple example is shown in the following Figure to describe web services. The directory is contained in the 'Web Services'. Using the service oriented architecture (SOA) concept a service provider and service consumer could communicate with each other.

Material 197 Fig. 4.1 Web Services Remote Procedure Calls (RPC) RPC web services define a distributed method of call interface. The WSDL operation is the basic unit of RPC Web services. The approaches which have the same functionality as RPC are Object Management Group (OMG), Common Object Request Broker Architecture (CORBA), Microsoft's Distributed Component Object Model (DCOM) or Sun Microsystems's Java/Remote Method Invocation (RMI). Service Oriented Architecture (SOA) Web services which are used to implement a specific architecture as per SOA concepts are considered as the basic unit of message communication and not an operation. This is also referred 'message oriented services'. SOA Web services are supported by middleware analysts and used enterprise service buses that combine message oriented processing and Web Services for creating an Event-driven SOA, for example open- source ESB is Mule and Open ESB. The following figure shows a basic SAO structure. It defines that how a service consumer is sending a message for service request to the service provider. The service provider replies to the service consumer in the form of a response message. The service request and the subsequent response message connections are explained with the help of arrows. These messages/requests are clear to both the service consumer and the service provider. Fig. 4.2 Service Request via SAO Web Services Description Language (WSDL) The WSDL structures the base for Web Services. The following figure describes how WSDL is used. The service provider and the service consumer communicate with each other as defined in the following steps to provide a service to the consumer: 1. First, the service provider explains its service with the help of WSDL. This is documented in directory of web services. The web service directory may use Universal Description, Discovery, and Integration (UDDI) or any other form of directory. Web Servers NOTES Self-Instructional

198 Material Web Servers NOTES Self-Instructional 2. The service consumer sends one or more queries to the web service directory for finding a service and determining the way for communicating with the selected service. 3. The WSDL provides the response of the query to the service consumer by defining the requests and responses to be made to the service provider. 4. The service consumer now sends a service request to the service provider through WSDL. 5. The service provider then offers the predictable response to the service consumer. Fig. 4.3 Service Request via WSDL REpresentational State Transfer (REST) REpresentational State Transfer (REST) defines architectures which use HTTP or identical protocols by restricting the interface to a set of distinguished and accepted functions GET, POST, PUT and DELETE for HTTP. The main aim is to interact with stateful resources instead of messages or operations. REST based architecture may utilize WSDL for describing SOAP messaging above HTTP and can also be executed as an abstraction solely on top of SOAP, for example WS-Transfer or can be produced without the use of SOAP. 4.2.4 Web Services Reliability and Functionality Reliability in web services means the reliable infrastructure services that support message transportation and interaction between services. Adequate scope is there to check the network connections at various levels which may be broken, servers can be switched off and while transactions the incorrect information can be entered in some description file. In the framework of Web services, the reliability issues can be addressed at various distinct levels for reliable and anticipated approach of infrastructure services for message transportation and service detection, reliable and anticipated interactions within services, and reliable and anticipated conduct of individual user request and agent providing services. Message reliability: Reliability of messages at various levels is also referred as reliable messaging. In web services, there are specific methods that are used to enhance

Material 199 the message reliability. Basically, two properties are important for sending the message. First, the message sender should be able to decide whether a given specified message has been delivered and received by its expected receiver exactly once. The sender can reattempt to again send a message if it has not been received. The common objective of reliable messaging is defined as the mechanism that helps in completing the tasks successfully and achieving the objectives inevitably even if the network is unpredictable and there may be failure of system and software. The following are the characteristics for message validity: ? The message received should be the same as the message sent. It is decided by byte counts, check sums and digital signatures. ? The message must be as per the specific format précised by the message protocol. Characteristically, the protocols are defined by automatic systems that use syntax constraints as well formed XML and structural constraints which are valid for one or more XML schemas or WSDL message definitions. ? The message must be as per the specifications of the business rules predicted by the receiver. Additional constraints and validity checks are typically specified for the business processes to check the application logic and entity process managers. The architecture of web services does not provide specific support to reliable messaging or to report the failure event. Though, it provides assistance for accomplishing the task successfully. The header and body of a message can be used by providing standard headers for supporting message auditing and to deploy infrastructures for message reliability without effecting applications and services. A specified message may include multiple ways of message transport. However, all messages are specifically structured as per the SOAP specifications so the user can incorporate complete message reliability features in the SOAP message structure. Acknowledgement infrastructure is another way to achieve message reliability. It is a set of defined rules that help the users in communicating with each other by sending the receipt of the message and thus proving its validity. The examples of acknowledgement infrastructure specifications are WS- Reliability and WS-ReliableMessaging that control the SOAP extensibility model. Service reliability: In message communication system the method can be deployed to enhance the reliability and to decrease the rate of failure. The principal method is termed as transactional context management that permits managed conversations among users so that all the users are involved with an advanced confidence level of transactions and the transaction progresses satisfactorily. In case of failure, it must identify the cause of failure and accordingly either cancel, roll back the transactions or compensate for it. No specified advice is provided by the architecture regarding the implementation of transactional reliability. The grouping of the flexible and extensible structures of messages and the multiple processing concepts of messages through intermediary services provide assistance to complete the task. By monitoring the messages that they are incoming in the predictable order is an important tool for deploying reliable services. Web service management: Management of Web services is performed via a set of management potentials that facilitate monitoring, control and reporting of service qualities and service usages. These service qualities include various qualities for availability and performance. The service usages include frequency, duration, scope, functional extent and access authorization. Web Servers NOTES Self-Instructional
200 Material Web Servers NOTES Self-Instructional A web service can be managed when it depicts a set of management operations for supporting management potentials. The management potentials understand the functions to monitor, control and report with the help of management information model which supports different types of service usages and service quality information related with web service management. Distinctive information types contain request and response counts, begin and end timers, lifecycle states and entity identifiers (sender, receiver, context, messages, etc.). Though the specification of management potentials enables a Web service to be manageable but the scope and degree of permissible management are specified in management policies which are related with the web service. Management policies are uniquely used for defining the 'obligations for'and 'permissions to'to manage the web service. Figure shows the concepts of services, policies and potentials defined in the architecture that is applied to management. Fig. 4.4 Management Services, Concepts and Relationships 4.2.5
Web Server
A web server is a computer program or virtual machine which serves web pages utilizing the Hypertext Transfer Protocol (
HTTP) across
the World Wide Web (WWW). The
main function of a web server is to

supply the web pages to the clients which includes HTML documents or any additional matter included in a document, for example images, style sheets and JavaScripts.Aclient, usually a web browser, initializes the communication requesting for a specified resource via HTTP. The server either responds along with the required content from that resource or an error message will occur if the request is not processed. The basic Web servers support server-side scripting, such as Apache HTTP Server and PHP. It means the actions of the web server may be scripted in a different file though the software of real server remains unaffected. Typically, this functionality is required for creating HTML documents for returning fixed documents. These features are referred as dynamic and static respectively. Tim Berners-Lee constituted the World Wide Web Consortium (W3C) for regulating the additional expansion of the various methods involving HTTP, HTML, etc. using the standardized process.

Material 201 Fig. 4.5 Web Server Hence, a web server is a computer that is capable of running a web site. It uses the HTTP protocol to deliver web pages to web browsers and also other data files for a web based application. When web server is utilized for specific purpose internally and is not used by the public, then it is termed as an 'Intranet Server'. HTTP server: Web servers are also referred as the HTTP server. It uses the HTTP server software on the computer system that provides the functionality for a web site. HTTP is the basic

protocol of the web whereas HTTP server software for example Apache server accepts the user requests from the user browser and then responds by sending back HTML documents

in the form of web pages and files. The small companies have a single computer that contains the HTTP server and a FTP server for downloading files, a SMTP server to handle e-mails and other functions of Internet. For large companies, each service may run on one or more dedicated servers. A big web site requires hundreds of servers. Web servers are the servers that are on the web and can be configured also.

HTTP server software can be built into hardware for providing a control panel to configure the devices from any authentic web browser.

Basically, for this purpose the network devices, for example routers, access points and print servers in reality contain a mini web site. Fig. 4.6 Fundamentals of Web Server Web Servers NOTES Self-Instructional

202 Material SQL Server DB2 Oracle ERP server app ODBC databases APPLICATION SERVER SERVER SIDE PROCESSING: Server-side JavaScript JSPs servlets EJBs Remote CORBA objects Web-based Application Server Remote EJBs WEB SERVER (HTTP server) SERVER SIDE PROCESSING: CGI scripts ASPs HSAPI apps ISAPI apps Server-side Java Script Server-side include JSPs servlets Messaging Transport SQL Server Client PC MySQL Oracle Web browser ODBC databases UNIX or Windows server app Web Servers NOTES Web browsers correspond with web servers using the TCP/IP protocol. In the above Figure

the browser is sending HTTP requests to the web server, which then responds through HTML pages and possible extra programs in the ActiveX controls forms or Java applets.

Self-Instructional Fig. 4.7 Environment of

Web Server Figure 4.7 shows the server-side procedure occurring in a web server (HTTP server) and in an application server. Both these can perform similar

jobs but with some overlapping. The web server and

the application server can be configured on the same computer system or in the separate computer systems. Common features of web server: The following are the common features of a web server: ? Virtual hosting: It serves different web sites using single IP address. ? Large file support: It can support files of size greater than 2 GB on 32 bit OS. ? Bandwidth throttling: It limits the rate of responses so that the network is not saturated and can serve more number of clients. ? Server-side scripting: It generates dynamic web pages but keeps the web server and web site specifications isolated from each other. Tuxedo CICS

Material 203 Web servers are also capable for mapping the path elements of a Uniform Resource Locator (URL) into the following: ? Local file system resources for static requests. ? Internal or external program names for dynamic requests. The static request for the URL path is specified using the client which is related to the root directory of web server. The following is the example of URL request by a client: Web Servers NOTES http://www.example.com/path/file.html The user agent for client translates this as a connection for www.example.com along with the HTTP 1.1 request as follows: GET /path/file.html HTTP/1.1 Host: www.example.com Now the web server for www.example.com will add this path to its root directory path. The web server reads the file if it is there and sends a reply to the web browser of client. This reply defines the file content and also contains the file. Load limits of web server Any web server follows the load limits defined in the program, as it can manage only restricted number of simultaneous client connections. By default it is between 500 and 1,000 but generally it is between 2 and 80,000 per IP address and TCP port. When a web server is about to reach it limits or it is over its limits then it is unresponsive. It is capable of serving a specific number of requests per second that depends on the following: ? The server settings. ? The HTTP request type. ? The content origin - static or dynamic. ? The served content may or may not be cached. ? The operating system hardware and software limits. Overloading causes of web server The web servers can be overloaded any time because of the following reasons: ? Too much legitimate web traffic ? DDoS (Distributed Denial of Service) attacks ? Computer worms ? XSS viruses ? Internet web robots ? Internet (network) slowdowns ? Web servers partial unavailability Most popular web sites use basic methods for partially crossing the load limits and for preventing overload. The methods used are: ? Managing network traffic using: o Firewalls for blocking superfluous traffic from bad IP sources or those which have bad patterns. o HTTP traffic managers for dropping, redirecting or rewriting requests for bad HTTP patterns. o Management of Bandwidth and traffic control for smooth network usage. Self-Instructional
204 Material Web Servers NOTES ? Deployment of web cache methods. ? Usage of various domain names for serving different static and dynamic contents using separate web servers as follows: o http://images.example.com o http://www.example.com ? Use of different web servers per computer where each one bounds to its specific network card and IP address. ? Use of different web servers which are together grouped acting as one big web server. ? Addition of more hardware resources on each computer system. ? Tuning the operating system parameters as per hardware potentials and usage. ? Use of additional competent computer programs for web servers. 4.2.6 Web Server Functionality The main function of a web server is that it handles the HTTP protocol. When an HTTP request is received by the web server, then it responds back through an HTTP response by returning back an HTML page. For processing a request, the web server responds using a static HTML page or image, sends a redirect or assigns the dynamic response generation to specific programs namely CGI scripts, JSPs (JavaServer Pages), servlets, ASPs (Active Server Pages), server-side JavaScripts or any other server-side methodology. Basically, such server-side methods and programs produce a response to use a web browser for viewing content. Role of web server on the Internet: Web servers perform a vital role on the Internet. The web server computer hosts the web site whereas the web server program assists to deliver the web pages along with their related files such as images and flash movies. Web servers are the core constituents of the Internet. The most basic features and functionality of a web Server is that it hosts web sites and web applications either for a Intranet of a company or for the Internet. Most of the web servers contribute to a general set of features and functionality that contain support for content, cache, virtual hosting, authentication and performance. Web server authentication: Web servers support the following secured authentication types to visitors on a web site: Anonymous authentication: In this everyone has right to access web site and for this no security is required. Basic authentication: In this a user name and password are essential and which is passed to the server in clear text, basically to enter the username and password on a login screen that appears on the web site. Though this is considered secure but it is risky because the clear text passes the security credentials. All web servers suggest SSL (Secure Socket Layer) which is considered as a secured transport layer to encrypt the entire communications amid the browser and the web server. Self-Instructional

Self-Instructional Material 205 4.3 WEB SERVER COMPOSITION The web server composition can be defined with the help of various system components and alternatives such as hardware alternatives, software alternatives and communication alternatives. The modular design approach is rooted in Hierarchical Morphological Multicriteria Design (HMMD) and includes the following: ? Tree like model for the system. ? Design alternatives for each leaf node of the system model. ? Generation criteria and their scales for each node of the system model. ? Assessment of the design alternatives upon the corresponding criteria. ? Multicriteria analysis of the alternatives for components of system for each design alternative. ? Compiling the selected alternatives in a resulting combination or a complex design alternative for the advanced hierarchical level of the system model. The multicriteria analysis is based on a hierarchical bottom-up framework of the design alternatives and their composition. Atwo-criterion combinatorial problem is utilized for composing and solutions explored for Pareto-effect. A basic web hosting system contains the essential system parts for web facilities (servers, telecommunication facilities), Internet access, software (web server and web technology). Web server configuration: Plug-in configuration is used to configure the web server so that it can use the binary plug-in module provided by the WebSphere Application Server. Plug-in configuration can also update the plug-in XML configuration file for reflecting the server configuration of current application. The binary module utilizes the XML file that helps in routing the requests of web client. A binary plug-in module is installed once the supported web server is configured and installed. The plug-in module permits the web server for communicating with the application server. The web server plug-in is installed by Plug-ins installation wizard. The plug-in wizard configures the web server and also generates a web server definition in the application server configuration. The Plug-ins installation wizard utilizes the following selected files for configuring a plug-in for the web server: ? Web server configuration file ? Binary Web server plug-in file ? Plug-in configuration file ? Default (temporary) plug-in configuration file ? Configure web_server_name script Configure web_server_name script is copied from the web server to the application server. The features of all these files are discussed below: Web server configuration file: The
web server configuration file is a part of the web server and is essential to install. The wizard of configuration file should be reconfigured for supporting the web server. Configuration contains the addition directives to identify the file locations of following two files: ? The binary plug-in file ? The plugin-cfg.xml
configuration file Web Servers NOTES

206 Material Web Servers NOTES Binary web server plug-in file: The binary plug-in file itself never changes. However, an XML file is the configuration file for the binary plug-in. The application server modifies the configuration file whenever some modifications are made to WebSphere Application Server configuration. The mod_ibm_app_server_http.dll file of IBM HTTP Server that is based on the Windows platform is an example of a binary plug-in module. The file can be regenerated also. The XML file is read by the binary module for adjusting settings and for routing requests to the application server. Plug-in configuration file (plugin-cfg.xml): The plug-in configuration file is basically an XML file and contains settings which can be tuned in the administrative console. All of the applications that are installed on the web server definition are listed in the file. Usually, the binary module interprets the XMLfile and adjusts settings to configure route requests on the application server. The plugin-cfg.xml file is regenerated by the stand-alone application server in the profile_root /config/cells/ cell_name /nodes/ web_server_name _node/servers/ web_server_name directory. Regeneration takes place whenever a modification occurs in the configuration of application server affecting the deployed applications. The file must be copied to the web server after regeneration. This helps the binary plug-in to access the most recent copyof its configuration file. The plugin-cfg.xml file is automatically regenerated after some events by the web server plug-in configuration service that modifies the configuration. When file is regenerated, the plugin-cfg.xml file is automatically transmitted by the configuration service to an IBM HTTP server. The file must be copied on other associated web servers manually. Default plug-in configuration file (plugin-cfg.xml): The temporary plugin- cfg.xml file are created in the plugins_root/config/ web_server_name directory by the Plug-ins installation wizard. The files are created by this wizard for each remote installation set-up. The file is created by this wizard at the same time when the binary plug-in module installation is done for the web server. Configure web_server_name script: The placeholder is a default file that must be replaced bythe plugin-cfg.xml file which is in the web server definition on the application server. Basically, the default file is a duplicate file created by the application server for a default stand-alone application server. You can run the configure web_server_name script from the app_server_root /bin directory of the application server for a remote installation. For local installation directly run it from the plugins_root /bin directory. The script generates the web server definition of the default profile in the configuration files. For configuring a different profile other than the default, edit the configure web_server_name script. Use the different -profileName parameter for identifying a profile that is different than the default. After creating the web server definition, the first plugin-cfg.xml file in the web server definition on the application server is created by the web server plug-in configuration service within the application server. 4.4 REGISTRATION Self-Instructional Server registration permits support to individual computer users or network users to control the 'applications' or 'ports' that can be accessed easily. Not only the servers nut any other computer on the network or individual computer can be registered to provide security. Information for registration is submitted via the web server page. The web service providers are accountable for the prevalence, legitimacy, legality and look of

Self-Instructional Material 207 their pages. For example, if the web application developers use Google's authorization service then they can register their application domain with Google. Registering the domain has several advantages. A registered domain/server: ? Is easily recognized. ? Can provide an enhanced level of security to its users. ? Get access to services which need third-party registered applications. Registration gives the basic information about the web application. The following are the three levels of registration: ? Unregistered: Applications if not registered are not recognized by any registered domain, for example Google. The Access Request page prompts the users to either grant the access or deny the access to the application by displaying the following caution: 'This web site has not registered with Google. We recommend that you continue the process only if you trust this destination.' ? Registered: Registered applications are recognized by any registered domain, for example Google. But the authorization must be configured otherwise the Access Request page exhibits the following caution: 'This website is registered with Google to make authorization requests, but has not been configured to send requests securely. We recommend that you continue the process only if you trust the following destination >URL of the requesting application<.' ? Registered with enhanced security: Registered applications which have a security certificate on file can utilize secure tokens. For example, Google Access Request page removes cautions, displaying the following message: 'Google is not affiliated with >the requesting application<, and we recommend that you grant access only if you trust the site.' Registration is voluntary but it is recommended to get the domain name registered because only the registered applications are 'recognized' by any registered domain, for example Google. This is imitated in the message displayed on the Google Access Consent page that is displayed to users. Web Servers NOTES 4.5

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HTTP The engine of the World Wide Web is the application protocol that defines how web servers and clients exchange information: the Hypertext Transfer Protocol (HTTP). The first version of HTTP, HTTP/0.9, was part of the early World Wide Web and was a very simple request/response protocol with limited capabilities that could transfer only text files. The first widely used version was HTTP/1.0, which is a more complete protocol that allows the transport of many types of files and resources. The current version is HTTP/1.1, which expands HTTP/1.0's capabilities with several features that improve the efficiency of transfers and address many of the needs of the rapidly growing modern World Wide Web. The Hypertext Transfer Protocol is a protocol designed to allow the transfer of Hypertext Markup Language (HTML) documents. HTML is a tag language used to create hypertext documents. Hypertext documents include links to other documents that 208

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contain additional information about the highlighted term or subject. Such documents can contain other elements apart from text, such as graphic images, audio and video clips, Java applets, and even virtual reality worlds. 4.5.1 Overview of HTTP HTTP is based on request–response activity. A client, running an application called a browser, establishes a connection with a server and sends a request to the server in the form of a request method. The server responds with a status line, including the message's protocol version and a success or error code, followed by a message containing server information, entity information, and possible body content. An HTTP transaction is divided into four steps: 1. The browser opens a connection. 2. The browser sends a request to the server. 3. The server sends a response to the browser. 4. The connection is closed. On the Internet, HTTP communication generally takes place over TCP connections. The default port is TCP 80, but other ports can be used. This does not preclude HTTP from being implemented on top of any other protocol on the Internet or on other networks. HTTP only presumes a reliable transport; any protocol that provides such guarantees can be used. HTTP is a stateless protocol because it does not keep track of the connections. To load a page including two graphics, for example, a graphic-enabled browser will open three TCP connections: one for the page and two for the graphics. Most browsers, however, are able to handle several of these connections simultaneously. 4.5.2 HTTP Operation In most cases, the HTTP communication is initiated by the user agent requesting a resource on the origin server. In the simplest case, the connection is established through a single connection between the user agent and the origin server (Figure 4.8). Fig. 4.8 HTTP Operation HTTP is a client/server-oriented, request/reply protocol. Basic communication consists of an HTTP Request message sent by an HTTP client to an HTTP server, which returns an HTTP Response message back to the client.

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The simple client/server operational model of HTTP is complicated when intermediary devices such as proxies, tunnels or gateways are inserted in the communication path between the HTTP client and server. HTTP/1.1 is specifically designed with features to support the efficient conveyance of requests and responses through a series of steps from the client through the intermediaries to the server, and back again. The entire set of devices involved in such a communication is called the request/response chain (Figure 4.9).

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Fig. 4.9 HTTP Operation with Proxies 4.5.3 HTTP Message All the communication between devices using the Hypertext Transfer Protocol takes place via HTTP messages. There are only two types of messages: requests and responses. Clients usually send requests and receive responses, while servers receive requests and send responses. Intermediate devices such as gateways or proxies may send and receive both types of message. 4.5.3.1 HTTP general message All HTTP messages are text-based messages created to fit a message structure that the standard calls the generic message format. HTTP messages consist of the following fields: Message types A HTTP message can be either a client request or a server response. The following string indicates the HTTP message type: HTTP-message = Request | Response Message header The HTTP message header field can be one of the following: – General header – Request header – Response header – Entity header _ Message body ? Message body can be referred to as entity body if there is no transfer coding. Message body simply carries the entity body of the relevant request or response. ? Message length indicates the length of the message body if it is included. #1 #2 #3 #3 #2 #1 HTTP

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Fig. 4.9 HTTP Operation with Proxies 4.5.3 HTTP Message All the communication between devices using the Hypertext Transfer Protocol takes place via HTTP messages. There are only two types of messages: requests and responses. Clients usually send requests and receive responses, while servers receive requests and send responses. Intermediate devices such as gateways or proxies may send and receive both types of message. 4.5.3.1 HTTP general message All HTTP messages are text-based messages created to fit a message structure that the standard calls the generic message format. HTTP messages consist of the following fields: Message types A HTTP message can be either a client request or a server response. The following string indicates the HTTP message type: HTTP-message = Request | Response Message header The HTTP message header field can be one of the following: – General header – Request header – Response header – Entity header _ Message body ? Message body can be referred to as entity body if there is no transfer coding. Message body simply carries the entity body of the relevant request or response. ? Message length indicates the length of the message body if it is included. #1 #2 #3 #3 #2 #1 HTTP

Client Intermediary #1 Intermediary #2 HTTP Server Response Request
210 Material Web Servers NOTES 4.5.3.2

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HTTP request message format HTTP requests are the means by which HTTP clients ask servers to take a particular type of action, such as sending a file or processing user input (Figure 4.10). The structure of HTTP requests >request-line< >general-headers< >request-headers< >entity-headers< >empty-line< [>message-body<] [>message-trailers<]

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HTTP request message format HTTP requests are the means by which HTTP clients ask servers to take a particular type of action, such as sending a file or processing user input (Figure 4.10). The structure of HTTP requests >request-line< >general-headers< >request-headers< >entity-headers< >empty-line< [>message-body<] [>message-trailers<]

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Fig. 4.10 HTTP Request Each request message begins with a request line, containing three critical pieces of information: the method (type of action) the client is requesting; the URI of the resource upon which the client wishes the action to be performed, and the version of HTTP that the client is using. After the request line come a set of message headers related to the request, followed by a blank line and then optionally, the message body of the request. o General headers: General headers refer mainly to the message itself, as opposed to its contents, and are used to control its processing or provide the recipient with extra information. They are not particular to either request or response messages, so they can appear in either. They are likewise not specifically relevant to any entity the message may be carrying. o Request headers: These headers convey to the server more details about the nature of the client's request, and give the client more control over how the request is handled. For example, special request headers can be used by the client to specify a conditional request—one that is only filled if certain criteria are met. Others can tell the server which formats or encodings the client is able to process in a response message. o Entity keaders: These are headers that describe the entity contained in the body of the request, if any. 4.5.3.3 HTTP response message format Each request message sent by an HTTP client to a server prompts the server to send back a response message (Figure 4.11).

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Fig. 4.10 HTTP Request Each request message begins with a request line, containing three critical pieces of information: the method (type of action) the client is requesting; the URI of the resource upon which the client wishes the action to be performed, and the version of HTTP that the client is using. After the request line come a set of message headers related to the request, followed by a blank line and then optionally, the message body of the request. o General headers: General headers refer mainly to the message itself, as opposed to its contents, and are used to control its processing or provide the recipient with extra information. They are not particular to either request or response messages, so they can appear in either. They are likewise not specifically relevant to any entity the message may be carrying. o Request headers: These headers convey to the server more details about the nature of the client's request, and give the client more control over how the request is handled. For example, special request headers can be used by the client to specify a conditional request—one that is only filled if certain criteria are met. Others can tell the server which formats or encodings the client is able to process in a response message. o Entity keaders: These are headers that describe the entity contained in the body of the request, if any. 4.5.3.3 HTTP response message format Each request message sent by an HTTP client to a server prompts the server to send back a response message (Figure 4.11).

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Host: www.myfavouriteamazingsite.com From: Joebloe@somewebsitesomewhere.com Accept: text/html, text/plain User–Agent. Mozilla/4.0 (compatible, MSIE 6.0; Windows NT 5.1) Request Headers HTTP Request Message Body

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Host: www.myfavouriteamazingsite.com From: Joebloe@somewebsitesomewhere.com Accept: text/html, text/plain User–Agent. Mozilla/4.0 (compatible, MSIE 6.0; Windows NT 5.1) Request Headers HTTP Request Message Body

Entity Headers General Headers Date: Thu, 20 May 2004 21:12:55 GMT Connection: close Request Line GET/index.html HTTP/1.1

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77% MATCHING BLOCK 267/472 W

The structure of HTTP response >status-line< >general-headers< >response-headers< >entity-headers< >empty-line< [>message-body<] [>message-trailers<] HTTP/1.1 200 OK Status Line HTTP Response Date: Thu, 20 May 2004 21:12:58 GMT Connection: close

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The structure of HTTP response >status-line< >general-headers< >response-headers< >entity-headers< >empty-line< [>message-body<] [>message-trailers<] HTTP/1.1 200 OK Status Line HTTP Response Date: Thu, 20 May 2004 21:12:58 GMT Connection: close

General Headers Server: Apache/1.3.27 Accept-Ranges: bytes Response Headers

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Content-Type: text/html Content-Length: 170 Entity Headers Last-Modified: Tue, 18 May 2004 10:14:49 GMT >html< >head< >title<Welcome to the Amazing Site!>/title< >/head< >body<

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Content-Type: text/html Content-Length: 170 Entity Headers Last-Modified: Tue, 18 May 2004 10:14:49 GMT >html< >head< >title<Welcome to the Amazing Site!>/title< >/head< >body<

Message

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Body >p<This site is under construction. Please come back later. Sorry!>/p< >/body< >/html< Fig. 4.11 HTTP Response Each response message starts with a status line that contains the server's HTTP version number, and a numeric status code and text reason phrase that indicate the result of processing the client's request. The message then contains headers related to the response, followed by a blank line and then the optional message body. Since most HTTP requests ask for a server to return a file or other resource, many HTTP responses carry an entity in the message body (Figure 4.12). o General headers: General headers that refer to the message itself and are not specific to response messages or the entity in the message body. These are the same as the generic headers that can appear in request messages (though certain headers appear more often in responses and others are more common in requests).

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Body >p<This site is under construction. Please come back later. Sorry!>/p< >/body< >/html< Fig. 4.11 HTTP Response Each response message starts with a status line that contains the server's HTTP version number, and a numeric status code and text reason phrase that indicate the result of processing the client's request. The message then contains headers related to the response, followed by a blank line and then the optional message body. Since most HTTP requests ask for a server to return a file or other resource, many HTTP responses carry an entity in the message body (Figure 4.12). o General headers: General headers that refer to the message itself and are not specific to response messages or the entity in the message body. These are the same as the generic headers that can appear in request messages (though certain headers appear more often in responses and others are more common in requests).

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Response headers: These headers provide additional data that expands upon the summary result information in the status line. The server may also return extra result information in the body of the message, especially when an error occurs, as discussed below. o Entity headers: These are headers that describe the entity contained in the body of the response, if any. These are the same entity headers that can appear in a request message, but they are seen more often in response messages. The

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Response headers: These headers provide additional data that expands upon the summary result information in the status line. The server may also return extra result information in the body of the message, especially when an error occurs, as discussed below. o Entity headers: These are headers that describe the entity contained in the body of the response, if any. These are the same entity headers that can appear in a request message, but they are seen more often in response messages. The

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reason for this is simply that responses more often carry an entity than requests, because most requests are to retrieve a resource.

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reason for this is simply that responses more often carry an entity than requests, because most requests are to retrieve a resource.

Web Servers NOTES
Self-Instructional Material 212 Web Servers NOTES Fig. 4.12 HTTP Messages Request and status lines

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Fig. 4.13 Request and Status Lines Status codes Table 4.1 Status Codes Self-Instructional Material 213 4.5.4 Method Definitions Currently defined methods are as follows: Safe and idempotent methods Methods considered not to cause side effects are referred to as safe. Idempotent methods are GET, HEAD, PUT, and DELETE. ? OPTIONS: This method allows the client to determine the options or requirements associated with a source or capabilities of a server without any resource retrieval. ? GET: This method allows the client to retrieve the data that was determined by the request URI. ? HEAD: This method allows the client to retrieve meta information about the entity that does not require you to transfer the entity body. ? POST: The post function is determined by the server. ? PUT: This method is similar to the post method with one important difference: The URI in post request identifies the resource that will handle enclosed entity. ? DELETE: This methods requests that the server delete the source determined by the request URI. ? TRACE: This method allows the client to see how the message was retrieved at the other side for testing and diagnostic purposes. 4.5.5 HTTP Message Headers Much of the functionality in HTTP is actually implemented in the form of message headers, which convey important details between clients and servers. Some headers can appear in only HTTP requests, some in only HTTP responses, and some in either type of message (Figure 4.14). Web Servers NOTES Self-Instructional Material 214 Web Servers NOTES Fig. 4.14 HTTP Message Header HTTP general headers HTTP general headers are so named because unlike the other three categories, they are not specific to any particular kind of message or message component (request, response or message entity) (Table 4.2). General headers are used primarily to communicate information about the message itself, as opposed to what content it carries. They provide general information and control how a message is processed and handled. Table 4.2 Types of Headers HTTP request headers HTTP request headers are used only in HTTP request messages, and serve a number of functions in them (Table 4.3). ? They allow the client to provide information about itself to the server. ? They give additional details about the nature of the request that the client is making. ? They allow the client to have greater control over how its request is processed and how (or even if) a response is returned by the server or intermediary. Table 4.3 Request Headers

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Fig. 4.13 Request and Status Lines Status codes Table 4.1 Status Codes Self-Instructional Material 213 4.5.4 Method Definitions Currently defined methods are as follows: Safe and idempotent methods Methods considered not to cause side effects are referred to as safe. Idempotent methods are GET, HEAD, PUT, and DELETE. ? OPTIONS: This method allows the client to determine the options or requirements associated with a source or capabilities of a server without any resource retrieval. ? GET: This method allows the client to retrieve the data that was determined by the request URI. ? HEAD: This method allows the client to retrieve meta information about the entity that does not require you to transfer the entity body. ? POST: The post function is determined by the server. ? PUT: This method is similar to the post method with one important difference: The URI in post request identifies the resource that will handle enclosed entity. ? DELETE: This methods requests that the server delete the source determined by the request URI. ? TRACE: This method allows the client to see how the message was retrieved at the other side for testing and diagnostic purposes. 4.5.5 HTTP Message Headers Much of the functionality in HTTP is actually implemented in the form of message headers, which convey important details between clients and servers. Some headers can appear in only HTTP requests, some in only HTTP responses, and some in either type of message (Figure 4.14). Web Servers NOTES Self-Instructional Material 214 Web Servers NOTES Fig. 4.14 HTTP Message Header HTTP general headers HTTP general headers are so named because unlike the other three categories, they are not specific to any particular kind of message or message component (request, response or message entity) (Table 4.2). General headers are used primarily to communicate information about the message itself, as opposed to what content it carries. They provide general information and control how a message is processed and handled. Table 4.2 Types of Headers HTTP request headers HTTP request headers are used only in HTTP request messages, and serve a number of functions in them (Table 4.3). ? They allow the client to provide information about itself to the server. ? They give additional details about the nature of the request that the client is making. ? They allow the client to have greater control over how its request is processed and how (or even if) a response is returned by the server or intermediary. Table 4.3 Request Headers

86% **MATCHING BLOCK 279/472** W

Self-Instructional Material 215 HTTP response headers The counterparts to request headers, response headers appear only in HTTP responses

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Self-Instructional Material 215 HTTP response headers The counterparts to request headers, response headers appear only in HTTP responses

sent by servers or intermediaries (

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Table 4.4). They provide additional data that expands upon the summary information that is present in the status line at the beginning of each server reply. Many of the response headers are sent only in response to the receipt of specific types of requests, or even particular headers within certain requests. Table 4.4 Response Headers HTTP entity headers These headers provide information about the resource carried in the body of an HTTP message, called an entity in the HTTP standards (Table 4.5). They serve the overall purpose of conveying to the recipient of a message the information it needs to properly process and display the entity, such as its type and encoding method. At least one entity header should appear in any HTTP message that carries an entity. However, they may also be present in certain responses that do not have an actual entity in them. Most notably, a response to a HEAD request will contain all the entity headers associated with the resource specified in the request; these are the same headers that would have been included with the entity, had the GET method been used instead of HEAD on the same resource. Entity headers may also be present in certain error responses, to provide information to help the client make a successful follow-up request. Table 4.5 Entity Headers

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Web Servers NOTES
Self-Instructional Material 216 Web Servers NOTES 4.5.6

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Some Other Features ? The most important feature that improves the efficiency of operation of HTTP is caching—the storing of recently requested resources in a temporary area. If the same resource is then needed again a short time later, it can be retrieved from the cache rather than requiring a fresh request to the server, resulting in a savings of both time and bandwidth. Caching can be performed by Web clients, servers and intermediaries. The closer the cache is to the user, the greater the efficiency benefits; the farther from the user, the greater the number of users that can benefit from the cache. ? One of the most important types of intermediary devices in HTTP is a proxy server, which acts as a middleman between the client and server, handling both requests and responses. A proxy server may either transport messages unchanged or may modify them to implement certain features and capabilities. Proxies are often used to increase the security and/or performance of Web access. ? HTTP is an inherently stateless protocol, because a server treats each request from a client independently, forgetting about all prior requests. This characteristic of HTTP is not an issue for most routine uses of the World Wide Web, but is a problem for interactive applications such as online shopping where the server needs to keep track of a user's information over time. To support these applications, most HTTP implementations include an optional feature called state management. When enabled, a server sends to a client a small amount of information called a cookie, which is stored on the client machine. The data in the cookie is returned to the server with each subsequent request, allowing the server to update it and send it back to the client again. Cookies thus enable a server to remember user data between requests. However, they are controversial, because of certain potential privacy and security concerns related to their use. 4.6

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IP ADDRESSES

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Using Internet has become common nowadays. We will now understand how the Internet interprets the Internet address. For instance, the Internet addresses are written as www.hotmail.com. Let us write one more address as server.institution.domain. It is significant to note that the address www.hotmail.com is not the actual address. It is actually a text version of the Internet address, which is basically a binary representation. Now we compare www.hotmail.com and server.institution.domain. Here, www is the name of the server owned by the institution (in this case, it is hotmail) and this server is connected to the Internet and a domain server (com in this case) which maintains a database of the addresses of different servers using the same domain com. The domain name has no geographical relevance, and two sites with the same domain name may exist at two different ends of this world. The above-mentioned case is the simplest one. Now, let us take the case of a large organization, which may have several other servers for different purposes, such as web server, email server, print server, etc. Now, take this example of www.sun.planet.universe.in. This address is written in five parts separated by three dots. This address apparently indicates that a group Planets (planet) comes under an Universe sub domain which is a part of India domain and maintaining one server sun out of many servers, which is linked to Internet through its web server. Similarly, an

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Using Internet has become common nowadays. We will now understand how the Internet interprets the Internet address. For instance, the Internet addresses are written as www.hotmail.com. Let us write one more address as server.institution.domain. It is significant to note that the address www.hotmail.com is not the actual address. It is actually a text version of the Internet address, which is basically a binary representation. Now we compare www.hotmail.com and server.institution.domain. Here, www is the name of the server owned by the institution (in this case, it is hotmail) and this server is connected to the Internet and a domain server (com in this case) which maintains a database of the addresses of different servers using the same domain com. The domain name has no geographical relevance, and two sites with the same domain name may exist at two different ends of this world. The above-mentioned case is the simplest one. Now, let us take the case of a large organization, which may have several other servers for different purposes, such as web server, email server, print server, etc. Now, take this example of www.sun.planet.universe.in. This address is written in five parts separated by three dots. This address apparently indicates that a group Planets (planet) comes under an Universe sub domain which is a part of India domain and maintaining one server sun out of many servers, which is linked to Internet through its web server. Similarly, an

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organization with several departments may create addresses for its sub-domain with different servers being maintained there. The Internet is the collection of several independent networks, which are interconnected with one another. Each independent network may have several hosts. Keeping this in mind, you can now think of your address. Your house has a unique house number, which is not assigned to any other house in your locality. In this case, your house can be considered as the host, your as the network and your city as the domain. You can write your address in Internet addressing notation as houseno.locality.city. In case you want to acquaint a foreigner with your address, then you need to add your country name in your address. In this case it will become houseno.locality.city.country. Now if someone wants to send you a letter or visit your house, then is required to come to your country first and then to your city. Only after fulfilling these two obligations, he can reach your locality and then your house by locating your house number. The same analogy applies in the case of Internet addressing.

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We have already studied that

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a host on Internet has two significant functions, namely the identification of the network and identification of the host on the network. Therefore, the address of the host comprises of two parts namely the network address and the host address. These two parts together make 32-bit long IP address for a particular host on the Internet. The IP address is written in four octets each separated by a dot. It may have a form like 197.23.207.10. Presently, we are using IP address version 4 (IPv4). However, IP address version 6 (IPv6) has not yet been implemented. 4.6.1 IPv4 Addressing IPv4 addresses are uniquely used as identifiers, which work at network layer to identify the source or destination of IP packets. At present, the version of IP, which is in use, is called IPv4. In this version, every node on the Internet may have one or more interfaces and we are required to identify each of these devices with a unique address assigned to each of them. It means that each node is assigned one or more IP addresses to invoke TCP/IP. These are logical addresses and have 32 bits. Technically, IP addresses are expressed using binary notation with 32-bit long string. In order to recall these strings easily, dotted decimal notations are used, in which periods or dots separate four decimal numbers from 0 to 255 representing 32 bits. As there are 32 bits, each decimal number contains 8 bits and is referred to as octet. For instance, the IPv4 address 11000000101010000000101000011001 is expressed as 192.168.10.25 in dotted decimal notation. Given below are the steps to convert an IPv4 address from binary notation to dotted decimal notation: ? Break 32-bit long address into segments of 8-bit blocks: 11000000 10101000 00001010 00011001 ? Write the decimal equivalent to each segment: 192 168 10 25 ? Separate the blocks with periods: 192.168.10.25 Figure 4.15 shows the IP address

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structure. 11000000 10101000 00001010 00011001 192 168 10 25 Fig. 4.15 IP Address in Dotted Decimal Notation Web Servers NOTES
Self-Instructional Material 218 Web Servers NOTES

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Dotted Decimal Notation We have seen that IPv4 address is expressed as a 32-bit number in dotted decimal notation. IP addresses may have fixed part and variable part depending upon the

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Dotted Decimal Notation We have seen that IPv4 address is expressed as a 32-bit number in dotted decimal notation. IP addresses may have fixed part and variable part depending upon the

allocation of total addresses to an organization. The fixed part of the address may range from one octet to three octets and the remaining octets will then be available for the variable part. An IPv4 address is assigned using these parts. All bits in the fixed octet (s) are set to 1, whereas the variable octet(s) are set to 0 bits. Thereafter, convert the result into dotted decimal notation. For instance, you may take an IP address as 192.168.10.25. Now, set all fixed bits to 1 and set all variable bits to 0. This gives 11111111 11111111 00000000 00000000. After converting it into dotted decimal notation, the result is 255.255.0.0. This dotted decimal notation with fixed and variable parts is used as an address prefix to 192.168.10.25 and is expressed as 192.168.10.25/255.255.0.0. This way of expressing the prefix length as a dotted decimal number is known as network mask or subnet mask notation. 4.6.2 Classification of IPv4 Addresses Internet standards allow the following addresses: 1. Unicast — It is assigned to a single network interface located on a specific subnet and it facilitates one-to-one communication. This is unique address is used globally for the identification of a device on the network. It may be understood as the house number in a particular locality. It includes a subnet prefix and a host ID portion. ? Subnet prefix — The subnet prefix is basically a network identifier or a network address portion of an IP unicast address. It should be noted that all nodes on the same physical or logical subnet must use the same subnet prefix, which eventually becomes unique within the entire TCP/IP network. ? Host ID — The host ID, which is the host address portion of an IP unicast address, serves to identify a network node to which some devices are interfaced. It is also regarded as unique within the network segment. 2. Multicast — It is used for one or more network interfaces located on various subnets. It facilitates one-to-many communication. It delivers single packets from one source to many destinations. These addresses are a part of Class D addressing scheme. 3. Broadcast — It is allocated to all network interfaces located on a subnet and is used for one-to-everyone communication on a subnet. It delivers packets from one source to all interfaces on the subnet. Broadcast addresses may be further classified as network broadcast, subnet broadcast, all subnets directed broadcast and limited broadcast. Internet Addresses are further classified into different categories. The number bits are used for the address prefix of a single subnet and the number of bits are used for the host ID. Therefore, it allocates the number of networks and the number of hosts per network. There are five address classes which are given below: - ? Class A — It uses an 8-bit network number whose first bit is always zero as shown in Table 4.6. It is reserved for IP unicast addresses. This class is used in case there are myriad hosts on a network. It uses only one octet to define the prefix length. The number of networks, which can be accommodated, are 2 8 or 128. However, out of these 128 addresses, 2 are used for administrative purposes

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and 126 addresses are available as prefix length. The remaining 3 octets are used for identifying up to 2 24 or 16,777,214 host IDs. ? Class B — It uses 16 bits for both the network address and the host address. In this case, the first two bits are always 10. It is reserved for IP unicast addresses. It

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It uses 2 octets for a particular network while the remaining two octets are deployed by the host IDs. They are particularly used for medium to large-sized networks. The Class B addresses can cater to 16,384 networks with up to 65,534 hosts per network. ? Class C — It is reserved for IP unicast addresses. It is meant for small networks. The first 3 octets specify a particular network and the last octet specify the host IDs. The Class C addresses may be used by up to 2,097,152 networks with up to 254 hosts per network. Its first three bits are always set to 110. ? Class D — Class D signifies IP multicast addresses. ? Class E — These addresses are reserved for experimental purposes. Table 4.6 represents IPv4 addresses classifications. Table 4.6 Classifications of IPv4 Addresses 32 bit address

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Number of Maximum

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Classification Octet 1 Octet 2 Octet 3 Octet 4 possible networks number of host or nodes Class A 0bbbbbbb xxxxxxxx xxxxxxxx xxxxxxxx 2 7 = 128 2 24 = 16,777,216 Class B 10bbbbbb bbbbbbbb xxxxxxxx xxxxxxxx 2 14 =16,384 2 16 = 65,536 Class C 110bbbbb bbbbbbbb bbbbbbbb xxxxxxxx 2 21 =2,097,152 2 8 = 256 Class D 1110bbbb followed by a 28 bit multicast address Class E 1111; reserved

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Classification Octet 1 Octet 2 Octet 3 Octet 4 possible networks number of host or nodes Class A 0bbbbbbb xxxxxxxx xxxxxxxx xxxxxxxx 2 7 = 128 2 24 = 16,777,216 Class B 10bbbbbb bbbbbbbb xxxxxxxx xxxxxxxx 2 14 =16,384 2 16 = 65,536 Class C 110bbbbb bbbbbbbb bbbbbbbb xxxxxxxx 2 21 =2,097,152 2 8 = 256 Class D 1110bbbb followed by a 28 bit multicast address Class E 1111; reserved

Sometimes, the allocation of the IPv4 address based on the above schemes, does not require addresses. Any organization with Class A address may have 16,777,214 hosts. Nevertheless, no organization may generally have more than 100,000 hosts. So, in this case, a huge IPv4 addresses become extraneous. Earlier, Classless Inter-Domain Routing (CIDR) method was used to allocate IPv4 addresses depending on the organization's needs. The agency, namely Internet Corporation for Assigned Names and Numbers (ICANN) or an Internet Service Provider (ISP), is responsible for determining the need of an organization to allocate IPv4 addresses under the respective class. Web Servers NOTES In the case of individual address, public addresses are used. Private addresses are also allocated based on proxied or translated connectivity to the Internet. It is observed that a user, who is either a part of an organization or belongs to an ISP, does not require direct connectivity with the Internet. Therefore, such organizations or ISPs require only a few public addresses for their nodes such as proxy servers, routers, firewalls, translators, etc. to connect directly with the Internet. Hence, some of the addresses are reserved distinctly from public addresses for private use only.
Self-Instructional Material 220 Web Servers NOTES

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Address is an identifier that is assigned to a device attached to a node in the Internet. It tells us about the source or destination of IP packets.

100% **MATCHING BLOCK 302/472** W

Address is an identifier that is assigned to a device attached to a node in the Internet. It tells us about the source or destination of IP packets.

Addresses are classified in terms of their functioning as unicast, multicast and broadcast. The number of network segments and hosts on the network are determined based on Class A, B and C addresses meant for unicast communication. 4.6.3 Subnetting for IP Addresses Over the past several years, the Internet has scaled enormous volume in terms of hosts connected to it and therefore IPv4 addresses, though readily available, are becoming rare. It is slightly perplexing that 32 bits give 2 32 unique addresses, which comes to approximately 4.3 billion different addresses. But actually this is not the case as different classes of the IPv4 addresses are available. Suppose a medium sized organization gets Class B address based on its current user population of say 1000. It uses 1000 different addresses. But the management of the organization has the ability to assign 2 16 = 65,536 different identifiers. It means that there is a dissipation of 64,536 addresses. Since they all belong to the same class B network number, they cannot be reclaimed by any other organization. A network administrator may suggest using Class C network address, which may require at least four class C networks. Later on, in case the number of users increase and the organization applies for another class C network, it might not get the same or even if it gets, it has to pass through a large number of paper works and delays. In addition to this, it also poses the problem of additional routing. With many Class C networks, you need to have more number of networks for routers to track. Consequently, the performance of the network also deteriorates. To resolve these problems, either the number of bits in IP address should be increased or resort to classless inter-domain routing (CIDR). The technique of subnetting may be used to efficiently divide the address space allocated to an organization to the different users divided among different subnets of an organization network. Therefore, subnetting is a process through which the address space of a unicast address prefix is divided for allocation amongst the subnets of an organization network. As we all know that a unicast address has fixed and variable portions. The fixed portion of a unicast address prefix has a defined value. The variable portion of the unicast address prefix has bits beyond the prefix length, which needs to be set to 0. Subnetting uses the variable portion of a unicast address prefix for assigning it to the subnets of an organization network. In order to implement subnetting, you need to follow the guidelines given below: ? Assess the number of subnets requirement. ? Assess the number of host IDs for each subnet. After this, a set of subnetted address prefixes with a range of valid IP addresses may be defined. The following steps are followed to carry out the process of Subnetting: 1. Estimate the number host bits for the subnetting. 2. Determine the new subnetted address prefixes. 3. Determine the range of IP addresses for each new subnetted address prefix. We will now learn as to how the subnet prefix of an IP address is determined, without the use of binary numbers. Given below are the guidelines for the same. 1. Write the number n (the prefix length) as the sum of 4 numbers by successively subtracting 8 from n. For instance, 22 is 8+8+6+0.

Self-Instructional Material 221 2. In a table with four columns and three rows, place the decimal octets of the IP address in the first row. The second row will then contain the four digits of the sum as shown in step 1. 3. The columns having 8 in the second row, write the corresponding octet from the first row to the third row. In case of 0 in a column in the second row, place 0 in the third row. 4. The column in the second row having a number between 0 and 8, convert the decimal number in the first row to a binary. Now select the high-order bits for the number of bits indicated in the second row and put a zero for the remaining bits and then convert back to decimal number. This will be the entry for that column. Now let us take an example in which the entry in the third column of the first row is 10. In this case, the binary equivalent comes to 00001010. Now again the third column of second row is having 6. It means we have to take 6 bits from high bi side and convert the remaining two bits into 00. This will give us a binary number 00001000 which is a decimal equivalent to 8. Therefore, the entry 8 will go in that column. 192 168 10 25 8 8 6 0 192 168 8 0 This gives the subnet prefix for the IPv4 address configuration 192.168.10.25/22 as 192.168.204.0/22. Now, we have to extract the subnet prefix from an arbitrary IPv4 address using an arbitrary subnet mask. For this purpose, a mathematical operation logical AND is used. In this case, a logical comparison between the 32-bit IP address and the 32-bit subnet mask is performed. This leads to the subnet prefix. For example, we may consider the following possible addresses for Class C. Web Servers NOTES Class C Network Bit Representation Address Range 210.195.8.0 11010010-11000011-00001000- 210.195.8.0-211.195.8.255 xxxxxxxx 210.195.9.0 11010010-11000011-00001001- 210.195.9.0-211.195.9.255 xxxxxxxx 210.195.10.0 11010010-11000011-00001010- 210.195.10.0-211.195.10.255 xxxxxxxx 210.195.11.0 11010010-11000011-00001011- 210.195.11.0-211.195.11.255 xxxxxxxx These Class C networks define the contiguous set of addresses from 210.195.8.0 to 210.195.11.255. On examining these addresses, it is observed that the first 22 bits are the same for each address. It means that these Class C networks have 22-bit network number followed by a 10 bit local identifier for hosts. A router can extract the network number using a logical AND operation between a 22-bit subnet mask and an IP address. With regard to this example, we can say that a router can represent four networks using the single entry 210.195.8.0/22, where /22 indicates that the network number is 22 bits long. Likewise, 210.195.8.0/20 address would first be 20 bits and so on. This indicates that we are grouping different smaller networks together and they are being treated in the same way for the routing purposes. Let us now take an example in which the IPv4 address is 210.195.8.0 and a 22 bit subnet mask is 255.255.252.0.

Web Servers NOTES 11010010 – 11000011 – 000010xx – xxxxxxxx (IP Address) AND 11111111 – 11111111 – 11111100 – 00000000 (22 Bit Subnet Mask) 11010010 – 11010011 – 00001000 – 00000000 (Network Number) (210) (195) (8) (0) The result of the bit-wise logical AND of the 32 bits of the IPv4 address and the subnet mask is the subnet prefix 210.195.8.0. Therefore, it may be noted that the bits in the fixed portion of the address (in which the bits in the subnet mask are set to 1) and the subnet prefix bits are copied from the IPv4 address by essentially extracting the subnet prefix of the IPv4 address. On the other side are the bits in the variable portion of the address where these are set to zero. The subnet prefix bits are also set to 0, thereby discarding the host ID portion of the IPv4 address. 4.7 DNS AND PORTS Self-Instructional 222 Material Earlier, Internet configurations were essentially based on numeric IP addresses. These addresses were cumbersome and complicated to remember. With the advent of symbolic host names, the problem was solved to a great extent. For example, instead of typing: TELNET 10.12.7.14 One can type: TELNET MyHost The system then translates the symbolic name to an IPAddress that is readable and easy to remember. MyHost is then translated into a machine-understandable form to the IP address 10.12.7.14. These are a kind of identifiers associated with IP protocol that provide access to computers.The use of symbolic names makes accessing a resource quite trouble free. The major impediment of this system is additionally maintaining the mappings between IP addresses and high-level machine names in a coordinated and centralized way. In general, there are two ways of organizing
a name space that maps each address to a unique name:
flat and hierarchical. When host names to address mappings are maintained in a single file (HOSTS.TXT), from which it is fetched, by all hosts using FTP, it is called a flat namespace. This file is maintained by the Network Information Center (NIC). When host names are organized into several parts, it is called a hierarchical name space. These parts contain a database of information about a particular organization.
The first part can define the nature of the organization, the second part can define the name of the organization, the third part can define the various departments in an organization, and so on.
There is decentralization of authority in assigning and controlling namespaces. For example, consider the name: myHost.myDept.myDiv.myCorp.com 4.7.1 Domain Name Space The domain name space is the most significant part of any naming procedure over an IP protocol since it defines the fashion in which they are formed. The domain name space is a lucid example of hierarchical namespace topology. In this hierarchical topology, the domain
names are defined in an inverted-tree structure with the root
right at the top. The tree can have 128 levels: level 0 (root) to level 127 (
Figure 4.16).
Self-Instructional Material 223 Fig. 4.16 Domain Name Space 1. Label: Each node is associated with a label
in the tree. This label is a string with a maximum of 63 characters. The root label is a null string.
In DNS, the children of a node have different labels. 2. Domain name: There is a
domain name assigned for each node in the tree. A full domain name is a sequence of labels separated by dots. The domain names are always read from the node up to the root (
Figure 4.17). Fig. 4.17 Domain Name and Labels Fully qualified domain name: A domain name is presumed to be complete if it concludes with a dot. Such a domain name is called a fully qualified domain name (FQDN) or an absolute domain name (Figure 3.3). For example, myDept.myDiv. myCorp.com. Partially qualified domain name: A domain name that does not conclude in a dot is incomplete. This is called a partially qualified domain name (PQDN) (Figure 3.3). For example, myDept.myDiv.myCorp. Fig. 4.18 FQDN and PQDN Web Servers NOTES
Self-Instructional Material 224 Web Servers NOTES Domain:
Subtree of domain name space. The name of the domain is the domain name existing at the top of the
subtree (Figure 4.19). Fig. 4.19 Domains 4.7.2 Distributed Name Space The
Domain Name System uses the concept of a distributed name space for assigning domain names and mapping them on the networking protocol. The distributed name space is organized as follows: Symbolic names are categorized into zones of authority, more commonly referred to as zones. There are one or more hosts in each of these zones, which are responsible for maintaining a database of symbolic names and associated IP addresses within that zone. This host acts as a server for clients that wish to translate between symbolic names and IP addresses. These local name servers are then (through the internetwork on which they are connected) logically interconnected and grouped into a hierarchical tree of domains.
A domain is a subtree of the domain name space.

Each zone contains a subtree of the hierarchical tree, and the names within the zone are administered independent of the names in the other zones. In other words, any name in the hierarchical architecture of a subtree is a constituent of a domain. Authority over zones is vested in the name servers (Figure 4.20). Normally, the name servers that control a zone will have domain names belonging to that zone, but this is not essential. In case a domain contains a subtree that falls in a different zone, the authority is delegated by the name server or servers with authority over the superior domain to the name server or servers with authority over the subdomain. Name servers can also delegate authority to themselves; in this case, the domain name space is still divided into zones moving down the domain name tree, but authority for two zones is held by the same server. The resource records stored in the Domain Name System aid in the division of the domain name space into zones. The top-level root domain is not organized as described above. Authority cannot be delegated to any higher system. It is not desirable to have all queries for fully qualified domain names to be directed to just one system. Thus, ICANN maintains a set of root servers, which share the authority for top-level zones amongst themselves (Figure 4.21). To better illustrate the process of resolving a symbolic name to an IP address, consider a query for myHost.myDept.myCorp.com. Let us assume that our name server does not have the answer already in its cache. The query goes to the .com root name server, which in turn forwards the query to a server with a DNS record for myCorp.com.

Self-Instructional Material 225 At this stage, it is likely that a name server has been reached that has cached the needed answer. However, the query could be further delegated to a name server for myDept.myCorp.com As a result of this scheme, ? The task of converting symbolic names to IP addresses is decentralized throughout the name space. ? The organization owning the zone has the authority for creating and changing symbolic host names and responsibility for maintaining a database for them. ? The user has the impression of a single database for address resolutions. The user might be aware that the database is distributed, but generally need not be concerned about this. Fig. 4.20 Hierarchy of Name Servers Fig. 4.21 Zones and Domains Information from the disk file is loaded into the primary server, which in turn loads all the information into the secondary server. The process of downloading information from the secondary server to the primary server is called zone transfer. 4.7.3 DNS

in the Internet The domain name space (tree) is divided into three different sections: generic domains, country domains, and

the inverse domain (

Figure 4.22). Web Servers NOTES

Self-Instructional Material 226 Web Servers NOTES Fig. 4.22 DNS used in the Internet 4.7.3.1 Generic domains The top-level names are known as the generic top-level domains (GTLDs), and can be three characters or more in length (Figure 4.23). Fig. 4.23 Generic Domains The following are the generic domain labels.

Self-Instructional Material 227 4.7.3.2 Country domains Country domains use two-character country abbreviations (Figure 4.24). Fig. 4.24 Country Domains 4.7.3.3 Inverse domains Inverse domains are used to map an IP address to a symbolic name. This generally occurs when a server has received a request from the client to execute a particular job. There is another namespace found in the domains in-addr.arpa. This domain also facilitates the reverse mapping of an IP address to a symbolic name (Figure 4.25). Web Servers NOTES

Self-Instructional Material 228 Web Servers NOTES Fig. 4.25 Inverse Domains To determine if the IP address is an authorized name, DNS can be used to find the matching host name for mapping a address to a name using a special type of domain query called a pointer query. 4.7.4 Resolution The conversion of an IP address to a symbolic name or vice versa

is called name- address resolution. DNS is designed as a client–server application

that maintains the record for a computer in the networking environment. When

a host needs to map an address to a name or a name to an address

for attempting to initiate the queries, it sends a request to a DNS client called a resolver. Consequently, the resolver forwards this request to the closest DNS server. If the server requires information, it sends a response back to

the resolver, else it forwards the request to the

other servers. On receiving the reply, the resolver interprets the response to see if it is a real resolution or an error.

It then delivers the result to the process to the end point (i.e., the host that requested it). 4.7.4.1 Mapping names to addresses Name servers are autonomous, cooperative systems that map symbolic names to IP addresses on the protocol. A name server is a server program that holds a master or a copy of a name-to-address mapping database, or otherwise points to a server of an IP address mapping. The name servers attempt to respond to the requests sent by the clients called resolver. 4.7.4.2

Mapping addresses to names A client

can request a server to map an IP address to a domain name

to

make it easier to read and comprehend. This is called a PTR query. Such queries are answered using

the inverse domain. The IP address is reversed and the two labels, in-addr and arpa, are added to create a domain acceptable by the inverse domain section. Consider the following IP address:
Material 229 129.34.139.30 The in-add.arpa address for this is: 30.139.34.129.in-addr.arpa. The domain name sent is 30.139.34.129.in-addr.arpa. which is received by the local DNS and resolved. 4.7.4.3 Recursive resolution
In recursive resolution,
the resolver expects the server to supply the final answer
sought (Figure 4.26). The server takes the onus of checking the database and responding, if it is the final authority for the domain name. If the server is not the authority, the request is communicated to another remote server until it receives an awaited
response. If the parent is the authority, it responds; otherwise, it sends the query to yet another server. When the query is finally resolved, the response (
algorithm) travels back through all the servers until it finally reaches the requesting client. Fig. 4.26 Recursive Resolution 3.2.4.4 Iterative resolution In iterative resolution, the server that is unable to answer does not forward the request to another server (Figure 4.27). It responds back with
the IP address of the server it thinks can resolve the query. The client
then iterates by transmitting a new request to the referred server. If the newly addressed server can resolve a problem, it answers the query with the IP address; otherwise, it returns the IP address of the new server to the client. The client must reiterate the query to the new server.
The practice is iterated till the desired and appropriate server is located. Fig. 4.27 Iterative Resolution Web Servers NOTES Self-Instructional
230 Material Web Servers NOTES Self-Instructional Caching Sometimes, a server requests a parent server to fulfil the request because it is unable to do so. On receiving
the response, it stores this information in its cache memory (
buffer storage memory of the RAM) before forwarding it to the client. This mechanism is called caching and it helps in optimizing data and curtails search time. The next request for the same mapping is answered by checking its cache. In this case, the response is marked as unauthoritative as it does not come from an authoritative source. 4.7.5 DNS Messages DNS facilitates its client by issuing messages for carrying information from one end to another. DNS messages are of two types: Query and Response. The DNS query message is the most important part of DNS. It comprises of header and question records. The DNS
response message consists of a header, question records, answer records, authoritative records, and additional records (Figure 4.28). Fig. 4.28 DNS Messages 4.7.5.1 Header format The header section is always mandatory and has a fixed length of 12 bytes. The other sections are of variable length. ? ID: This is a 16-bit identifier assigned by the program that generates the query. This identifier is duplicated in the corresponding reply from the name server and can be used to differentiate responses when multiple queries are pending at the same time. ? Parameters: A 16-bit value in the following format (Figure 4.29). Fig. 4.29 Parameters QR: Flag that identifies a query (0) or a response(1).
Material 231 Op code: 4-bit field specifies the kind of query: 0: Standard query (QUERY) 1: Inverse query (IQUERY) 2: Server status request (STATUS) Other values are reserved for future use. AA: Authoritative answer flag. If this flag is set in a response, it specifies that the responding name server is an authority for the domain name which sent the query. TC: Truncation flag. It is set, if the message is longer than the maximum permitted length on the physical channel. RD: Recursion desired flag. This bit signals to the name server that recursive resolution attempts to answer the query. The bit is copied to the response. RA: Recursion available flag. This indicates whether the name server that generates the reponses supports the recursive resolution or not. Zero 3: Bits reserved for future use must be set to zero. Rcode: 4-bit response code. The possible values are: 0: No error. 1: Format error. The server was unable to interpret the message and respond to the corresponding query. 2: Server failure. The server failed and the message was not processed due to some flaw. 3: Name error. The domain name in the query does not exist in the domain. This is only valid if the AA bit is set in the response. 4: Not implemented. This requested type of query is not implemented by name server. 5: Refused. The server refuses to respond, possibly for policy reasons. Other values are reserved for future use. QDcount: An unsigned 16-bit integer specifies the number of entries in the question section existing in the message. ANcount: An unsigned 16-bit integer specifies the number of RRs in the answer section existing in the message. NScount: An unsigned 16-bit integer specifies the number of name server RRs in the authority section existing in the message. ARcount: An unsigned 16-bit integer specifies the number of RRs in the additional records section existing in the message. 4.7.5.2 Question section The next section contains the queries for the name server. It contains QDcount (usually 1) entries (Figure 4.30). Web Servers NOTES Self-Instructional

232 Material Web Servers NOTES Self-Instructional Fig. 4.30 Question Section The various terms used are as follows: Length: A single byte specifies the length of the next label. Label: One element of the domain name characters (for example, ibm from ral.ibm.com). The domain name referred to by the question is stored as a series of these variable length labels, each preceded by a 1-byte length. 00: X'00' indicates the end of the domain name and represents the null label of the root domain. Type: 2 bytes specifying the type of query. It can have any value from the Type field in a resource record. Class: 2 bytes specifying the class of the query. For Internet queries, this will be IN. 4.7.5.3 Answer, authority and additional resource sections These three sections contain a variable number of resource records. The number is specified in the corresponding field of the header (Figure 4.31). Fig. 4.31 Answer, Authority and Additional Resource Sections Where the fields before the TTL field have the same meanings as for a question entry and: TTL: A 32-bit time-to-live value in seconds for the record. This defines how long it can be regarded as valid.
Material 233 RDlength: A 16-bit length for the Rdata field. Rdata: A variable length string whose interpretation depends upon the Type field. 4.7.6 DNS Records As envisaged, there are
two types of records that DNS uses. The question section of the query and response messages uses question records. The answer, authoritative and additional information sections of the response message
use resource records. 4.7.6.1 Question record A question record is used primarily by the client to get response from the server. This question record contains a domain name. The question record format is shown in Figure 4.32. Fig. 4.32 Question Record 4.7.6.2 Resource record Each domain name is associated with a record known as the resource record. The server database consists of resource records. The server returns resource records as response to request by the client (Figure 3.18). Web Servers NOTES Compression Fig. 4.33 Resource Record Compression implies compressing or reducing the size of the message. During compression, repetition of domain names in the various RRs is eliminated. This is done with the help of a pointer. Any duplicate domain name or list of labels is replaced with a pointer to the previous occurrence. The pointer has the form of a 2-byte field as shown in Figure 4.34. 1 1 offset Fig. 4.34 Compression Self-Instructional
234 Material Web Servers NOTES Self-Instructional Figure 4.34 components are described as follows: ? The first 2 bytes distinguish the pointer from a normal label, which is restricted to a 63-byte length plus the length byte ahead of it (which has a value >64). ? The offset field specifies an offset from the start of the message. A zero offset specifies the first byte of the ID field in the header. ? If compression is used in an Rdata field of an answer, authority or additional section of the message, the preceding RDlength field contains the real length after compression is executed. 4.7.7 Dynamic Domain Name System (DDNS) The Dynamic Domain Name System (DDNS) is a mechanism that provides an extension to DNS. DDNS enables DNS servers to accept requests to add, update and delete entries in the DNS database dynamically. Being a functional superset to existing DNS servers, a DDNS server can serve both static and dynamic domains simultaneously. DDNS is currently available in a non-secure and secure flavour. If there is no authentication procedure for a client, another host could pretend to be an unsuspecting host. This can be done by remapping the address entry for the unsuspecting host to its own. As a result of this, remapping sensitive information such as login passwords and mail meant for the host would be sent to the false host instead. 4.7.8 DNS Ports A port, in computer networking, is considered as application-specific or process-specific software that builds function for a communication endpoint utilized by Transport Layer Protocols (TLP) of the Internet Protocol (IP) suite namely Transmission Control Protocol (TCP) and User Datagram Protocol (UDP). A specific port is recognized by its number termed as the port number, the associated IP address and the communication protocol. DNS helps to look up names and IP addresses. A port number is a 16-bit unsigned integer that ranges from 0 to 65535. The port numbers are categorized into the following three ranges: ? Well-known ports ? Registered ports ? Dynamic or private ports The port numbers 0 through 1023 are termed as well-known ports. The following are important well-known ports: ? 23: Telnet ? 53: Domain Name System ? 80: World Wide Web HTTP ? 119: Network News Transfer Protocol ? 443: HTTP over Transport Layer Security/Secure Sockets Layer ? 445: Microsoft-DS (Microsoft Directory Service), Server Message Block over TCP The registered ports are from 1024 through 49151. The dynamic or private ports are from 49152 through 65535. Generally, the DNS port uses a high port on the client side and port 53 on the server side (see Figure). Whenever any two DNS servers send the data from one DNS server to the other, then typically both the DNS servers use port 53. For individual

Material 235 queries UDP is used whereas TCP is used to transfer entire zones. Zone transferring is done when a secondary name server acquires information from a primary name server. Fig. Ports between Client and DNS Server Fig. 4.35 Ports between Two DNS Servers Whenever a client program sends queries to a name server and the name server in turn has to query another name server, then the queries and data are sent with UDP from port 53 to port 53. Both UDP and TCP are utilized for transferring zone. First, a small data is sent with UDP to a name server which requests another name server for a name or IP address. Then, a TCP connection is created from a high port on the secondary name server to port 53 on the primary name server. Fig. 4.36 Ports between Secondary DNS Server and Primary DNS Server There are a few versions of Windows which contain programs that sends DNS queries from port 137. DNS follows rules for both directions via the firewall. A particular port performs a specific process termed as binding for sending and receiving data. The incoming packets are checked for destination port number and IP destination address to match with that port and to send outgoing packets by confirming the source port number. Port numbers are defined in the transport protocol packet header from where they can be interpreted for sending and receiving data to source computers and also via other networking infrastructure components. Basically, the Firewalls are configured to make a difference between source and destination packets depending on port numbers. An important example for the usage of ports is the Internet mail system. A server is used for sending and receiving e-mails. It needs two types of services. The first service is to transport e-mail to and from other servers which is accomplished using the Simple Mail Transfer Protocol (SMTP). The SMTP service application is supported by TCP port 25 for incoming requests. The second service is the Post Office Protocol Web Servers NOTES Self-Instructional

 (POP) which uses the e-mail client applications on user computer to fetch e-mail messages from the server. The POP service is supported by TCP port number 110. Both the services may run on the same host computer which distinguishes the services as per the port number that was requested by a remote computer or another mail server. 4.8 CONCEPTUAL ARCHITECTURE OF A TYPICAL WEB SERVER LIKE APACHE The Apache HTTP Server is generally referred as Apache. It is web server software and has a key role in the World Wide Web. Apache is mainly used for both static content and dynamic web pages on the World Wide Web. Many web applications are being designed as per characteristic environment and features provided by Apache. 4.8.1 Apache Web Server Basics The core function of Apache web server is its ability to serve web pages. It is an advanced, specialized and powerful software application that serves billions of web pages daily. The most basic function of Apache is to assist static and unchanging HTML web documents. The web pages can be generated in Apache using the Perl and PHP script rules. Apache supports various programming languages, scripted or compiled. It is a versatile product. At present, the Apache web server is the most accepted web server, as per a NetCraft Survey. Originally, this project was developed on NCSA HTTPd 1.3. The name Apache is derived from "A PAtCHy Server". After that the entire code base was rewritten and developed into an independent project. The main reason for the Apache success is that it is an 'open source' project because any one can access the Apache code source and can rewrite its modules as per the requirements. 4.8.2 Apache Web Server Architecture Apache web server is based on a high level modular approach. Figure given below shows the high level conceptual architecture of Apache server. The server has a core part which defines the steps to service a request and the several modules that really implement the various phases to handle the request. Interaction with the HTTP Client Self-Instructional Fig. 4.37 Apache Web Server: High Level Conceptual Architecture Legend Module Calls/Uses Returns control/data APACHE MODULE

Material 237 4.8.2.1 Core and the Modules of Apache Server The conceptual parts of the Apache server describe that how core and modules decompose a request in a set of phases. It also describes the structure of an Apache module at a conceptual level. Core: The core executes the essential functionalities of the server. Additionally it also executes various utility functions. A significant utility is that it provides resource allocation per request pool. This utility is not only restricted to the server core but it is also provided to server modules. The following are the core components: ? http_protocol.c: It contains routines which directly communicate with the client using the socket connection and follows the HTTP protocol. ? http_main.c: It is the component which startup the server. It holds the main server loop to wait for and accept connections. It also manages timeouts. ? http_request.c: It handles the flow of request processing, dispatching modules control in the proper order. It manages error handling. ? http_core.c: It implements the most essential functionality that is defined in a comment from a source file as "just 'barely' functional enough to serve documents, though not terribly well". Another exciting quote from a source file comment defines well the function of this component as "this file could almost be mod_core.c". This means that the component acts like a module but it must directly access some globals that is not a module characteristic. ? alloc.c: This component takes care of allocating resource pools and keeps track of it. Other utilities include files to read configuration and to manage the information collected from files http_config.c to support virtual hosts. A significant function of http_config is that it can service various request phases which are called form the list of modules. Web Servers NOTES Fig. 4.38 Architecture for Apache Core The above Figure describes the interaction process between the various core components. During the interaction process, a component is called from service function for conceptually releasing component control. All the core components have distinct functionalities. Generally the architectural information is depicted in the module names. In Apache server design the objects are expressed into the modules part in the form of separate entities. Self-Instructional
Self-Instructional Material 238 AN APACHE MODULE Legend Data Component/Subcomponent Calls/Uses Returns control/data Handler 3 Handler 2 Handler 1 Web Servers NOTES Modules: All the modules have the similar interface to the Apache server core. Modules never interact with each other directly. They only interact via the Apache core. The responsibility of the Apache web server modules is to implement/override/extend its functionality. Fig. 4.39 Architecture of an Apache Module Apache allows modules loading when required as these are linked dynamically with the server. Hence, methods for initialization and configuration can be called after the module loading. Request phases A module can only implement part of the functionality to serve the request of client. To completely respond to a client request more than one module is required. The modules do not directly recognize each other during any process. The control is shifted back and forth between the Apache server core and the different Apache modules. The request is divided into a set of distinctive phases for handling it perfectly. The distinct phases of request handling for the Apache server are as follows: ? Uniform Resource Identifier (URI) to filename translation. ? Verify access which is either based on host address or other existing information. ? Getting an userid from the HTTP request and to validate it. ? Authorizing the user. ? Determining the Multipurpose Internet Mail Extensions (MIME) requested object type (the content, the encoding and the language). ? Fix-ups for replacing aliases with the actual path. ? Sending the real data back to the client. ? Logging the request. All these phases are managed and controlled by the http_request component of the Apache server core. private date From/To Apache Core

Material 239 Handlers In Apache, a handler is the action to be performed during the request servicing phase. For example, if the object requested is a file then the handler which returns the file will open the file to read the file contents and then pass this file containing requested content to the client via the Apache core. Handlers are described through modules and a module specifies handlers for one, many or none of the request phases. Basically, the handler is the element of the module and is only called when the request processing enters that specific phase in which the handler is described. The modules also export additional functions associated with server configuration and server initialization which are termed as the startup phase of the Apache server. Standard modules Apache has a set of standard modules to provide total functionality to a web server. The following are the most significant standard modules and the type of manipulation that can be made at each phase: ? For URI to file name translation phase: o mod_userdir: It translates the home directories of user to the real paths by mod_rewrite Apache 1.2 and above. o mod_rewrite: It rewrites the URL on the basis of regular expressions. It also has additional handlers for fix-ups and to determine the MIME. ? For authentication/authorization phases: o mod_auth,mod_auth_anon,mod_auth_db,mod_auth_dbm : Verifies user authentication to use text files, anonymous FTP style, Berkeley database files and DBM files. o mod_access: It provides the host based access control. ? For determining the MIME type of the requested object: o mod_mime: It determines document types with file extensions. o mod_mime_magic: It determines document types with "magic numbers". For example, all graphics interchange format (gif) files can be initialized with a specific code. ? For fix-ups phase: o mod_alias: It replaces aliases by the real path. o mod_env: It fix-ups the environment on the basis of information in configuration files. o mod_speling: It automatically corrects minor typing errors in URLs. ? For sending actual data back to the client: It selects the proper module for this phase, such as the MIME type or the pseudo MIME type to complete the task. o mod_actions: It is file type/method based on script execution. o mod_asis: It sends the file in its original form without changes. o mod_autoindex: It sends an automatic created representation of a directory listing. o mod_cgi: It invokes CGI scripts to return the result. o mod_include: It handles server side and the documents parse by server which includes the additional data before passing the document to the client. o mod_dir: It handles basic directory. o mod_imap: It handles image-map files. Web Servers NOTES Self-Instructional
Self-Instructional Material 240 Web Servers NOTES ? For logging the request phase: o mod_log_*: It includes various types of logging modules. 4.8.2.2 Conceptual Architecture of Apache Server Figure 1 describes the most important components of the Apache web server and the way they interact with each other. The handlers defined in modules are called in a predefined fixed order which is termed as the order of the phases to service a user request. The phases in which only one module is called are the authorization phase, the authentication phase, the return of the actual object to the client phase and occasionally the URI to filename translation phase. Other request servicing phases include more that one handler. For example, the logging part of the user request can be implemented using more than one module. The phases may call all the handlers (in registered modules) to process a request and functions when one handler returns a unique (special) code which specifies that the subsequent registered handlers for the present phase must not be called, for example the URI to filename translation phase. When the handler returns an error code then the request processing is stopped and an error message is returned to the client. mod_userdir mod_rewrite } URL – < filename modules HTTP Request HTTP Response APACHE CORE mod_auth* mod_alias mod_mime mod_env mod_mime_magic } Authorize/Authenticate module } Fix-up modules } det. MIME Type modules mod_asis } return object module mod_log_agent mod_log_config mod_referer } log modules Legend Calls/Uses Returns control/data Initialize call Execution Flow (for a Request) Component/Module HTTP Req/Resp Fig. 4.40 Conceptual Architecture of Apache Web Server 4.8.3 Extensibility of Apache Apache server architecture supports modifications in the functions defined in existing file and also addition of new functionalities. Its modular approach is very helpful in modifying the web server functionality and saving into separate modules to perform the task easily. A separate module is written to be called either before the standard module
Material 241 or after it to perform a specific function. Essentially only some configuration files are changed or modified. Remember that Apache web server will not modify, change and add the module that is implemented as HTTP protocol. Hence, Apache web server is based on modular architecture and a core component for defining the fundamentals of web server functionality including the HTTP protocol. Web Servers NOTES 4.9 SUMMARY In this unit, you learnt that: ? Web services have the capacity to change the applications into web applications. ?
Web services are considered as application programming interfaces (API) or web APIs which can be easily accessed on the Internet and also implemented on a remote system to host the requested services. ?

Reliability in web services means the reliable infrastructure services that support message transportation and interaction between services. ? The web server composition can be explained with the assistance of various system components and alternatives such as hardware alternatives, software alternatives and communication alternatives. Using the Service Oriented Architecture (SOA) concept a service provider and service consumer could communicate with each other. ? A basic web hosting system contains the essential system parts for web facilities, Internet access, and software. ? Server registration permits support to individual computer users or network users to control the 'applications' or 'ports' that can be accessed easily. Registration is voluntary but it is recommended to get the domain name registered. ? The IP protocol operates as the third level of the in the OSI reference model. The DNS is a client/server identification application that identifies each individual host on the Internet with a unique user friendly name. All the user names are methodized in a hierarchical fashion in the DNS. ?

70% **MATCHING BLOCK 303/472** W

The Hypertext Transfer Protocol is designed to allow the transfer of HTML documents. It is

70% **MATCHING BLOCK 304/472** W

The Hypertext Transfer Protocol is designed to allow the transfer of HTML documents. It is

95% **MATCHING BLOCK 305/472** W

is based on a request–response activity. A client, running an application called a browser, establishes a connection with a server and sends a request to the server in the form of a request method. ?

95% **MATCHING BLOCK 306/472** W

is based on a request–response activity. A client, running an application called a browser, establishes a connection with a server and sends a request to the server in the form of a request method. ?

Apache is web server software that has a key role in the World Wide Web and is mainly used for both static content and dynamic web pages on the World Wide Web. 4.10 KEY TERMS ? Simple object access protocol (SOAP): An XML-based protocol for accessing a web service and to exchange information on HTTP using specific applications. ? Web services: Application programming interfaces (API) or web APIs which can be easily accessed on the Internet and also implemented on a remote system to host the requested services. ?
Subnetting: A process through which the address space of a unicast address prefix is divided for allocation amongst the subnets of an organization network. Self-Instructional
Self-Instructional Material 242 Web Servers NOTES ? Web server: The computer program or virtual machine which serves web pages utilizing the Hypertext Transfer Protocol (HTTP) across the World Wide Web (
WWW).? ? IP protocol: A connectionless type service which operates at the third layer of OSI reference model.? ? Domain name system (DNS): A TCP/IP application service that converts user- friendly names to IP addresses.? ? DNS server: A computer that holds information about name space.? ? Hypertext transfer protocol (HTTP): An application service for retrieving a web document.? ? Request header: A part of the HTTP
request message that specifies the client's configuration and the client's preferred document format.? ? Response header:
A part of the HTTP
response message that specifies the server's configuration and special information about the request.? ?
Apache: A web server software having a key role in the World Wide Web.? 4.11 ANSWERS TO 'CHECK YOUR PROGRESS' 1. Web services have the capacity to change the applications into web applications. 2. SOAP is an XML-based protocol for accessing a web service and to exchange information on HTTP using specific applications. 3.
Web services are considered as application programming interfaces (API) or web APIs which can be easily accessed on the Internet and also implemented on a remote system to host the requested services. 4.

WS-Security defines the usage of XML Encryption and XML Signature in SOAP for secured message exchange. It is an alternate or extension to use HTTPS for securing the channel. 5. The WSDL structures the base for Web Services. 6. The main function of a web server is that it handles the HTTP protocol. 7. The multicriteria analysis is based on a hierarchical Bottom-Up framework of the design alternatives and their composition. 8. Server registration permits support to individual computer users or network users to control the 'applications' or 'ports' that can be accessed easily. 9. HTTP is the basic
protocol of the web whereas HTTP server software for example Apache server accepts the user requests from the user browser and then responds by sending back HTML documents
in the form of web pages and files. 10. HTTP Request Headers, HTTP Response Headers and HTTP Entity Headers. 11. The various HTTP methods are GET, HEAD, POST, PUT, TRACE, CONNECT and OPTION. 12.

100% **MATCHING BLOCK 307/472** W

The Internet is the collection of several independent networks, which are interconnected with one another. 13.

100% **MATCHING BLOCK 308/472** W

The Internet is the collection of several independent networks, which are interconnected with one another. 13.

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IPv4 addresses are uniquely used as identifiers, which work at network layer to identify the source or destination of IP packets. Material 243 14. The technique of

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IPv4 addresses are uniquely used as identifiers, which work at network layer to identify the source or destination of IP packets. Material 243 14. The technique of

subnetting may be used to efficiently divide the address space allocated to an organization to the different users divided among different subnets of an organization network. 15. If a domain name ends in a dot, it is assumed to be complete. This is called a Fully Qualified Domain Name (FQDN) or an Absolute Domain Name. For example, myDept.myDiv.myCorp.com. If the domain name does not end in a dot, it is incomplete. This is called a Partially Qualified Domain Name (PQDN), for example, myDept.myDiv.myCorp. 16.
Mapping a name to an address or an address to a name is called name-address resolution. 17.
The Dynamic Domain Name System (DDNS) is a protocol that defines extensions to the Domain Name System to enable DNS servers to accept requests to add, update and delete entries in the DNS database dynamically. 18. It is web server software that has a key role in the World Wide Web. Web Servers NOTES 4.12 QUESTIONS AND EXERCISES Multiple Choice Questions 1. The HTTP protocol is the protocol that is typically used by: (a) System (b) Users (c) Internet (d) No one 2. UDDI is specifically used as a directory service for companies so that they can register there and then explore: (a) Web services (b) Internet (c) Modem (d) System 3. Web APIs permit the composition of various web services into fresh new applications termed as: (a) Virus (b) Mashups (c) MS-Word (d) Power Point 4. Web services which are used to implement a specific architecture as per SOA concepts are considered as the basic unit of message communication and not an: (a) Function (b) Program (c) Issue (d) Operation Self-Instructional
244 Material Web Servers NOTES Self-Instructional 5. The plug-in module permits the web server for communicating with the application: (a) Server (b) Program (c) Software (d) Feature 6. The file must be copied on other associated web servers: (a) Automatically (b) Manually (c) Physically (d) Mentally 7. Information for registration is submitted via the web server: (a) Website (b) File (c) Page (d) ISP 8. HTML is a tag language used to create hypertext: (a) Files (b) Data (c) Pages (d) Documents 9.

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The server may also return extra result information in the body of the message, especially when an error: (

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The server may also return extra result information in the body of the message, especially when an error: (

a) Reduces (b)Occurs (c) Evolves (d) None of the above 10.

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Address is an identifier that is assigned to a device attached to a node in the: (

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Address is an identifier that is assigned to a device attached to a node in the: (

a) System (b) Data (c) Packets (d) Internet 11. The header section is always mandatory and has a fixed length of: (a) 14 bytes (b) 18 bytes (c) 12 bytes (d) 13 bytes 12. A question record is used primarily by the client to get response from the: (a) Server (b) User
Material 245 (c) System (d) Internet 13. Generally, the DNS port uses a high port on the client side and on the server side is port: (a) 32 (b) 53 (c) 35 (d) 54 14. The core function of Apache web server is its ability to serve: (a) User (b) Documents (c) Server (d) Web pages 15. On receiving the reply, the resolver
interprets the response to see if it is a real resolution or an error.
It then delivers the result to the process to the: (a) User (b) Documents (c) End point (d) Web pages Answers: 1. (c), 2. (a), 3. (b), 4. (d), 5. (a), 6. (b), 7. (c), 8. (d), 9. (b), 10. (d), 11. (c), 12 (a), 13 (b), 14 (d), 15 (c) Fill in the Blanks 1. The HTTP protocol is the protocol that is typically used by _____ _. 2. The service consumer sends one or more queries to the web service directory for finding a service and determining the way for communicating with the selected __ _____ _. 3. A Web service can be managed when it depicts a set of management for supporting management potentials. 4. Web browsers correspond with web servers using the protocol. 5. The binary module utilizes the file that helps in routing the requests of web client. 6. Registered applications which have a security certificate on file can utilize secure_____ _. 7.

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Hypertext documents include links to other documents that contain additional information about the term or subject. 8.

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Hypertext documents include links to other documents that contain additional information about the term or subject. 8.

Subnetting is a process through which the address space of a address prefix is divided for allocation amongst the subnets of an organization network. 9. DNS is designed as a client–server application that maintains the _for a computer in the networking environment. Web Servers NOTES Self-Instructional
246 Material Web Servers NOTES 10. A client
can request a server to map an IP address to a domain name

to make it easier to read and . 11. Registered applications are by any registered domain. 12. A specific port is recognized by its number termed as the port number, the associated IP address and the protocol. 13. DNS helps to look up names and addresses. 14. The Firewalls are to make a difference between source and destination packets depending on port numbers. 15. The service is supported by TCP port number 110. Answers: 1. Internet, 2. Service, 3. Operations, 4. TCP/IP, 5. XML, 6. Tokens, 7. Highlighted, 8. Unicast, 9. Record, 10. Comprehend, 11. Recognized, 12. Communication, 13. IP, 14. Configured, 15. POP State Whether TRUE or FALSE 1. The HTTP protocol is the protocol that is typically used by Internet. 2. No specified advice is provided by the architecture regarding the implementation of transactional reliability. 3. Least popular web sites use basic methods for partially crossing the load limits and for preventing overload. 4. Plug-in configuration is used to configure the web server so that it can use the binary plug-in module provided by the WebSphere Application Server. 5. The web service providers are not accountable for the prevalence, legitimacy, legality and look of their pages. 6. For group queries UDP is used whereas TCP is used to transfer entire zones. 7. Apache web server is based on a high level modular approach. 8. The

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TRACE method allows the client to see how the message was retrieved at the other side for testing and diagnostic purposes. 9.

97% **MATCHING BLOCK 318/472** W

TRACE method allows the client to see how the message was retrieved at the other side for testing and diagnostic purposes. 9.

An organization with a single department

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may create addresses for its sub-domain with different servers being maintained there. 10.

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may create addresses for its sub-domain with different servers being maintained there. 10.

The conversion of an IP address to a symbolic name or vice versa is called name- address resolution. 11. Apache is web site software and has a key role in the World Wide Web. 12. Apache web server is based on a high level modular approach. 13. The main reason for the Apache failure is that it is an 'open source' project because any one can access the Apache code source and can rewrite its modules as per the requirements. 14. Inverse domains are not used to map an IP address to a symbolic name. 15. Authority over zones is vested in the name servers Answers: 1.
True, 2. True, 3. False, 4. True, 5. False, 6. False, 7. True, 8. True, 9. False, 10. True, 11. False, 12. True, 13. False, 14. False, 15. True Self-Instructional
Self-Instructional Material 247 Match Column A with Column B ColumnA Column B 1. An XML-based protocol for accessing a web service and to exchange information on HTTP using specific applications is called A DNS server. 2. Application programming interfaces (API) or web APIs which can be easily accessed on the Internet and also implemented on a remote system to host the requested services
are known as B Domain Name System (DNS). 3. The process through which the address space of a unicast address prefix is divided for allocation amongst the subnets of an organization network is called C Web server. 4. The computer program or virtual machine which serves
web pages utilizing the Hypertext Transfer Protocol (HTTP) across the World Wide Web (
WWW) is called D Simple Object Access Protocol (SOAP). 5. A connectionless type service and operates at third layer of OSI reference model is termed as E Request header. 6. A TCP/IP application service that converts user- friendly names to IP addresses is known as F Port. 7. A computer that holds information about the name space is called G Web services. 8. An application service for retrieving a web document is termed as H Partially qualified domain name. 9. A part of the HTTP
request message that specifies the client's configuration and the client's preferred document format
is known as I HTTP messages. 10. A part of the HTTP

response message that specifies the server's configuration and special information about the request is termed as J IP protocol. 11. A web server software that has a key role in the World Wide Web is known as K Hypertext Transfer Protocol (HTTP). 12. In computer networking, a application-specific or process-specific software that builds function for a communication endpoint utilized by Transport Layer Protocols (TLP) of the Internet Protocol (IP) suite namely Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) is called L General headers. 13. A domain name that does not conclude in a dot is incomplete and is called M Apache. 14.

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All the communication between devices using the Hypertext Transfer Protocol takes place via

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All the communication between devices using the Hypertext Transfer Protocol takes place via

N Response header. 15.

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The message itself, as opposed to its contents, and are used to control its processing or provide the recipient with extra information are

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The message itself, as opposed to its contents, and are used to control its processing or provide the recipient with extra information are

termed as O Subnetting. Answers: 1. (D), 2. (G), 3. (0), 4. (C), 5. (J), 6. (B), 7. (A), 8. (K), 9. (O), 10. (N), 11. (M), 12. (F), 13. (H), 14. (I), 15. (L) Short-Answer Questions 1. What are web services? Name the elements for its platform. 2. What are the design methodologies of web services? Web Servers NOTES
248 Material Web Servers NOTES Self-Instructional 3. Describe the significance of web services description language (WSDL) and universal description, discovery and integration (UDDI). 4. What does World Wide Web consortium (W3C) describe? 5. What are remote procedure calls? 6. Describe the importance of service oriented architecture (SOA). 7. What does REpresentational state transfer describe? 8. Why are message reliability and service reliability required? 9. Why web service management is required? 10. What is a web server? What are its common features? 11. What are the load limits of web server? 12. What is the main function of web server? 13. Which files are used by Plug-in installation wizard for configuring a web server? 14. Why it is essential to register the web server? 15. What is HTTP? 16. What is the HTTP request message format? 17. What is an IP address? 18. What is domain name system? 19. Name the sections into which the domain name space (tree) is divided. 20. On which mechanism the dynamic domain name system is based? 21. What is DNS port? How is it classified? 22. What is the core function of Apache web server? Long-Answer Questions 1. Describe the characteristics of each element required for web services platform. 2. Explain the architecture and specification profiles for web services. 3. Describe the tools used for various web services. 4. Explain the various functions of web service reliability. 5. How are web services managed? Describe with the help of an example. 6. Describe the architecture and environment of a web server. 7. Explain the reasons of web servers overloading. 8. Discuss the role and authentication of web server on the Internet. 9. Define the modular design approach and composition of web server. 10. 'The plug-in wizard configures the web server and generates a web server definition in the application server configuration.' Discuss with the help of examples. 11. Explain the various levels of web server registration. 12. Write a short essay on the significance of HTTP. 13. Describe the various HTTP message formats and the headers involved in transferring a message. 14. Explain the safe and idempotent methods.

Self-Instructional Material 249 15. Why is IP address configured? What is IPv4 addressing and how is it classified? 16. What is IP address subnetting? Describe the steps required in the process of subnetting. 17. Discuss the significance of domain name system with reference to Internet. Differentiate between domain name space and distributed name space with the help of suitable examples. 18. What is resolution? Describe its various types. 19. Discuss the format of DNS messages and records. 20. What is the significance of DNS ports? Discuss its various types. 21. Why port 53 is required? Discuss with the help of suitable examples. 22. What is Apache web server? Describe its architecture and functionality. Web Servers NOTES 4.13 FURTHER READING Black, Utyless D. Computer Networks. USA: Prentice-Hall. 1993. Stallings, W. Data and Computer Communications. New Delhi: Prentice-Hall of India. 1997. Tanenbaum, Andrew S. Computer Networks. USA: Prentice-Hall 2002. Zhi-Hua Zhous & Shaowu Liu (2021) Machine learning 4.14 LEARNING OUTCOMES ? Web servers and the services offered by them ? The architecture of the of the web services ? Understand the reliability and functionality of the web services ? The features of web servers ? The composition and configuration of web servers ? The registration of the web services and its importance. ? Understand the significance of IP protocol and addresses ? Learn how messaging works in DNS ? Know the various domains in the DNS ? Understand the HTTP protocol Self-Instructional Material 251 UNIT 5 INTRODUCTION TO HTML Structure 5.0 Introduction 5.1 Unit Objectives 5.2 Hypertext Markup Language (HTML) Basics 5.3 Writing a Web Page in HTML 5.4 Tags 5.5 Hyperlinks 5.5.1 Link on the Same Page 5.6 URLs 5.7 Tables 5.7.1 Building a Simple HTML Document Table 5.8 Text Formatting in Web Pages 5.9 Using Graphics and Multimedia in Web Pages 5.9.1 Internet Audio/Video 5.9.2 Digitizing Audio and Video 5.9.3 Audio and Video Compressions 5.9.4 Streaming Stored Audio/Video 5.9.5 Real-Time Interactive Audio/Video 5.9.6 Real-Time Transport Protocol 5.9.7 Real-Time Transport Control Protocol 5.9.8 Voice-over IP 5.10 Image Maps 5.11 Use of Forms 5.11.1 Form Tags 5.12 Use of Frames 5.13 Summary 5.14 Key Terms 5.15 Answers to 'Check Your Prgoress' 5.16 Questions and Exercises 5.17 Further Reading 5.18 Learning Outcomes Introduction to HTML NOTES 5.0

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INTRODUCTION In this unit, you will learn about the basics of

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INTRODUCTION In this unit, you will learn about the basics of

HTML. You also will learn how to write a web page in HTML, how to format text in web pages and about tags, hyperlinks, URLs, image maps, forms, frames and using graphics and multimedia in web pages. Hypertext Mark-Up Language (HTML) is a scripting language which is used to prepare written documents by using formatting tags. It is the most widely used markup language for web pages. It facilitates the creation of structured documents by denoting structural semantics for text such as headings, paragraphs, lists, etc., as well as for links, quotes and other items. It allows images and objects to be embedded and can be used to create interactive forms. It is written in the form of HTML elements consisting of 'tags' surrounded by angle brackets within 'the Web page content'. It can include or can load scripts in languages such as JavaScript which affect the behavior of HTML processors like Web browsers; and cascading style sheets (CSS) to define the appearance and layout of text and other material. HTML has several different versions like HTML2 and HTML3. 252 Material Head Body Introduction to HTML

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NOTES 5.1 UNIT OBJECTIVES After going through this unit, you will be able to: ? Understand

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NOTES 5.1 UNIT OBJECTIVES After going through this unit, you will be able to: ? Understand

HTML basics ? Write a web page

in HTML ? Format text in web pages ? Create tags, hyperlinks, URLs and tables in HTML ? Use graphics and multimedia in Web pages ? Create image maps ? Use forms ? Use frames 5.2 HYPERTEXT MARKUP LANGUAGE (HTML) BASICS HTML is a simple scripting language that is used to write Web pages. It is an abbreviation and stands for Hyper Text Markup Language that is predominantly markup language for the creation of Web pages. Hypertext in HTML is simply a piece of text that works as a link. It is basically a text file containing small markup tags as headings, paragraphs, lists, and so on. It also supplements the text with interactive forms, embedded images, and other objects. Its file extension is htm or html. It can be created using a simple text editor. These markup tags guide the Web browser as to how display the page. When an HTML file is opened in a Web browser, the browser looks for HTML codes in the text and uses them to change the layout, insert images, or create links to other pages. As HTML documents are only text files therefore they can be written in even the simplest text editor. FrontPage and Dreamweaver are some of the most popular HTML editors. In general, a computer takes an 'A' as simply an 'A' whether it is bold, italic, big or small. In order to tell the computer that 'A' should be italic or bold, a software program namely Browser is used which is specified with a markup in front of the A. Such a markup is known as a Tag. It is customary that all HTML tags should be enclosed in > and <. For example, >b<bold>/b< makes the text bold. 5.3 WRITING A WEB PAGE IN HTML A web page consists of a head and a body as shown in Figure 5.1. Self-Instructional Fig. 5.1 HTML Page Structure The purpose of using head is not to show the text and tags directly on the page while in case of body they appear directly on the web page. All web pages start with an >html< tag at the beginning and the end, indicating the browser where the document starts and where it stops. Metatags are used in the head section to, among

Self-Instructional Material 253 other things, improve the rankings in search engines. Often, the head section also includes JavaScript, which is a programming language for more complex HTML pages. The HTML document is used as document appearing on a web page that declares the version of HTML. A HTML document is prepared either in Notepad or Dreamweaver applications. Creating HTML document leads to the use of HTML tags. Users who want to prepare the HTML document must be aware of HTML code which provides the various tags and elements used to format the HTML document. The following is an example of a simple HTML code: >html< >head< >h1 align=center< A SIMPLE HYPERTEXT MARKUP LANGUAGE (HTML) DOCUMENT>/h1< >h2 align=center< INFORMATION TECHNOLOGY >/h2< >/head< >/html< This file is saved as by going through the following steps: Step 1: Write the code in notepad and click on File?Save As menu. Step 2: The file can be saved for the web with an .htm or .html file extension. Both extensions represent the html file that appears as a web page, but DOS does not recognize the four letter extension code. After selecting the option, type the file name in File name: bar as 'Asset.html' and click Save button as follows: Introduction to HTML NOTES

254 Material Introduction to HTML NOTES Self-Instructional Step 3: Once you save the file as 'Asset.html', you can run on the local host server. You can select the either option as running the .html file on the local host server or by selecting the file directly as follows: Step 4: After selecting the .html file you can view the web page as follows: Now, you can see the result on the screen that appears as a Web page according to the coding. >h1 align=center< A SIMPLE HYPERTEXT MARKUP LANGUAGE (HTML) DOCUMENT>/h1< >h2 align=center< INFORMATION TECHNOLOGY >/h2< Since, the first line is shown as header 1, therefore, A SIMPLE HYPERTEXT MARKUP LANGUAGE (HTML) DOCUMENT is tagged with >h1<...>/h1< tag. The text INFORMATION TECHNOLOGY is set with >h2<... >/h2< tag therefore, it appears as header 2. An HTML document contains two prime parts as follows: ? Head: This element contains meta data and title of a web browser. ? Body: This HTML element contains the text or information that will be displayed on the screen.

Material 255 Introduction to HTML NOTES Fig. 5.2 HTML Tags Table 5.1 Basic Elements Used in HTML Code Elements Code Function Document type >HTML<>/HTML< Beginning and ending of file. Title >TITLE<>/TITLE< Defines the header Header >HEAD<>/HEAD< Detailed information about information Body of the Text >BODY<>/BODY< Display the content of the page Division >DIV<>/DIV< Quote >Q<>/Q< For short quotations Emphasis >EM<>/EM< Large Font Size >BIG<>/BIG< Small Font Size >SMALL<>/SMALL< Bold >B<>/B< Make text as bold Italic >I<>/I< Make text as Italic Underline >U<>/U< Make text as underline Strikeout >STRIKE<>/STRIKE< Subscript >SUB<>/SUB< Text appeared as subscript Superscript >SUP<>/SUP< Text appeared as superscript Blinking >BLINK<>/BLINK< Specified text blinks Linking >A HREF= “URL”<>/A< Specified text is made as hyperlink entity to navigate the other Web page Action on Click >A HREF=“URL” ONCLICK= “***”<>/A< Used in JavaScript Mouseover Action >A HREF=“URL” ONMOUSEOVER= “***”<>/A< Used in JavaScript Link to email >A HREF=“mailto:@”<>/A< The basic structure or format of HTML code is taken as follows: >!DOCTYPE HTML PUBLIC “-//W3C//DTD HTML 3.2//EN”< >html< >head< >!— Header Information —< Self-Instructional >html< >html< tag indicates that this web page is written in HTML. >head< >title< Title of the web page >/titile< >/head< >title< tag contains the web page title. >head< tag contains information about the web. >body< Content of the page. >/body< >body< tag contains the content of the web page. >/html< >/html< marks the end of the web page.

256 Material Introduction to HTML NOTES >/head< >body< >!—Text Displaying on the Screen —< >/body< >/html< In the above HTML code, the first line is written as follows: >!DOCTYPE HTML PUBLIC “-//W3C//DTD HTML 3.2//EN”< But this line is generally not required. Some commercial organizations include the HTML code template to get the feedback from users or customers. 5.4 TAGS HTML uses tags that are used to mark-up HTML elements and are surrounded by the two characters > and < and are called angle brackets that indicate start and end of the tag. These tags are not case sensitive. Take an example: >html< >head< >title<Title of page>/title< >/head< >body< This is my homepage. >b<This text is bold>/b< >/body< >/html< Figure 5.3 shows a web page. Self-Instructional Fig. 5.3 A Web Page

Material 257 Let us take >title<Title of page>/title<. As it has been indicated earlier that the HTML element starts with a start tag: >title< and the content of the HTML element is: Title of Page. It ends with an end tag: >/title<. Tags can have attributes to provide additional information about the HTML elements on the Web page. Attributes always written as name/value pairs like this: name=”value”. They are always added to the start tag of an HTML element. For example: 1. Attribute tag defines the body element of an HTML page: >body<. Using bgcolor attribute, browser can be enabled to define the background color of Web page. For example if background color is blue, it should be like this: >body bgcolor=”blue”<. 2. Attribute also defines an HTML table: >table<. Using an added border attribute, the browser could be enabled to define the border. If the table has no border, it should like this: >table border=”0”< Other important tags in HTML are headings, paragraphs and line breaks. It also enables to define a lot of elements for formatting output, like bold or italic text. Text formatting tags Some

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text formatting tags are: >em< Renders as emphasized text >strong< Renders as strong emphasized text >dfn< Defines a definition term >code< Defines computer code text >samp< Defines sample computer code >kbd< Defines keyboard text >var< Defines a variable part of a text >cite< Defines a citation Try the following HTML in your browser: >html< >head< >title<Other Text formatting tags>/title< >/head< >body< >em<Emphasized text>/em<>/br< >strong<Strong text>/strong<>/br< >dfn<Definition term>/dfn<>/br< >code<Computer code text>/code<>/br< >samp<Sample computer code text>/samp<>/br< >kbd<Keyboard text>/kbd<>/br< >var<Variable>/var<>/br< >cite<Citation>/cite< >/body< >/html<

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text formatting tags are: >em< Renders as emphasized text >strong< Renders as strong emphasized text >dfn< Defines a definition term >code< Defines computer code text >samp< Defines sample computer code >kbd< Defines keyboard text >var< Defines a variable part of a text >cite< Defines a citation Try the following HTML in your browser: >html< >head< >title<Other Text formatting tags>/title< >/head< >body< >em<Emphasized text>/em<>/br< >strong<Strong text>/strong<>/br< >dfn<Definition term>/dfn<>/br< >code<Computer code text>/code<>/br< >samp<Sample computer code text>/samp<>/br< >kbd<Keyboard text>/kbd<>/br< >var<Variable>/var<>/br< >cite<Citation>/cite< >/body< >/html<

Introduction to HTML NOTES Self-Instructional
Self-Instructional Material 258 Introduction to HTML NOTES The output on the screen would be like:

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List formatting tags The list formatting tags used in HTML

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List formatting tags The list formatting tags used in HTML

are: >

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ul< Creates an Ordered List >ol< Creates an UnOrdered List >li< Defines a list item >menu< Defines a menu list >dir< Defines a directory list

88% MATCHING BLOCK 334/472 W

ul< Creates an Ordered List >ol< Creates an UnOrdered List >li< Defines a list item >menu< Defines a menu list >dir< Defines a directory list

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list Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title< >/head< >body< >h3<Ordered List>/h3< >ol< >li<Orange>/li< >li<Mango>/li< >li<Apple>/li< >/ol< >hr/< >h3<Unordered List>/h3< >ul< >li<Tea>/li< >li<Coffee>/li< >li<Milk>/li< >/ul< >hr/< >menu< >li<HTML>/li< >li<DHTML>/li<

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list Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title< >/head< >body< >h3<Ordered List>/h3< >ol< >li<Orange>/li< >li<Mango>/li< >li<Apple>/li< >/ol< >hr/< >h3<Unordered List>/h3< >ul< >li<Tea>/li< >li<Coffee>/li< >li<Milk>/li< >/ul< >hr/< >menu< >li<HTML>/li< >li<DHTML>/li<

Self-Instructional Material 259 >

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li<CSS>/li< >/menu< >hr/< >dir< >li<HTML>/li< >li<DHTML>/li< >li<CSS>/li< >/dir< >/body< >/html< The output on the screen would be

94% **MATCHING BLOCK 338/472** W

li<CSS>/li< >/menu< >hr/< >dir< >li<HTML>/li< >li<DHTML>/li< >li<CSS>/li< >/dir< >/body< >/html< The output on the screen would be

like: Table formatting tags The tags used to format a table are: >

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thead< The >thead< tag is used to group the header content in an HTML table. >tfoot< The >tbody< element is used to group the body content in an HTML table >tbody< The >tfoot< element is used to group the footer content in an HTML table.

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thead< The >thead< tag is used to group the header content in an HTML table. >tfoot< The >tbody< element is used to group the body content in an HTML table >tbody< The >tfoot< element is used to group the footer content in an HTML table.

100% **MATCHING BLOCK 341/472** W

Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title<

100% **MATCHING BLOCK 342/472** W

Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title<

Introduction to HTML NOTES
Self-Instructional Material 260 Introduction to HTML NOTES >style type=”text/css”< thead {color:green} tbody {color:blue;height:50px} tfoot {color:red} >/style< >/head< >body< >
table border=”1"< >thead< >
tr< >th<Month>/

34% **MATCHING BLOCK 343/472** W

th< >th<Savings>/th< >/tr< >/thead< >tfoot< >tr< >td<Total>/td< >td<$2000>/td< >/tr< >/tfoot< >tbody< >tr< >td<January>/td< >td<$700>/td< >/tr< >tr< >td<February>/td< >td<$800>/td< >/tr< >tr< >td<March>/td< >td<$500>/td< >/tr< >/tbody< >/table<>/body< >/html< The output on the screen would be

34% **MATCHING BLOCK 344/472** W

th< >th<Savings>/th< >/tr< >/thead< >tfoot< >tr< >td<Total>/td< >td<$2000>/td< >/tr< >/tfoot< >tbody< >tr< >td<January>/td< >td<$700>/td< >/tr< >tr< >td<February>/td< >td<$800>/td< >/tr< >tr< >td<March>/td< >td<$500>/td< >/tr< >/tbody< >/table<>/body< >/html< The output on the screen would be

like:
Self-Instructional Material 261 Note: Element >tfoot< must appear before element >tbody< within a table, so that a browser can render the table foot row before all the data rows. By default these elements will not affect the layout of the table. Well, you can use CSS to let these elements affect the table's layout.

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Font style tags The Font Style tags used in HTML

100% **MATCHING BLOCK 346/472** W

Font style tags The Font Style tags used in HTML

are: >i<

100% **MATCHING BLOCK 347/472** W

Renders as italic text >b< Renders as bold text >big< Renders as bigger text >small< Renders as smaller text >tt< Renders as Tele Type text

100% **MATCHING BLOCK 348/472** W

Renders as italic text >b< Renders as bold text >big< Renders as bigger text >small< Renders as smaller text >tt< Renders as Tele Type text

81% **MATCHING BLOCK 349/472** W

Try the following HTML in your browser: >html< >head< >title<Font Style Examples>/title< >/head< >body< >

81% **MATCHING BLOCK 350/472** W

Try the following HTML in your browser: >html< >head< >title<Font Style Examples>/title< >/head< >body< >

tt<Teletype text>/tt< >/br< >i<Italic text>/i< >/br< >b<Bold text>/b< >/br< >big<Big text>/big< >/br< >small<Small text>/small< >/br< >/body< >/html< The output on the screen would be like: Note: The elements are not deprecated, but it is possible to achieve much richer effect with CSS.

100% **MATCHING BLOCK 351/472** W

Text scripting tags Tags which are used to script text are:

100% MATCHING BLOCK 352/472 W

Text scripting tags Tags which are used to script text are:

Introduction to HTML NOTES
Self-Instructional Material 262 Introduction to HTML NOTES

78% MATCHING BLOCK 353/472 W

Try the following HTML in your browser: >html< >head< >title<Text Scripting Examples>/title< >/head< >body< >

78% MATCHING BLOCK 354/472 W

Try the following HTML in your browser: >html< >head< >title<Text Scripting Examples>/title< >/head< >body< >

p<This text contains >sub<subscript>/sub< text.>/p< >p<This text contains >sup<superscript>/sup< text.>/ p< >/body< >/html< The output on the screen would be

96% MATCHING BLOCK 355/472 W

like: Element grouping tags Tags which are used to group similar kinds of elements are: >fieldset< This tag is used to logically group elements together. It draws a box around the related elements. >legend< This tag provides a caption for fieldset elements.

96% MATCHING BLOCK 356/472 W

like: Element grouping tags Tags which are used to group similar kinds of elements are: >fieldset< This tag is used to logically group elements together. It draws a box around the related elements. >legend< This tag provides a caption for fieldset elements.

78% MATCHING BLOCK 357/472 W

Try the following HTML in your browser: >html< >head< >title<Text Scripting Examples>/title< >/head< >body< >

78% MATCHING BLOCK 358/472 W

Try the following HTML in your browser: >html< >head< >title<Text Scripting Examples>/title< >/head< >body< >

fieldset< >legend<Personal Information>/legend< First Name: >input type=”text” size=”30" /< >br/< >

100% MATCHING BLOCK 359/472 W

sub< The >sub< tag defines subscript text. Subscript text appears half a character below the baseline. Subscript text can be used for chemical formulas, like O 2 . >super< The >sup< tag defines superscript text. Superscript text appears half a character above the baseline. Superscript text can be used for footnotes, like WWW [1] .

100% MATCHING BLOCK 360/472 W

sub< The >sub< tag defines subscript text. Subscript text appears half a character below the baseline. Subscript text can be used for chemical formulas, like O 2 . >super< The >sup< tag defines superscript text. Superscript text appears half a character above the baseline. Superscript text can be used for footnotes, like WWW [1] .

Self-Instructional Material 263 Last Name: >input type="text" size="30" /< >br /< Age: >input type="text" size="30" /< >br /< Date of birth: >input type="text" size="10" /< >/fieldset< >fieldset< >legend<Contact Information>/legend< Address: >input type="text" size="30" /< >br /< Email: >input type="text" size="30" /< >br /< Phone Number : >i nput t ype=" t ext " si ze=" 10" / < >br / < Cel l Number : >i nput t ype=" t ext " si ze=" 10" / < >/ f i el dset < >/ body< >/ ht ml < The output on the screen would be like: Preformatted text Tag >pre< is used to pre-format the text. The text will be displayed in fixed width font. The text entered in this will maintain all white spaces and new line breaks.

100% MATCHING BLOCK 361/472 W

Try the following HTML in your browser: >html< >head< >title<Pre formatted text Example>/title< >/head< >body< >

100% MATCHING BLOCK 362/472 W

Try the following HTML in your browser: >html< >head< >title<Pre formatted text Example>/title< >/head< >body< >

pre< Text in a pre element is displayed in a fixed-width font, and it preserves both spaces and Introduction to HTML NOTES
264 Material Introduction to HTML NOTES Self-Instructional line breaks >/pre< >p<The pre element is often used to display computer code:>/p< >pre< for i = 1 to 10 print i next i >/pre< >/

75% MATCHING BLOCK 363/472 W

body< >/html< The output on the screen would be like: As you can see

75% MATCHING BLOCK 364/472 W

body< >/html< The output on the screen would be like: As you can see

in the example above, all new line breaks and white spaces are preserved. Therefore it is called pre-formatted text.

87% MATCHING BLOCK 365/472 W

Striking text The tag >s< and >strike< are used to strike through the text. Try the following HTML in your browser: >html< >head< >title<Pre formatted text Example>/title< >/head< >body< This is an example of >s<stike through text>/s< using element s. >br/< This is an example of >strike<stike through text>/ strike< using element strike. >br/< >/body< >/html< Material 265 The output on the screen would be like: Text editing tags Tags which are used to format the edited text in the HTML document are: >del< Defines text that has been deleted from a document. >ins< Defines text that has been inserted into a document. Try the following HTML in your browser. >html< >head< >title<List Formatting Examples>/title< >/head< >body< >p< Hi All this is a HTML document. >del<This line has been deleted from this document>/del<. >ins<This is a new line which has been inserted into this document in place of the deleted line>/del<. >/p< >/body< >/html< The output on the screen would be

87% MATCHING BLOCK 366/472 W

Striking text The tag >s< and >strike< are used to strike through the text. Try the following HTML in your browser: >html< >head< >title<Pre formatted text Example>/title< >/head< >body< This is an example of >s<stike through text>/s< using element s. >br/< This is an example of >strike<stike through text>/ strike< using element strike. >br/< >/body< >/html< Material 265 The output on the screen would be like: Text editing tags Tags which are used to format the edited text in the HTML document are: >del< Defines text that has been deleted from a document. >ins< Defines text that has been inserted into a document. Try the following HTML in your browser. >html< >head< >title<List Formatting Examples>/title< >/head< >body< >p< Hi All this is a HTML document. >del<This line has been deleted from this document>/del<. >ins<This is a new line which has been inserted into this document in place of the deleted line>/del<. >/p< >/body< >/html< The output on the screen would be

like: Definition

91% MATCHING BLOCK 367/472 W

list In HTML you can define a definition list. Definition list is a list of elements with their definition. Tags which are used for defining a definition list are: >dl< Defines a definition list >dt< Defines an item in definition list >dd< Describes the item in the list Try the following HTML in your browser: >html< >head<

91% MATCHING BLOCK 368/472 W

list In HTML you can define a definition list. Definition list is a list of elements with their definition. Tags which are used for defining a definition list are: >dl< Defines a definition list >dt< Defines an item in definition list >dd< Describes the item in the list Try the following HTML in your browser: >html< >head<

Introduction to HTML NOTES Self-Instructional
Self-Instructional Material 266 Introduction to HTML NOTES >title<List Formatting Examples>/title< >/head< >body< >dl< >dt<Mango>/dt< >dd<- Yellow coloured fruit, comes in Summer>/dd< >dt<Apple>/dt< >dd<- Red coloured Fruit, available all the year>/ dd< >dt<Orange>/dt< >dd<- Orange coloured Fruit, available in Spring>/ dd< >/dl< >/body< >/html< The output on the screen would be like: In line frame Tag >iframe< is used to define an in line frame in HTML document. An in line frame is a frame which opens a different document, but it comes inside >body< tag.

75% MATCHING BLOCK 369/472 W

Try the following HTML in your browser: >html< >head< >title<In Line Frame Example>/title< >/head< >body< >h3<

75% MATCHING BLOCK 370/472 W

Try the following HTML in your browser: >html< >head< >title<In Line Frame Example>/title< >/head< >body< >h3<

Here comes an inline frame>/h3< >iframe src="http://www.google.com" width="300" height="150" /< >/body< >/html<
Material 267 The output on the screen would be like: If you set the scrolling attribute to no then the scroll bars will not appear. Attributes associated with >iframe< tag are: align left right top middle bottom Specifies the alignment of an iframe according to surrounding elements

100% **MATCHING BLOCK 371/472** W

frameborder 1 0 Specifies whether or not to display a border around

100% **MATCHING BLOCK 372/472** W

frameborder 1 0 Specifies whether or not to display a border around

an iframe height pixels % Specifies the height of an iframe

79% **MATCHING BLOCK 373/472** W

longdesc URL Specifies a page that contains a long description of the content of an iframe marginheight pixels Specifies the top and bottom margins of an iframe marginwidth pixels Specifies the left and right margins of an iframe name name Specifies the name of

79% **MATCHING BLOCK 374/472** W

longdesc URL Specifies a page that contains a long description of the content of an iframe marginheight pixels Specifies the top and bottom margins of an iframe marginwidth pixels Specifies the left and right margins of an iframe name name Specifies the name of

an iframe

100% **MATCHING BLOCK 375/472** W

scrolling yes no auto Specifies whether or not to display scrollbars in

100% **MATCHING BLOCK 376/472** W

scrolling yes no auto Specifies whether or not to display scrollbars in

an iframe

100% **MATCHING BLOCK 377/472** W

src URL Specifies the URL of the document to show in

100% **MATCHING BLOCK 378/472** W

src URL Specifies the URL of the document to show in

an iframe width

84% **MATCHING BLOCK 379/472** W

pixels % Specifies the width of an iframe class classname Specifies a classname for an element id id Specifies a unique id for an element style style_definition Specifies an inline style for an element title text Specifies extra information about an element

84% MATCHING BLOCK 380/472 W

pixels % Specifies the width of an iframe class classname Specifies a classname for an element id id Specifies a unique id for an element style style_definition Specifies an inline style for an element title text Specifies extra information about an element

Acronyms and abbrevations In HTML you can define acronym and abbreviations in your HTML content. Tags used to define them are: >abbr< Describes an abbreviated phrase. >acronym< Defines an acronym. An acronym can be spoken as if it were a word like USA , UK, NATO, etc.

90% MATCHING BLOCK 381/472 W

Try the following HTML in your browser: >html< >head< >title<Acronym Example>/title< >/head< >body<

90% MATCHING BLOCK 382/472 W

Try the following HTML in your browser: >html< >head< >title<Acronym Example>/title< >/head< >body<

Introduction to HTML NOTES Self-Instructional
Self-Instructional Material 268 Introduction to HTML NOTES C a n I g et t h i s > a c r o n y m t i t le = " a s s o o n a s possible"<ASAP>/acronym<?>br/< The >abbr title="World Health Organization"<WHO>/abbr< was founded in 1948. >/body< >/html< The output on the screen would be like: When you bring mouse cursor over the acronym and abbreviation they will display their title. Note: Marking up abbreviations can provide useful information to search engines, browsers, spellcheckers, screen readers, translation systems, etc. Label element Tag >label< defines a label for an input element. It does nothing, as of any special rendering on screen. However, if you are a mouse user and you click the label text, then it toggles
the control.

90% MATCHING BLOCK 383/472 W

Try the following HTML in your browser: >html< >head< >title<Label Example>/title< >/head< >body<

90% MATCHING BLOCK 384/472 W

Try the following HTML in your browser: >html< >head< >title<Label Example>/title< >/head< >body<

Click on text, it will toggle input control >br/< >label for="male"<Male>/label< >input type="radio" name="sex" id="male" /< >br /< >label for="female"<Female>/label< >input type="radio" name="sex" id="female" /< >hr/< Click on text, it will not toggle input control >br/< Male >
input type="radio" name="sex" id="male1" /< >br /< Female >input type="radio" name="sex" id="female1" /< >/
body< >/html<
Material 269 The output would be like this: When you click on text on above radio buttons the controls will be toggled, but if you click on the text below there will be no toggling. The following are the Attributes associated with Label Element: for element_id Specifies which form element a label is bound to
Access key character Specifies a keyboard shortcut to access an element

95% MATCHING BLOCK 385/472 W

class classname Specifies a classname for an element dir rtl ltr Specifies the text direction for the content in an element id id Specifies a unique id for an element lang language_code Specifies a language code for the content in an element style style_definition Specifies an inline style for an element title text Specifies extra information about an element xml:lang language_code Specifies a language code for the content in an element, in XHTML documents Note: The for attribute

95% MATCHING BLOCK 386/472 W

class classname Specifies a classname for an element dir rtl ltr Specifies the text direction for the content in an element id id Specifies a unique id for an element lang language_code Specifies a language code for the content in an element style style_definition Specifies an inline style for an element title text Specifies extra information about an element xml:lang language_code Specifies a language code for the content in an element, in XHTML documents Note: The for attribute

of the >label< tag should be equal to the id attribute of the related element to bind them together. Span element Span is very similar to the element >p<. Text in span element can be styled with CSS. It does not provide any visual change by itself. The >span< tag provides a hook to a part of text in a HTML document. When the text is hooked in span element, styles can be added to it or even you can manipulate the text using

90% MATCHING BLOCK 387/472 W

the JavaScript. Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title< >

90% MATCHING BLOCK 388/472 W

the JavaScript. Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title< >

script language="JavaScript"< function changeName(){ if(document.getElementById("inputtext").value=='') return; Introduction to HTML NOTES Self-Instructional
270 Material Introduction to HTML NOTES d o c u m e n t . g e t E l e m e n t B y I d (" n a m e ") . i n n e r H T M L = document.getElementById("inputtext").value; } >/script< >/head< >body< >input type="text" id="inputtext" width="50"/< >br/ < >input type="button" onclick="changeName();" value="Change" /< >hr/< >p< Hi everybody, My name is >span id="name"<Albert Einstien>/span<. This ia an example of HTML span tag. >/p< >/body< >/html< The output on the screen would be like: Whatever text 'you type in the text' box and click on change button, that text will replace the name "Albert Einstien". In the above example on button click event using Dynamic HTML the HTML of the span was changed dynamically. Attributes associated with >span< tag:

100% MATCHING BLOCK 389/472 W

class classname Specifies a classname for an element dir rtl ltr Specifies the text direction for the content in an element id Id Specifies a unique id for an element lang language_code Specifies a language code for the content in an element style style_definition Specifies an inline style for an element title Text Specifies extra information about an element xml:lang language_code Specifies a language code for the content in an element, in XHTML documents

100% MATCHING BLOCK 390/472 W

class classname Specifies a classname for an element dir rtl ltr Specifies the text direction for the content in an element id Id Specifies a unique id for an element lang language_code Specifies a language code for the content in an element style style_definition Specifies an inline style for an element title Text Specifies extra information about an element xml:lang language_code Specifies a language code for the content in an element, in XHTML documents

Self-Instructional Changing text direction Tag >bdo< is used to change the text direction on the screen. BDO stands for Bi- Directional Override. Tag >bdo< allows you to specify the direction of text and override the bi-directional algorithm.

51% MATCHING BLOCK 391/472 W

Try the following HTML in your browser: >html< >head< Material 271 >title<Span Examples>/title< >/head< >body< >bdo dir="rtl"<Hi everybody, my name is Albert Einstien>/

51% MATCHING BLOCK 392/472 W

Try the following HTML in your browser: >html< >head< Material 271 >title<Span Examples>/title< >/head< >body< >bdo dir="rtl"<Hi everybody, my name is Albert Einstien>/

bdo< >/body< >/html< The output on the screen would be like: You can see that the display of the text has been reversed. Try the steps mentioned above by changing the value of dir attribute to ltr. Here we had changed the display direction from left to right to right to left. Introduction to HTML NOTES 5.5 HYPERLINKS Hyperlinks are links that appear on the Web page which help in navigating to the corresponding Web pages for a reference. If the

77% MATCHING BLOCK 393/472 W

user navigates the pages to search to get the information through links this is also called hyperlink in Web technology

77% MATCHING BLOCK 394/472 W

user navigates the pages to search to get the information through links this is also called hyperlink in Web technology

and it facilitates a look at the Web pages. A link is the same thing

100% MATCHING BLOCK 395/472 W

as citation in literature. It is combined with suitable access protocol and data networking. The syntax of creating link is as follows: >a href="url"<Link text>/a< The start tag contains the attributes of specified link, whereas 'Link text' is declared as the highlighted text that is

100% MATCHING BLOCK 396/472 W

as citation in literature. It is combined with suitable access protocol and data networking. The syntax of creating link is as follows: >a href="url"<Link text>/a< The start tag contains the attributes of specified link, whereas 'Link text' is declared as the highlighted text that is

to be displayed on a Web page as a

100% MATCHING BLOCK 397/472 W

link. The element content could be text or graphics, for example buttons etc. You would be able to link from an image or other HTML element. Creating

100% MATCHING BLOCK 398/472 W

link. The element content could be text or graphics, for example buttons etc. You would be able to link from an image or other HTML element. Creating

a

100% MATCHING BLOCK 399/472 W

link is possible by writing the HTML code as follows: >html< >body< >p< >a href="feedback.htm"<Feedback>/a< >/p< >p< >a href="http://www.abc.com/"<Link to World Wide Web>/ a< >/p< >/body< >/html<

100% MATCHING BLOCK 400/472 W

link is possible by writing the HTML code as follows: >html< >body< >p< >a href="feedback.htm"<Feedback>/a< >/p< >p< >a href="http://www.abc.com/"<Link to World Wide Web>/ a< >/p< >/body< >/html<

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81% MATCHING BLOCK 401/472 W

HTML Result of the above web code is as follows that provides the following link: NOTES Self-Instructional After clicking on Feedback link and Link to World Wide Web you can navigate on

81% MATCHING BLOCK 402/472 W

HTML Result of the above web code is as follows that provides the following link: NOTES Self-Instructional After clicking on Feedback link and Link to World Wide Web you can navigate on

the Feedback page and the

100% MATCHING BLOCK 403/472 W

referenced Web site. If you set target="_blank" on the coding, the link will open a new window where

100% MATCHING BLOCK 404/472 W

referenced Web site. If you set target="_blank" on the coding, the link will open a new window where

the referenced information can be found.

100% MATCHING BLOCK 405/472 W

So, the proper coding is written as follows: >a href=”feedback.htm” target=”_blank” <Feedback>/a< The HTML anchor is defined by >a<, which is used to define both anchors and hyperlinks. The href attribute is set with >a< element that defines the link as marked with underline and generally highlighted with blue

100% MATCHING BLOCK 406/472 W

So, the proper coding is written as follows: >a href=”feedback.htm” target=”_blank” <Feedback>/a< The HTML anchor is defined by >a<, which is used to define both anchors and hyperlinks. The href attribute is set with >a< element that defines the link as marked with underline and generally highlighted with blue

colour. The following code is appeared in a browser as follows:

100% MATCHING BLOCK 407/472 W

Feedback Hyperlinks point to resources that appear on the web page. These resources can be an HTML document, an image, a movie or a sound file, etc. The following HTML code shows how an image is connected with link: >html< >body< >p< > a

100% MATCHING BLOCK 408/472 W

Feedback Hyperlinks point to resources that appear on the web page. These resources can be an HTML document, an image, a movie or a sound file, etc. The following HTML code shows how an image is connected with link: >html< >body< >p< > a

h r e f = ” f e e d b a c k . h t m ” < > i m g b o r d e r = ” 0 "

100% MATCHING BLOCK 409/472 W

src=”button_def.gif” width =”65" height=”38"< >/a< >/p< >/body< >/html<

100% MATCHING BLOCK 410/472 W

src=”button_def.gif” width =”65" height=”38"< >/a< >/p< >/body< >/html<

The following image appears as a link: The mail link can also be created by issuing the following HTML code: >html< >body< >p< > a href=”mailto:someone@abc.com?subject=Hello%20again”<Mail has been sent>/a< >/p< >p< >b<>Note:>/b<Spaces between words are replaced by %20 to >b<ensure>/b<that browser would display the text properly. >/p< >/body< >/html< Feedback Link to World Wide Web
Material 273 The above HTML code appears on the screen as follows: Introduction to HTML Note: Spaces between words are reduced by 20 per cent to ensure that browser would display the text properly. 5.5.1
Link on the

91% MATCHING BLOCK 411/472 W

Same Page Linking on same page is basically created when the Web document is too long and

91% MATCHING BLOCK 412/472 W

Same Page Linking on same page is basically created when the Web document is too long and

the

96% **MATCHING BLOCK 413/472** W

user navigates the pages quickly, for example chapter wise navigation on the page or in an e-book. Linking on same Web page is written as follows: >html< >body< >p< >a href="C4"<You can navigate on Chapter 4 from here.<>/ a< >/p< >h2<Chapter 1>/h2< >p<This chapter explains MS Word.>/p< >h2<Chapter 2>/h2< >p<This chapter explains MS Excel.>/p< >h2<Chapter 3>/h2< >p<This chapter explains MS PowerPoint.>/p< >h2<>a name="C4"<Chapter 4>/a<>/h2< >p<This chapter explains a detailed description about MS Access. >/p< >/body< >/html< The

96% **MATCHING BLOCK 414/472** W

user navigates the pages quickly, for example chapter wise navigation on the page or in an e-book. Linking on same Web page is written as follows: >html< >body< >p< >a href="C4"<You can navigate on Chapter 4 from here.<>/ a< >/p< >h2<Chapter 1>/h2< >p<This chapter explains MS Word.>/p< >h2<Chapter 2>/h2< >p<This chapter explains MS Excel.>/p< >h2<Chapter 3>/h2< >p<This chapter explains MS PowerPoint.>/p< >h2<>a name="C4"<Chapter 4>/a<>/h2< >p<This chapter explains a detailed description about MS Access. >/p< >/body< >/html< The

above coding displays the result on the web page as follows: NOTES In this

100% **MATCHING BLOCK 415/472** W

result, if you click on 'You can navigate on Chapter 4 from here.' marked hyperlink, you will get the Chapter 4 page quickly and directly.

100% **MATCHING BLOCK 416/472** W

result, if you click on 'You can navigate on Chapter 4 from here.' marked hyperlink, you will get the Chapter 4 page quickly and directly.

The Chapter numbers, such as Chapter 1, Chapter 2, Chapter 3 and Chapter 4 are appeared as header in bold and italics. These days, links are useful for search engine optimization. The following figure

98% **MATCHING BLOCK 417/472** W

shows how links are useful for major Pay Per Click (PPC) search engines. These search engines provide various links that make Web page more powerful.

98% **MATCHING BLOCK 418/472** W

shows how links are useful for major Pay Per Click (PPC) search engines. These search engines provide various links that make Web page more powerful.

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90% **MATCHING BLOCK 419/472** W

You can navigate on Chapter 4 from here. Chapter 1 This chapter explains MS Word. Chapter 2 This chapter explains MS Excel. Chapter 3 This chapter explains MS PowerPoint. Chapter 4 This chapter explains a detailed description about MS Access.

90% MATCHING BLOCK 420/472 W

You can navigate on Chapter 4 from here. Chapter 1 This chapter explains MS Word. Chapter 2 This chapter explains MS Excel. Chapter 3 This chapter explains MS PowerPoint. Chapter 4 This chapter explains a detailed description about MS Access.

Mail has been sent
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95% MATCHING BLOCK 421/472 W

In each search engine index, titled links create the popularity of your Website by PPC or CPC mechanisms. Users browse the sites that give the quality and volume of the pages. You can view the referring traffic of the Web pages. Commercial organizations make powerful linking and

95% MATCHING BLOCK 422/472 W

In each search engine index, titled links create the popularity of your Website by PPC or CPC mechanisms. Users browse the sites that give the quality and volume of the pages. You can view the referring traffic of the Web pages. Commercial organizations make powerful linking and

the Web pages are tagged with search engine optimization for the maximum growth of

87% MATCHING BLOCK 423/472 W

their business. Note: The broken link also known as dangling link or dead link takes place

87% MATCHING BLOCK 424/472 W

their business. Note: The broken link also known as dangling link or dead link takes place

if

73% MATCHING BLOCK 425/472 W

the Web server responded but the specific page is not found. The frequently link is known as 404 error representing broken link.

73% MATCHING BLOCK 426/472 W

the Web server responded but the specific page is not found. The frequently link is known as 404 error representing broken link.

The broken link appears as follows in the website.

Self-Instructional Material 275 Links that are the most fundamental part of the World Wide Web provides the facility to navigate from one web page to another web page. Links can be classified in three categories. These are links to anchors on the current page, links to other pages within the current site and links to pages outside the current site. Links could be provided for both texts and images. Defining colours for the HTML links: With the use of a few settings, colors for all links could be defined on the Web pages. The general color of text links which is blue before the click is given in the >body< tag as: >body link="#C0C0C0" vlink="#800080" alink="#FF0000"<. vlink, indicates that the link has been visited by the user and standard color is purple. A link specifies active link which means the color of the link when the mouse is on it. Its standard colour is red. In order to define more links to have different colors than the rest of the page, we can either place the font tags between the >a href< and the >/a<tag:>a href="http://www.hotmail.com"<>font color="FF00CC"<here >/font<>/a< or using a style setting in the >a<tag:>ahref="http:// www.hotmail.com" style="color: rgb(0,255,0)"<here>/a<. Defining link targets: It is evident that a link is usually open in the current window or frame by default. However, in some cases it is required to be opened in another window or frame. It is accomplished by adding a target="" to the >a href<. For example: >a href="http://www.hotmail.com" target="_blank"<. The _blank loads the page into a new browser window. Other targets are _self; _parent; and _top that load the Web page into the current window, the frame that is superior to the frame the hyperlink is in and cancels all frames, and loads in full browser window respectively. Defining link within a page: It is required to create a link pointing to the anchor, as it has already been mentioned that an anchor is created using the >a< tag. For example, if an anchor is created for TOYS in an online shopping mall, this word Toys is simply added where it is anchored. The HTML cod is: >a name="TOYS"<>/a< and then
a link pointing to the anchor using the normal >a href< tag, like this: >a href="#
TOYS"<here>/a<. When it is required to create a link to anchors on external web pages, the syntax is: >a href="http://www.hotmail.com#HotmailAnchor"< blabla>/a< Defining links for a frameset: A link in a frameset may provide link to a Web page that is loaded in the other frame window. Take an example Website having tutorials in a frameset called Contents where different links such as Lesson 1, Lesson 2, Lesson 3 etc are created. The HTML code to go at Lesson 3 will be like: >a href="Lesson 2.htm" target="Lesson 2"<Lesson 2>/a< of the tutorial. Defining image link: A technique called image mapping is used to link one image to several pages by simply specifying which of the areas of the image should link to where. In other words it explains that a user can go to different websites by simply clicking at different portions of an image. For example: >img src="rainbow.gif" usemap = #example border=0< >map name=example< >area shape=circle coords=0,0,29,29 Href="http:// www.hotmail.com"< Introduction to HTML NOTES
276 Material Introduction to HTML NOTES >area shape=circle coords=30,30,59,59 Href="http:// www.google.co.in"< >/map< In the example above, if mouse is clicked at the upper left corner it links to the Hotmail Website and if it is clicked at the lower right corner, it links to Google Website. For other shapes we can use: 1. >area shape=rect coords= x1,y1,x2,y2 Href="http:// www.domain.com"< for Rectangles 2. >area shape=circle coords= x1,y1,x2,y2 Href="http:/ /www.domain.com"< for Circles 3. >area shape=polygon coords= x1,y1,x2,y2,..,xn,yn Href="http://www.domain.com"< for Polygons Defining link to the new window: In order to open a page in a new window use the target="_blank" in the >a href< tag. It simply opens a new browser window that will load the linked page. For example linking to the hotmail, the link will be like this: >a href="http://www.hotmail.com"<Go to Hotmail>/ a<. Defining links to send an email: In order to send email, links are created almost in a similar manner as it is done to link other pages: >a href< tag. The HTML code for the email link is: >a href="mailto:emailaddress"<Email Me>/a<. If a special subject is needed to be added in the email, it can be done using subject= setting: >a href="mailto: email@lessonnnn.org? subject=HTML Tags"<Send Email>/a<. An email link for specific text in the body of the message can be accomplished by simply adding &body=: >a href="mailto:email@lessonnnn.org? body=Please send me a list of HTML Text Tags!"<Send Email>/ a<. All the above options can be combined in a single email. It will look like: >a h r e f = " m a i l t o : e m a i l @ l e s s o n n n n . o r g ? s u b j e c t = H T M L Tags&body=Please send me a list of HTML Text Tags!"<Email Me>/a<. 5.6 URLS Self-Instructional Links available with HTML are hyperlinks that enable users to link to another document on the Web. To facilitate hyperlinks there are the anchor tag >a< and >/ a< and the href attribute, which are used by HTML. An anchor can be used to point to any resource on the Web such as an HTML page, an image, a sound file, a movie, etc. The syntax for creating an anchor is: >a href="url"<Text to be displayed>/a<. The following is an example of an another - >a href="http:// www.hotmail.com"<>/a<. The href attribute is used to address the document to link to and the words between the open and close of the anchor tag will be displayed as a hyperlink.

Self-Instructional Material 277 Target attribute is used to define where the linked document will be opened. The name attribute is used to create a named anchor. When using named anchors, links can be created that can jump directly into a specific section on a page, instead of letting the user scroll around to find the needed document. Below is the syntax of a named anchor: >a name="label"<Text to be displayed>/a<. 5.7 TABLES Tables are powerful tools that present tabular data for laying out text and graphics on an HTML page. It consists of one or more rows and each row consists of one or more cells. The table width and column for each table is displayed when the table is selected. The table header menu and column header menu are accessed quickly by using table-related commands. In tables with percentage-based widths, pixels are not used here, if you drag the right border of the rightmost columns, the whole table's width changes and all the columns grow wider or narrow proportionately. The table tags are defined in the >table< tag. The syntax of table tag is written as >table<...>/table<. The >table< is started with tag, '...' represents the body of the tag and >/table< is ended with the table. Table 5.2 shows the various table tags used in Java coding: Introduction to HTML NOTES Table 5.2 Table Tags Tag Function >table< This tag defines a table. >th< This tag defines a table header. >tr< This tag defines a table row. >td< This tag defines a table cell. >caption< This tag defines a table caption. >colgroup< This tag defines a group of table columns. >col< This tag defines the attribute values for one or more columns in a table. >thead< This tag defines a table head. >tbody< This tag defines a table body. >tfoot< This tag defines a table footer. The following code results a table that have two rows and two columns: >
table border= "1"< >tr< >th<Name>/th< >th<Course>/th< >/tr< >tr<
>td<Richa>/td< >td<BCA>/td< >/tr< >/
table<
Self-Instructional Material 278 Introduction to HTML NOTES The result is as follows: Name Course Richa BCA The >tr<...>/tr< element defines a table row and contains one or more than one >th< and >td< elements. The >th<...>/th< defines the table header cell in the table. The two kinds of cells are header cells and standard cells. The header cells keep the header information and standard cells keep the relevant data. The header cells are created with >th< element and the standard cells are created with the >td< element. The text defined in a >th< element is appeared on the screen as bold and centered, whereas text defined in >td< element is regular and left-aligned. The >td<...>/td< tag provides a standard cell in the table.

83% **MATCHING BLOCK 427/472** W

The >caption< tag is used to add a caption of the table.

83% **MATCHING BLOCK 428/472** W

The >caption< tag is used to add a caption of the table.

For this the coding is written in the following way: >table border= "1"< >caption<Student's Record>/caption< ... >/table< The caption tag is inserted very next after the >table< tag. The caption is specified only once in the table and after running the code, it is placed in the centered above the table. By default, all the defined tags of table do not affect the layout of the table. The cascading style sheet is used to let the affect on the table's layout. The result of the >caption< element coding is as follows: Student's Record Name Course Richa BCA HTML tag with resource link with specified text. 5.7.1 Building a Simple HTML Document Table Tables on Websites intend to provide arranged information and create a Web page layout with the use of hidden tables. The tables are used to divide the Web page into different sections. HTML enables us to create tables. They are defined with the >table< attribute tag. A table has rows (with the >tr< attribute tag, where tr stands for table row).
Each row has data cells (with the >td< attribute tag where td stands for table data). A data cell includes text, images, lists, paragraphs, forms, horizontal rules, tables, etc.,
as data. Briefly, each table starts with a table tag and each table row starts with a tr tag. Each table data in a row starts with a td tag. The following example explains this well: R1, C1 R1, C2 R2, C1 R2, C2

Self-Instructional Material 279 >table border=”1"< >tr< >td<R1, C1>/td< >td<R1, C2>/td< >/tr< >tr< >td<R2, C1>/td< >td<R2, C2>/td< >/tr< >/table< Tables and border attribute: Without border attribute the table will be displayed without any borders. In order to display a table with borders, it is required to use the border attribute: >table border=”1"< >tr< >td<R1, C1>/td< >td<R1, C2>/td< >/tr< >/table< The screenshot demonstrates this. Headings in a table: Headings in a table are defined with the >th< attribute tag. Heading1 Heading2 R1, C1 R1, C2 R2, C1 R2, C2 >table border=”1"< >tr< Introduction to HTML NOTES

Self-Instructional Material 280 Introduction to HTML NOTES >

th<Heading1>/

th< >th<Heading2>/th< >/tr< >tr< >td<R1, C1>/td< >td<R1, C2>/td< >/tr< >tr< >td<R2, C1>/td< >td<R2, C2>/td< >/tr< >/table<

Empty cells in a table: Table cells without content are not displayed very well in most browsers.

It looks like this: R1, C1 R1, C2 R2, C1 >table border=”1"< >

tr< >td<R1, C1>/td< >td<R1, C2>/td< >/tr< >tr< >td<R2, C1>/td< >td<>/td< >/tr< >/table<

It should be noticed that the border around the empty cell is missing. However, some browsers also support the feature that in this particular case the border around empty cell should not be missing. This can be avoided by adding a non-breaking space ( ) to empty data cells. It looks like this: R1, C1 R1, C2 R2, C1 >table border=”1"< >tr< >td<R1, C1>/td< >td<R1, C2>/td< >/tr<

Self-Instructional Material 281 >tr< >td<R2, C1>/td< >td< >/td< >/tr< >/table< 5.8 TEXT FORMATTING IN WEB PAGES HTML Text HTML text is entered in the same manner as any text is entered. It requires attributes to be defined for indicating size, font, etc. The Web browsers show the fonts available on the user’s system. In order to specify the overall font for the Web page, use the >basefont< tag at the beginning of the >body< section. It can be understood better with the following example: Learn to use Font in Web pages. Make entire text looks the same. It is possible with the help of basefont. In order to display the above text uniformly, write the following HTML code using >basefont< tag: >html< >head< >title<Lesson 1>/title< >/head< >body< >basefont face=”arial, verdana, courier” size=”4" color=”green”< Learn to use font in web pages.>br< Make entire text looks the same.>br< It is possible with the help of basefont.>br< >/body< >/html< The screenshot that follows shows how text should be inserted in a Web page. Introduction to HTML NOTES

Self-Instructional Material 282 Introduction to HTML NOTES You will notice the use of colour attribute in the above HTML code, which selects the desired colour for the text. Similarly, the face attribute specifies the desired font. You may now notice that the >font< tag is used to change the font. Following tables shows the tags for text formats: >b<text>/b< Text as bold >i<text>/i< Text in italics >u<text>/u< Text as underline >sub<text>/sub< Lowers text and makes it smaller >sup<text>/sup< Supcripts text and makes it smaller >strike<text>/strike< Strikes a line through the text >big<text>/big< Increases text size by one >small<text>/small< Decreases the text size by one >h1<text>/h1< Text in biggest heading >h6<text>/h6< Text in smallest heading >font size="1"<text>/font< Text in smallest font size (8 pt) >font size="7"<text>/font< Text in biggest font size (36 pt) >p<text>/p< Adds a paragraph break after the text (2 line breaks) >p align="left"<text>/p< Left justify text >p align="center"<text>/p< Center text >p align="right"<text>/p< Right justify text text>br< Adds a single line break

Material 283 5.9 USING GRAPHICS AND MULTIMEDIA IN WEB PAGES 5.9.1 Internet Audio/Video Figure 5.4 provides the various Internet audio/video types. Fig. 5.4 Types of Services ? Streaming stored audio/video refers to on-demand requests for compressed audio/video files. ? Streaming live audio/video refers to the broadcasting of radio and TV programs through the Internet. ? Interactive audio/video refers to the use of the Internet for interactive audio/ video applications. 5.9.2 Digitizing Audio and Video Before audio or video signals can be sent on the Internet, they need to be digitized. 1. Digitizing audio As we feed sound into a microphone, an electronic analog signal is generated which represents the sound amplitude as a function of time. This signal is an analog audio signal. An analog signal can be digitized to produce a digital signal. According to the Nyquist theorem, if the highest frequency of the signal is f, we need to sample the signal 2f times per second. Voice is sampled at 8000 samples per second with 8 bits per sample. This results in a digital signal of 64 kbps. Music is sampled at 44,100 samples per second with 16 bits per sample. This results in a digital signal of 705.6 kbps for monaural and 1.41 Mbps for stereo. 2. Digitizing video A video consists of a sequence of frames. If the frames displayed on the screen are fast enough, there is an impression of motion. There is no standard number of frames per second. The frames need to be continuously refreshed. Each frame is divided into small grids, called picture elements or pixels. Compression is needed to send video over the Internet. 5.9.3 Audio and Video Compressions 1. Audio compression Audio compression can be used for speech or music. For speech, a 64 kHz signal needs to be compressed and for music 1.41 kHz signal. Two categories of techniques are used for audio compression: predictive encoding and perceptual encoding. Introduction to HTML NOTES Self-Instructional
Self-Instructional Material 284 Introduction to HTML NOTES ? Predictive encoding: In predictive encoding, the differences between samples are encoded instead of encoding all samples. This is normally used for speech. Several standards have been defined such as GSM (13 kbps), G.729 (8 kbps) and G.723.3 (6.4 or 5.3 kbps). ? Perceptual encoding: This is the most commonly used technique for creating CD quality audio. Perceptual coding is based on psychoacoustics, which is the study of how people perceive sound. There are some sounds which can mask other sounds. This masking can happen in frequency and time. In frequency mapping, a loud sound in a frequency range can partially or totally mask a softer sound in another frequency range. In temporal masking, a loud sound can numb our ears for a short time even after it has stopped. MP3, a part of MPEG standard uses this technique. It uses the above two phenomena to compress audio signals. This technique analyses and divides the spectrum into several groups. Zero bits are allocated to the frequency ranges that are totally masked. A small number of bits are allocated to frequency ranges that are partially masked. A larger number of bits are allocated to frequency ranges that are not masked. 2. Video compression Video is composed of multiple frames where each frame is one image. For video compression, we have to first compress the images. There are two standards followed for compression: Joint Photographic Experts Group (JPEG) and Moving Picture Experts Group (MPEG). (a) Image compression: JPEG In JPEG, a grey scale picture is divided into blocks of 8 × 8 pixels (Figure 5.5). Fig. 5.5 Grey Scale Image The idea behind JPEG is to change the picture into a linear set of numbers that reveal redundancies. The redundancies can then be removed by using one of the text compression methods (Figure 5.6). Fig. 5.6 JPEG Compression ? Discrete cosine transform: In this step, each block of 64 pixels goes through a transformation called the Discrete Cosine Transform (DCT). This transformation changes the 64 values so that only the redundancies are revealed and relative relationships between pixels are kept hidden.
Self-Instructional Material 285 Case 1: Block of uniform grey and value of each pixel is 20 (Figure 5.7). Fig. 5.7 Uniform Grey Scale Case 2: Block with two different uniform grey scales. There is a sharp change in value of pixels from 20 to 50 (Figure 5.8). Fig. 5.8 Two Different Uniform Grey Scales Case 3: Block that changes gradually (Figure 5.9). Fig. 5.9 Gradient Grey Scale ? Quantization: Once Table T is created, its values are quantized to reduce the number of bits required for encoding. The number is divided by a constant and the fraction part is dropped. This will reduce the required number of bits even more. The divisor depends on the position of the value in Table T. ? Compression: After quantization, the values are read from the table, and redundant 0s are removed. However, to cluster the 0s together, the table is read diagonally in a zigzag fashion (Figure 5.10). Fig. 5.10 Reading the Table Introduction to HTML NOTES

286 Material Introduction to HTML NOTES Self-Instructional (b) Video compression: MPEG A video or a motion picture is a rapid flow of a set of frames, where each frame is an image. Compressing video means spatially compressing each frame and temporally compressing a set of frames. Spatial compression: The compression of each frame with regard to space is done with JPEG. Each frame is a picture that can be independently compressed. Temporal compression: It is a process by which redundant frames are reduced and is done with MPEG. The MPEG method first divides frames into three categories: I-frames, P-frames and B-frames. Figure 5.11 shows the structure of these frames, which are explained as follows. The I-frames are intra coded and present at regular intervals. This means, these are independent frames that can be reconstructed without any reference to other frames. Also, an I-frame must appear periodically to handle some sudden change in the frame that the previous and following frames cannot show. The P-frames are forward predicted from the last I-frame or P-frame and each contains only the changes from the preceding frame. This means, it is impossible to reconstruct P-frames without the data of another frame (I or P). The B-frames are both, forward and backward predicted from the last/next I-frame or P-frame, i.e., there are two other frames necessary to reconstruct them. P-frames and B-frames are referred to as inter coded frames (Figure 5.11). Fig. 5.11 MPEG Frames Figure 5.11 shows the MPEG frame construction. Fig. 5.12 MPEG Frame Construction 5.9.4 Streaming Stored Audio/Video Once you have the compressed the audio/video, the next step is to stream this compressed constructions. In the following paragraphs we shall explain the process

Self-Instructional Material 287 of streaming these compressed audio/video. There are five approaches to distribute the compressed A/V files. ? First approach: Using a web server? A compressed audio/video file can be downloaded as a text file using a web server. The client can use HTTP services and send a GET message to download a file. The web server will send the compressed file to a browser. The browser can play the file using a help application, namely media player (Figure 5.13). Fig. 5.13 Using a Web Server This is a very simple approach and does not require streaming. But this approach is slow because the entire file needs to be downloaded before it can be played. ? Second approach: Using a web server with a metafile? 1. The HTTP client accesses the web server by using the GET message (Figure 5.14). 2. The information about the metafile comes in the response. 3. The metafile is passed to the media player. 4. The media player uses the URL in the metafile to access audio/video file. 5. The web server responds. Fig. 5.14 Using a Web Server with a Metafile Introduction to HTML NOTES

288 Material Introduction to HTML NOTES ? Third approach: Using a media server? 1. The HTTP client accesses the web server by using the GET message (Figure 5.15). 2. The information about the metafile comes in the response. 3. The metafile is passed to the media player. 4. The media player uses the URL in the metafile to access the media server to download the file. Downloading can take place in any protocol that uses UDP. 5. The media server responds. Fig. 5.15 Using a Media Server ? Fourth approach: Using a media server and RTSP? The Real-Time Streaming Protocol is a control protocol designed to add more functionalities to the streaming process (Figure 5.16). 1. The HTTP client accesses the web server by using the GET message. 2. The information about the metafile comes in the response. 3. The metafile is passed to the media player. 4. The media player sends a SETUP message to create a connection with the media server. 5. The media server responds. 6. The media player sends a PLAY message to start playing (downloading). 7. The audio/video file is downloaded by using another protocol that runs over UDP. 8. The connection is broken by using a TEARDOWN message. 9. The media server responds. Self-Instructional

Self-Instructional Material 289 Fig. 5.16 Using a Media Server and RTSP Streaming Live Audio/Video In streaming live audio/video, the communication is multicast and live, and the stations broadcast through the Internet. Live streaming is better suited to the multicast services of IP and the use of protocols such as UDP and RTP. 5.9.5 Real-Time Interactive Audio/Video The characteristics of real-time interactive audio/video are: ? Time relationship. ? Jitter is introduced in real-time data by delay between packets. To prevent jitter, we can timestamp the packets and separate the arrival time from the playback time. ? A playback buffer is required for real-time traffic. ? A sequence number on each packet is required for real-time traffic. ? Real-time traffic needs the support of multicasting. ? Translation means changing the encoding of a payload to a lower quality to match the bandwidth of the receiving network. ? Mixing means combining several streams of traffic into one stream. ? TCP, with all its sophistication, is not suitable for interactive multimedia traffic because we cannot allow retransmission of packets. ? UDP is more suitable than TCP for interactive traffic. However, we need the services of RTP, another transport layer protocol, to make up for the deficiencies of UDP. 5.9.6 Real-Time Transport Protocol Real-Time Transport Protocol (RTP) is the protocol designed to handle real-time traffic on the Internet. RTP does not have a delivery mechanism; it must be used with UDP (Figure 5.17). Introduction to HTML NOTES

290 Material Introduction to HTML NOTES Self-Instructional Fig. 5.17 Real-Time Transport Protocol Figure 5.18 shows the RTP packet header format. The constituents of header format are: Fig. 5.18 RTP Packet Header Format V er : Indicates the RTP version. The current version is 2. P: Contains the padding bit. If this field is set, the packet contains a set of padding octets that are not part of the payload. This function is used by certain encryption algorithms. X: Contains the extension bit. If this field is set, a header extension follows the fixed header. CSRC count: This field contains the number of contributing source identifiers that follow the fixed header. M: This field allows significant events to be marked in the packet stream (that is, frame boundaries). Payload type: Specifies the format of the payload in the RTP packet. An RTP sender emits a single RTP payload type at any given time (Figure 5.19). Fig. 5.19 Payload Type
Material 291 Sequence number: It is used by the receiver to restore packet sequence and detect packet loss. Timestamp: It contains a value representing the time when the payload data was sampled. SSRC identifier: The synchronization source is a randomly chosen identifier for an RTP host. All packets from the same source contain the same SSRC identifier. Each device in the same RTP session must have a unique SSRC identifier. This enables the receiver to group packets for playback. CSRC identifiers: The contributing source field contains a list of sources for the payload in the current packet. This field is used when a mixer combines different streams of packets. The information contained in this field allows the receiver to identify the original senders. RTP uses a temporary even-numbered UDP port. 5.9.7 Real-Time Transport Control Protocol Real-time Transport Control Protocol (RTCP) is a protocol that allows messages that control the flow and quality of data. RTCP has five types of messages (Figure 5.20). Introduction to HTML NOTES The primary function of RTCP
is to provide feedback about the quality of the RTP data distribution. This is
comparable to the flow and congestion control functions provided by other transport protocols. Feedback provided by each receiver is used to diagnose distribution faults. By sending feedback to all participants in a session, the device observing problems can determine if the problem is local or remote. This also enables a managing entity (that is, a network service provider) that is not a participant in the session to receive the feedback information. RTCP uses a UDP connection for communication. 200 201 202 203 204 Fig. 5.20 RTCP Message Types The RTCP architecture defines five types of control information used to report current performance: Sender report: An RTCP sender report is sent by the source of an RTP data stream. It provides the transmission and reception statistics observed by the sender. This report is sent as a multicast packet processed by all RTP session participants. Receiver report: An RTCP receiver report provides reception statistics for participants that are not active senders. A sender report is issued if a device has sent any data packets during the interval since issuing the last report; otherwise, a receiver report is issued. Self-Instructional Sender report Receiver report Source description message Bye message Application specific message RTCP Message types
292 Material Introduction to HTML NOTES Source description report: A source description packet is used by an RTP sender to provide local capability information. The currently defined source descriptions include: CNAME: A unique name for the source NAME: The real name of the source EMAIL: The e-mail address of the application user PHONE: The phone number of the application user LOC: The geographic location of the application user TOOL: The specific application or tool name NOTE: Additional notes about the source PRIV: Private extensions BYE: The RTCP BYE message is used by a source when it leaves a conference. This is used when a mixer shuts down. The BYE message is used to indicate all sources contributing to the session. APP: The APP packet is intended for experimental use as new applications and features are developed. After testing and if wider use is justified, it is recommended that each APP packet be registered with the Internet Assigned Numbers Authority. Figure 5.21 gives the RTCP packet format: Self-Instructional Fig. 5.21 RTCP Packet Format 0 2 V= 2 P RC 8 16 31 PT=SR=200 length header sender info report block 1 fraction host report block 2

Self-Instructional Material 293 The fields in the packet are described as follows: V: Indicates the version. P: Indicates if additional padding is located at the end of the packet. RC: Contains the number of report blocks in this packet. PT: Contains the report type. Length: Contains the packet length. SSRC of sender: Contains the SSRC identifiers of the host sending this packet. NTP timestamp: Contains the absolute time reported by NTP. This protocol counts the number seconds since 1 January 1900. RTP timestamp: Contains the timestamp from the RTP packets according to the sender. Sender's packet count: Contains the total number of RTP data packets transmitted by the sender since the start of the transmission. Sender's octet count: Contains the total number of payload bytes transmitted by the sender since the start of the transmission. SSRC_n: Contains the SSRC identifier of another RTP sender from which this sender has received packets. The number of report blocks with different sender SSRCs depends on the number of other sources that were heard by this sender since the last report. Fraction lost: Contains the fraction of RTP data packets that were lost since the previous sender report or receiver report was sent from the source SSRC_n. Cumulative number of packets lost: Indicates the total number of lost RTP packets from source SSRC_n. Extended highest sequence number received: Contains the highest sequence number that was received in an RTP packet from the source SSRC_n. Interarrival jitter: Contains the estimated variance of the interarrival times from the appropriate source. If the packets arrive regularly, the jitter value is zero. If the packets arrive irregularly, the jitter value is high. Last SR timestamp (LSR): Contains the middle 32 bits from the 64-bit NTP timestamp received in the last RTCP sender report packet from the source SSRC_n. Delay since last SR (DLSR): Contains the delay between receiving the last SR packet from the source SSRC_n and the sending of the current exception report block in units of 1/65536 seconds. RTCP uses an odd-numbered UDP port number that follows the port number selected for RTP. 5.9.8 Voice-over IP Voice-over IP (VoIP), or Internet telephony is an application that allows communication between two parties over the packet-switched Internet.

VoIP works by encoding voice information into a digital format, which can be carried across IP networks in discrete packets. Benefits and applications of VoIP are as follows: The key drivers in VoIP are cost benefits, because cost savings are the primary short-term reason to converge voice, data, and video onto a single IP network (with Introduction to HTML NOTES

294 Material Introduction to HTML NOTES Self-Instructional everything over same infrastructure). Corporations have deployed large-scale data networks, expecting cost savings and reduced expenses resulting from a merged multimedia network. Specifically: ? For the users, voice calls using the Internet are a means to reduce costs, avoiding tolls on the PSTN (toll bypass) and long-distance voice networks. ? For a pure VoIP service provider, minimal infrastructure ownership can be achieved by allowing the client to tap into the existing Internet service provider access and transport. ? For cable operators, VoIP enables the reuse of the existing infrastructure while rolling out new services. ? For network carriers, VoIP service is mainly a tool to counter the threat from new service providers while increasing the efficiency of their own infrastructure. New applications provide improvements to existing telecom services. Key VoIP applications include: ? Telecom trunk replacements by using Ethernet trunk cards VoIP Private Branch Exchange (PBX) switches. ? Toll bypass services for multinational corporations by linking offices from different cities or countries. ? Rapid application deployment, made possible by following the IT and data networking world in combination with the use of open APIs and standards. Finally, applications and service features can be distributed throughout the network. Traditional central office switching equipment can be replaced by less expensive servers in handling call processing and routing. Two protocols have been designed to handle this type of communication: SIP and H.323. Session initiation protocol Developed in 1996, the Session Initiation Protocol was originally designed as a means of notifying or inviting users to Internet multicast and broadcast sessions. This design, an early form of Internet signalling, made SIP very useful for signalling in VoIP, and thus, most VoIP developers have adopted SIP as the core IP telephony standard. Primary SIP functions include: User location and name translation: This is used to ensure that the call reaches the user. User availability: This determines whether the called party is willing to engage in communication. User capabilities: Used for feature negotiation. This allows the group on the call to agree on the different features supported. If a certain CODEC rate is not supported by SIP, there is room for negotiation. Session set-up: This is used for establishing the communication session parameters at both ends. Session management: This is used for modifying session parameters and invoking services. SIP applications are based on a client/server architecture consisting of: ? The user agent (or proxy) as the client ? The network server

Self-Instructional Material 295 User agent or proxy A user agent (SIP client) or proxy acts as the endpoint entity. Through request and response exchanges, the user agent can initiate and terminate sessions. In a SIP network, this functionality is found in devices such as: ? IP phones ? Telephony gateways ? Call agents ? Automated answering servers A user agent resides in every SIP end station (phone or PC softphone). It contains two components: ? A user agent client (UAC) is responsible for issuing SIP requests. ? A user agent server (UAS) is responsible for receiving and responding to requests. Network servers SIP network servers are used to support advanced calling functions. There are multiple types of network servers: ? Redirect serverware provides a user agent placing a call with the address of a desired target, much like an application can determine a host's IP address using the NSLOOKUP utility. The request is sent to a SIP server, which returns the necessary addresses or zero if there is no known address. ? The proxy server provides application layer routing of SIP requests and responses. When the server receives a request, it forwards the request to a next hop server having more information about the location of the called device. These are also intermediary entities which can act both as client and server in order to make requests on behalf of other clients. These requests are either handled internally or are passed on to other servers. ? Registrar servers are used to record the SIP address and the associated IP address of a device. ? The application server provides call processing, personal and group services, and service management. ? The network server provides policy-based call routing and translations. ? The media server provides specialized media resources, interactive voice response, three-way conferencing, and other regulatory requirements. SIP network servers usually implement a combination of the different server Introduction to HTML NOTES types. 1. SIP messages Figure 5.22 provides a structure of SIP messages. The various components of SIP messages are: Fig. 5.22 SIP Messages
Self-Instructional Material 296 Introduction to HTML NOTES INVITE: Indicates a user or service is being invited to participate in a call session. ACK: Confirms that the client has received a final response to an INVITE request. BYE: Terminates a call, and can be sent by either the caller or the callee. CANCEL: Cancels any pending searches but does not terminate a call that has already been accepted. OPTIONS: Queries the capabilities of servers. REGISTER: Registers the address listed in the 'To' header field with a SIP server. Registrations can require authentication. 2. SIP responses SIP 1xx: Informational responses (for example, 180 Ringing) SIP 2xx: Successful responses (for example, 200 OK) SIP 3xx: Redirection responses (for example, 302 Temporarily Moved) SIP 4xx: Client failure responses (for example, 404 User Not Found) SIP 5xx: Server failure responses SIP 6xx: Global failure responses 3. SIP addresses There are IPv4 address, e-mail address and phone number (Figure 5.23). 5. SIP simple session Fig. 5.23 SIP Addresses Fig. 5.24 SIP Simple Session
Self-Instructional Material 297 A simple session using SIP consists of three modules: establishing, communicating, and terminating (Figure 5.24). Establishing a session: Establishing a session in SIP requires a three-way handshake. The caller sends an INVITE message using UDP or TCP to begin the communication. If the callee is willing to start the session, she sends a reply message. To conform that a reply code has been received the caller sends an ACK message. Communicating: After the session has been established, the caller and the callee can communicate by using two temporary ports. Terminating the session: The session can be terminated with a BYE message sent by either party. H.323 ITU has designed a set of standards to allow telephones on the public telephone network to talk to computers connected to the Internet. Introduction to HTML NOTES Fig. 5.25 H.323 Architecture As seen in Figure 5.25, the H.323 architecture gateway connects the Internet to the telephone network. A gateway is a five-layer device that translates a message from one protocol stack to another. It transforms a telephone network message to Internet message. 1. Protocols (Figure 5.26). Fig. 5.26 H.323 Protocol The Internet
Self-Instructional Material 298 Introduction to HTML NOTES 2. Operation (Figure 5.27). Fig. 5.27 Operation Video-on-demand Video-on-Demand (VoD) or Audio/Video-on-Demand (AVoD) systems allow users to select and watch/listen to video or audio content on demand. VoD systems either stream content through a set-top box, allowing viewing in real time, or download it to a device such as a computer, digital video recorder, personal video recorder or portable media player for viewing at any time. The majority of cable and telco-based television providers offer both VoD streaming such as pay-per-view, whereby a user buys or selects a movie or television programme and it begins to play on the television set almost instantaneously, or downloading to a DVR rented from the provider, for viewing in the future. Reasons for the development of VoD: ? Development of the telecommunication and electronic industry. ? The capacity of a hard disk has doubled almost every year at near-constant cost. ? The useful compression ratio for video has been increased considerably; MPEG-formatted video can be transported at a bit rate of few Mbit/s. ? The digital signal processing techniques permit the transport of a few Mbit/ s over existing copper wires for a distance of a few kilometres. ? Asynchronous Transfer Mode (ATM) systems allow the switching of any reasonable bit rate to a single or multiple customers among a large number of connected customers. Types of interactive services: Based on the level of interactivity, interactive services can be classified into several categories. ? Broadcast (No-VoD) services similar to broadcast TV, in which the user is a passive participant and has no control over the session.

Material 299 ? Pay-per-view (PPV) services in which the user signs up and pays for specific programming, similar to existing CATV PPV services. ? Quasi Video-on-Demand (Q-VoD) services, in which users are grouped based on a threshold of interest. Users can perform at the simplest level temporal control activities by switching to a different group. ? Near video-on-demand (N-VoD) services in which functions like forward and reverse are simulated by transitions in discrete time intervals (on the order of 5{ts}min). This capability can be provided by multiple channels with the same programming skewed in time. ? True Video-on-Demand (T-VoD) services, in which the user has complete control over the session presentation. The user has full-function VCR (virtual VCR) capabilities, including forward and reverse play, freeze, and random positioning. T-VoD needs only a single channel per customer; multiple channels become redundant. VoD system elements: A Video-on-Demand system has many elements that are necessary for the use of the complete service (Figure 5.28). This includes video servers, community network, switching office, set-top unit, and backbone network VoD system providers will offer services which select the right technology, features, performance, price, reliability, and ease of use. Equipment is developed so that they will allow to operate in different environments and in a variety of services. Introduction to HTML NOTES Fig. 5.28 VoD Elements The main VoD scenario consists of a local database and a server connected to the user via a communications network. Data is stored on local distribution sites which are connected through high speed backbone network to information archives Self-Instructional Remote video server Set-top Remote video server Backbone network Switching office Subscriber network Set-top Archive Set-top Video server Switch Video dial tone gateway Head end Video server

300 Material Introduction to HTML NOTES and video servers. This distribution scheme serves many purposes. First, it is possible to implement it in a distributed fashion, increasing availability and reliability. Second, a provider can tailor the information delivery to the specific tastes of a user community in a particular geographic area, reducing costs. Third, it is easier to manage, as each local system is responsible for its own billing and accounting. Fourth, the system can be constructed in a regional, piecewise fashion. Set-top unit: The user interacts with the services by the set-top unit in the subscriber premises. Along with the television and the remote control, it gives the consumers opportunity to be connected to a video server and browse through a selection of movies or contents such as news or games. The key components of the set-top device are the line transceiver, demodulator, decompression unit, back-channel interface, remote control and display driver. The cost of the set-top unit must limit to a reasonable price (few hundred dollars) for the VoD technology to succeed. Open and interoperable systems that let the users to subscribe to several different services are preferred. Community network: The communications infrastructure between the customer premises and the local switching office is called the community or subscriber network. It connects the video server and the set-top device. A VoD system will require the transfer of huge volumes of data at very high speed. Many communication protocols and network architectures have been proposed to connect the various components. However, ATM is emerging as the most important technology. The interconnection includes signalling and program data transfer, the latter in real- time, semipermanent and on-demand. ATM combines the advantages of packet and circuit switching schemes. But each access technology has its own service range, bandwidth and environmental characteristics. Switching office: The switching office means both the telephone company's central office and the cable company's head-end. It is the place where services are fed and distributed to individual subscribers. It contains a head-end, video dial tone gateway, switches, and video servers. Servers: The video server is the network equipment providing the storage for video program material, which can be requested by the customers. It has to perform many functions, such as admission control, request handling, data retrieval, guaranteed stream transmission, stream encryption, and support of functions found in VCRs including pause, rewind and fast forward. Backbone network: Outside of the local switching office, the backbone network connects it to the other video servers which are not in the local switching office and provide some national or specialized information. Currently, the high speed backbone network uses fiber cable and SDH-based transmission system. In the future, ATM technology comes to the backbone network and then probably also to the community networks to simplify the interface requirements. 5.10 IMAGE MAPS Self-Instructional Images can be added to a web page and they can also be customized with alignments. Images can also be used for creating links, which has already been explained under links in the same unit earlier. Images in computers are stored in several different ways depending upon the needs. GIF and JPG are some the popular compression

Material 301 image format techniques that help in reducing download times as much as possible. Their characteristics are given in the following table: Table 5.3 Characteristics of Image Maps Characteristics JPG GIF Colours Unlimited 256 Transparent images Can not handle Can handle Compression Excellent Not good Uses Compressing photographs and complex images Banners, buttons and clipart Inserting an image: An image could be inserted in an HTML document with the use of tag img. A HTML code to insert the image of Tajmahal on the Web page namely My Spaceeee: >img src="http://www.myspaceeee.in/ tajmahal.gif"<. The code even become simpler if the image is stored in the same folder as the HTML page: >img src="tajmahal.gif"< Resizing: The size of an image can be altered using the width and height attributes. However, it is advisable to reduce the size in a graphics program rather than reducing the size on the Web page using the width and height attributes. For example: >img src="http://www.myspaceeee.in/ tajmahal.gif" width="60" height="60"< can be changed to >img src="http:// www.myspaceeee.in/tajmahal.gif" width="120" height="120"<. In case of no setting for width and height, at that moment the browser will automatically use the real size of the image. However, it is advisable to always enter the settings for width and height, even when using the real size. Border: Border can be added to an image with the help of the following HTML code: >img src="http://www.myspaceeee.in/tajmahal.gif" border="5"< Alternative text: An alternative text can also be added to an image using the alt setting shown in the example below: >img src="http://www.myspaceeee.in/tajmahal.gif" alt="Taj is for beauty"<. Spacing around the image: Space over and under an image can be added with the Vspace attribute. Space to the left and right of the image can be inserted using the Hspace attribute: >img src="tajmahal.gif" Hspace="30" Vspace="10"< Spacing on one side of the image is done using a 1 × 1 pixel transparent gif image. A 10-pixel spacing to the left of the image can be done with the help of pixel.gif: Introduction to HTML NOTES >img src="pixel.gif" width="10" height="1"<>img src="tajmahal.gif"< Image alignments: Images can be aligned according to the text around it with the help of the alignments parameters. These are for default, left, right, top and text-top aligns, etc. Self-Instructional

Self-Instructional Material 302 Introduction to HTML NOTES 5.11 USE OF FORMS 5.11.1 Form Tags Form tags support client side program of the client–server relationship. If a visitor feeds information in a provided form, information is displayed in a web browser. If the submit button is clicked by the user/visitor the information goes to a server. The server-side script executes the code for processing the application. The HTML form data is validated if the form includes at least one text field and one submit button. The >form<...>/form< tag is used for HTML form for user input. A simple form facilitates the various types of controls or input elements, such as text fields, radio buttons, submit buttons, checkboxes, etc. It also provides textarea, fieldset, label elements and select menus. Data is passed to the server by using forms. The >form< tag basically surrounds all forms on a web page. This tag significantly contains the input, textarea, etc. controls that must appear on the web page. The >form< tag is placed within HTML body. All the controls or input elements are enclosed within the >FORM< tags. Practically, a form is submitted by the following actions: ? Either by calling the JavaScript submit method ? Or, by clicking the form submit method The form is completed by modifying its controls. >FORM action="http://sometime.com/prog/adduser" method= "post"< ...Form contents... >/FORM< The above coding shows a form that is added by the 'adduser' program when it is going to be submitted. The form is sent to the program by using HTTP 'POST' method. This method is widely used because of the security reason. In the get method, input values are visible in the URL bar. Table 5.4 shows the attributes of the >FORM< tag: Table 5.4 Form Tags and Functions Tag Function action The form is sent to the program by action attribute after clicking on the submit button. method This method is used by a browser to communicate with the web server for sending the form information. The POST method uses HTTP protocols to send the form information as a data block. INPUT The text input comes with INPUT type; it collects single line text, for example, name, e-mail, etc. The form 'submit' button is created by the following code within >FORM< tag: >INPUT type="submit" name="my_submit" value="Click!"< In the above coding, type defines a button to submit a form, name represents identification for the submit button, and value is the label appearing on the button. The type represents the various input types, such as radio, file, checkbox, password, text, button or image. The result creates the submit button with label as follows:

Material 303 Top of Form Introduction to HTML NOTES The complete program for >FORM< tag is as follows: >FORM action="http://somesite.com/prog/adduser" method="post"< >p< >INPUT type="submit" name="my_submit" value="Click!"< >/p< >/FORM< The >p<...>/p< tag represents the paragraph. It automatically creates paragraph space before and after itself. The browser applies this space. It is good to end with >/p< tag because the space becomes clear where the paragraph ends. The following code contains the input control in the forms: >FORM action="http://somesite.com/prog/adduser" method="post"< >p<
First name: >
INPUT type="text" name="firstname"<>BR< Last name: >INPUT type="text" name="lastname"<>BR< e-mail: >INPUT type="
text" name="email"<>BR< >
INPUT type="

radio" name="sex" value="Male"< Male>BR< >INPUT type="radio" name="sex" value="Female"< Female> BR< >
INPUT type="submit" name="Send"< >INPUT type="reset"< >/p< >/FORM< Output: The three fields shown in the diagram are First name: Last name: and email: that contain text field to accept the values filled by users or visitors. The Self-Instructional Click!
Self-Instructional Material 304 Introduction to HTML NOTES Send and Reset buttons are used to send the data to store in client-side server and reset button is used if information is possibly is to be changed or reset. The two radio buttons are set as Male and Female. The >BR< tag has no end tag because it is an empty tag that inserts a single line break. 5.12 USE OF FRAMES It is for displaying

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more than one HTML document in the same browser window

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more than one HTML document in the same browser window

or to divide the screen into separate windows. An example of frame is shown below: Each of the above windows contains a
HTML document. In fact,

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each HTML document is called a frame and each frame is independent of the others.

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each HTML document is called a frame and each frame is independent of the others.

Using frames in developing Web pages have certain disadvantages such as the Web developer has to keep track of more HTML documents and it becomes difficult to print the entire page. A file, which explains how the screen is sectioned into frames, is called a frameset. When a frameset page is loaded to a Web browser, it automatically loads each of the Web pages associated with the frames. The tag >frameset< enables a Web developer to divide the window into frames wherein it includes a set of rows or columns. The values of the rows/columns indicate the amount of screen area each row/column will occupy. The tag >frame< defines which HTML document can be put into each frame. In the given example, there are a frameset with two columns. The first column is set to 30 per cent of
the width of the browser window. The second column is set to 70 per cent of the width of the browser window.
The HTML document "frame_1.htm" is put into the first column, and the HTML document "frame_2.htm" is put into the second column. >frameset cols="30%,70%"< >frame src="frame_1.htm"< >frame src="frame_2.htm"< >/frameset<
Some examples of different framesets are being given below: 1. >frameset rows="25%,75%"< >frame src="top.htm" name="top"<

Material 305 >frame src=”bottom.htm” name=”bottom”< >/frameset< 2. >frameset rows=”25%,75%”< >frameset cols=”50%,50%”< >frame src=”Tl.htm” name=”Tl”< >frame src=”T2.htm” name=”T2"< >/frameset< >frame src=”bottom.htm” name=”bottom”< >/frameset< We will now learn in the following steps the designing of frames: Designing a frame: The HTML code: >frameset cols=”120,*”< >/frameset< This will produce a frame that looks like in a design with screen is divided into two columns. The left is having 120 pixels and the right using the rest of the screen that is indicated by the *. Adding default pages: It can be added to frame windows with the src setting. When these pages are loaded, the frameset is opened the first time. Names to each frame window using the name setting can also be inserted in order to make a link in one frame window open a page in another frame window. For example: >frameset cols=”120,*” < >frame src=”menu.htm” name=”menu” < >frame src=”frontf.htm” name=”main” < >/frameset< Frame borders: In case of invisible border, it is required to simply add the parameters “cols-line” to the frameset: >frameset cols=”120,*” frameborder=”0" border=”0" framespacing=”0"< >frame src=”menu.htm” name=”menu” < >frame src=”frontf.htm” name=”main” < >/frameset< Resizable windows: The frame windows can be designed with resizeable with the help of the “noresize” to the frame src lines: >frameset cols=”120,*” frameborder=”0" border=”0" framespacing=”0"< >frame src=”menu.htm” name=”menu” noresize< >frame src=”frontf.htm” name=”main” noresize< >/frameset< Adding scroll bar in the menu window: A scrollbar can be added in case of long documents with the help of “noresize scrolling=auto” to the frame src lines: >frameset cols=”120,*” frameborder=”0" border=”0" framespacing=”0"< Introduction to HTML NOTES Self-Instructional M Main e n u

306 Material Introduction to HTML NOTES Self-Instructional >frame src=”menu.htm” name=”menu” noresize scrolling=no< >frame src=” frontf. htm” name=” main” noresize scrolling=auto< >/frameset< Designing links with HTML frames: A link in the menu window can be used to load a Web page in the main window with the help of the following code: >a href=”Text.htm” target=”main”<Text>/a<. It can be noticed that a parameter target=”main” to the >a href< tag accomplishes the task. This enables the link to be opened in the “main” frame window instead of the “menu” frame window where the link itself is located. There are four target names are available: 1. _blank for a new browser window. 2. _self for the current window. 3. _parent loads the page into the frame that is superior to the frame the hyperlink is in. 4. _top cancels all frames, loads in full browser window. The browser window contains frame that is independently displayed with HTML document. A frameset shows the layout and properties of the frames displays as HTML file. The frameset file for a site is named by default as index.html. The three frames are basically defined in a frameset. The top frame never changes if visitor navigates the site. This frame bar contains the logo. The side frame navigation bar contains links. The large frame contains the main link. You can navigate easily between pages using frames. Advantages of Frames The
advantages of frames are as follows: ? The navigation related graphics for every page is not reloaded by browser. ? Each frame contains its own scroll bar. Disadvantages of Frames
The disadvantages of frames are as follows: ?
Testing of navigation is time consuming. ? The URL of individual frame does not appear. The >FRAMESET< container retains the >FRAME< tag. Each >FRAME< tag is an empty tag that determines what URL is associated with the specified frame. The syntax is as follows: >FRAMESET COL/ROWS=”numbers”< >FRAME SRC=”URL”< ... >/FRAMESET< The >FRAME< tag creates window of the frame and
each row or column is defined within >FRAMESET< file. A typical page contains the >FRAMESET< as follows: >HTML< >HEAD<
Self-Instructional Material 307 ...HEAD Markup... >/HEAD< >FRAMESET< ...Frames and other HTML Markup... >/FRAMESET< >/HTML< The following coding shows how a frame is tagged with a Web page: > FRAMESET ROWS=”30%”,30%”< >FRAME SRC=”index.html”< >FRAME SRC=”help.html”< >/FRAMESET< The >FRAMESET< tag accepts two attributes known as
ROWS and COLS. These attributes accepts one of the types of values, such as number values are measured in terms of pixels, percentages or both combination. The ROW attribute provides the number of horizontal subspace that is specified in a frameset. The value * is used to go through a specific row or column for rest of the pages. The SRC attribute gives the information which URL is to be loaded into the current frame. The >FRAMESET< allows that the site would display within frames and it begins the >FRAMESET< tag. The >FRAME< allows a detailed description about each individual frame. Each frame

in a frameset has various attributes for example, scrolling, resizing properties, border, etc. The >/FRAMESET< ends the frameset tag. The result of this coding is shown in Figure 5.29. Introduction to HTML NOTES Fig. 5.29 Tag Setting in Browser 5.13 SUMMARY In this unit, you learnt that: ? HTML is a simple scripting language that is used to write web pages. It is an abbreviation and stands for Hyper Text Markup Language. ? The HTML document that appears on a web page declares the version of HTML. HTML document is prepared either in Notepad or Dreamweaver applications. 1 >Frameset...< >Frame...< >Frame...< >Frame...< >Frameset...< Netscape Navigator Location ..... (URL) 1 >HTML< 2 2 3 >HTML< 3 >HTML< 4 4 ... ...
Self-Instructional Material 308 Introduction to HTML NOTES ? HTML uses tags that are used to mark-up HTML elements and are surrounded by two characters > and < called angle brackets that indicate the start and end of the tag. These tags are not case sensitive.? ? Links appear on web pages to navigate to

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the corresponding web pages as a reference. A user can navigate the pages to search or get information through links

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the corresponding web pages as a reference. A user can navigate the pages to search or get information through links

called lyperlinks.

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It is combined with suitable access protocol and data networking.? ?

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It is combined with suitable access protocol and data networking.? ?

Linking on the

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same page is basically created, if the web document is too long and user navigates the pages quickly,

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same page is basically created, if the web document is too long and user navigates the pages quickly,

such as chapterwise navigation on the page or e-book.? ? Links available with HTML are hyperlinks that enables user to link to another document on the Web.? ? Tables are powerful tools that present data in tabular form for displaying text and graphics on an HTML page. It consists of one or more rows and each row consists of one or more cells.? ? Tables on websites intend to provide arranged information and to create a web page layout with the use of hidden tables. The tables are used to divide the Web page into different sections.? ? HTML text is entered in the same manner as any text is entered. It requires attributes to be defined for indicating size, font, etc.? ? Images can be added to a web page and they can also be customized with different alignments. Images can also be used for creating links.? ?
Frames

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display more than one HTML document in the same browser window

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display more than one HTML document in the same browser window

or divide the screen into separate windows.? 5.14 KEY TERMS ? HTML: A scripting language which is used to prepare written documents by using formatting tags. ? Frames: Frames are used for displaying

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more than one HTML document in the same browser window

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more than one HTML document in the same browser window

or to divide the screen into separate windows. ? Web browser: A software application for retrieving, presenting and traversing information resources on the World Wide Web. ? HTML tags: Tags that are used along with their respective attributes to create HTML documents so that you can view them in browsers. ? Hyperlink: A reference to a document on a Web site

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that the reader can directly follow or that is followed automatically. ?

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that the reader can directly follow or that is followed automatically. ?

URL: A subset of the
Uniform Resource Identifier (URI) that specifies where an identified resource is available. ?
Text formatting: It determines how your text will look in your document.
Self-Instructional Material 309 5.15 ANSWERS TO 'CHECK YOUR PRGORESS' 1. HTML is a simple scripting language that is used to write Web pages. It is an abbreviation and stands for Hyper Text Markup Language that is predominantly markup language for the creation of Web pages. Hypertext in HTML is simply a piece of text that works as a link. 2. A Web page consists of a head and a body. 3. The file can be saved for the Web page files with extension name as .htm or .html file extension. Both extensions represent the html file that appears as a Web page, but DOS does not recognize the four letter extension code. 4. HTML uses tags that are used to mark-up HTML elements and are surrounded by the two characters > and < and are called angle brackets that indicate start and end of the tag. These tags are not case sensitive. Other important tags in HTML are headings, paragraphs and line breaks. It also enables to define a lot of elements for formatting output, like bold or italic text. 5. The >kbd< tag defines the keyboard text. It is text formatting tag. 6. The >dir< tag defines the directory list. It is list

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formatting tag. 7. The >thead< tag is used to group the header content in an HTML table.

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formatting tag. 7. The >thead< tag is used to group the header content in an HTML table.

It is table formatting tag. 8.

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Tags which are used to group similar kinds of elements are >

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Tags which are used to group similar kinds of elements are >

fieldset< and >legend<. 9. Tag >pre< is used to pre-format the text. The text will be displayed in fixed width font. The text entered in this will maintain all white spaces and new line breaks. 10. Tag >iframe< is used to define an in line frame in HTML document. An in line frame is a frame which opens a different document, but it comes inside >body< tag. 11. Tag >bdo< is used to change the text direction on the screen. BDO stands for Bi-Directional Override. Tag >bdo< allows you to specify the direction of text and override the bi-directional algorithm. 12. Hyperlinks are links that appear on the Web page which help in navigating to the corresponding Web pages for a reference. If the

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user navigates the pages to search to get the information through links this is also called hyperlink in Web technology

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user navigates the pages to search to get the information through links this is also called hyperlink in Web technology

and it facilitates a look at the Web pages. 13. The href attribute is used to address the document to link to and the words between the open and close of the anchor tag will be displayed as a hyperlink. 14. Tables are powerful tools that present tabular data for laying out text and graphics on an HTML page. 15. Real-Time Transport Protocol (RTP) is the protocol designed to handle real- time traffic on the Internet. RTP does not have a delivery mechanism; it must be used with UDP. 16. The primary function of RTCP
is to provide feedback about the quality of the RTP data distribution. This is
comparable to the flow and congestion control functions provided by other transport protocols. Feedback provided by each Introduction to HTML NOTES
Self-Instructional Material 310 Introduction to HTML NOTES receiver is used to diagnose distribution faults. By sending feedback to all participants in a session, the device observing problems can determine if the problem is local or remote. 17. Voice-over IP (VoIP), or Internet telephony is an
application that allows communication between two parties over the packet-switched Internet.
VoIP works by encoding voice information into a digital format, which can be carried across IP networks in discrete packets. 18. This includes video servers, community network, switching office, set-top unit, and backbone network VoD system providers will offer services which select the right technology, features, performance, price, reliability, and ease of use. Equipment is developed so that they will allow to operate in different environments and in a variety of services. 19. Images can be aligned according to the text around it with the help of the alignments parameters. These are for default, left, right, top and text-top aligns, etc. 20. Form tags support client side program of the client–server relationship. If a visitor feeds information in a provided form, information is displayed in a web browser. 21. The
advantages of frames are as follows: ? The navigation related graphics for every page is not reloaded by browser. ? Each frame contains its own
scroll bar. 5.16 QUESTIONS AND EXERCISES Multiple Choice Questions 1. Hypertext in HTML is simply a piece of text that works as a: (a) Packet (b) Set (c) Link (d) Document 2. Tags can have attributes to provide additional information about the HTML elements on the: (a) Web page (b) Browser (c) Internet (d) Document 3. A link is the same thing

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as citation in literature. It is combined with suitable access protocol and data: (

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as citation in literature. It is combined with suitable access protocol and data: (

a) Processing (b) Management (c) Implementation (d) Networking
Material 311 4. Hyperlinks point to resources that appear on the: (a) Network (b) Web page (c) Internet (d) All of the above 5.

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Users browse the sites that give the quality and volume of the: (

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Users browse the sites that give the quality and volume of the: (

a) Data (b) Web page (c) Pages (d) Drive 6. In streaming live audio/video, the communication is multicast and live, and the stations broadcast through the: (a) Pages (b) Network (c) System (d) Internet 7. VoIP works by encoding voice information into a digital format, which can be carried across IP networks in discrete: (a) Packets (b) Data (c) Network (d) Link 8. After the session has been established, the caller and the callee can communicate by using two temporary: (a) Software (b) Ports (c) Data (d) Files 9. A file, which explains how the screen is sectioned into frames, is called a: (a) Web page (b) Link (c) Packet (d) Frameset 10. Form tags support client side program of the client–server: (a) Designing (b) Processing (c) Relationship (d) Planning Answers: 1. (c), 2. (a), 3. (d), 4. (b), 5. (c), 6. (d), 7. (a), 8. (b), 9. (d), 10. (c) Fill in the Blanks 1. When an HTML file is opened in a web browser, the browser looks for HTML codes in the text and uses them to change the layout, insert images, or links to other pages. Introduction to HTML NOTES Self-Instructional
312 Material Introduction to HTML NOTES Self-Instructional 2. Some commercial organizations include the code template to get the feedback from users or customers. 3. Definition list is a list of with their definition. 4. A link is combined with suitable access protocol and data . 5. Links that are the most fundamental part of the World Wide Web provides the facility to from one Web page to another Web page. 6. Tables on Websites intend to provide arranged and create a Web page layout with the use of hidden tables. 7. HTML text is entered in the same manner as any is entered. 8. Audio can be used for speech or music. 9. Real-Time Transport Protocol (RTP) is the protocol designed to handle real-time on the Internet. 10. Voice-over IP (VoIP) is an
application that allows between two parties over the packet-switched Internet. 11.
Form tags support _ __ side program of the client–server relationship. 12. The browser window contains that is independently displayed with HTML document. 13. The capacity of a hard disk has doubled almost every year at near-constant cost is one of the reason for the of VoD. 14. Open and systems that let the users to subscribe to several different services are preferred. 15. Images in computers are stored in several different ways depending upon the . Answers: 1. Create, 2. HTML, 3. Elements, 4. Networking, 5. Navigate, 6. Information, 7. Text, 8. Compression, 9. Traffic, 10. Communication, 11. Client, 12. Frame, 13. Development, 14. Interoperable, 15. Needs State Whether TRUE or FALSE 1. When an HTML file is opened in a Web browser, the browser looks for HTML codes in the text and uses them to change the layout, to insert images or to create links to other pages. 2. Tags do not have attributes to provide additional information about the HTML elements on the Web page. 3. When the user navigates the pages to search the information using links also termed as hyperlink in Web technology then it facilitates a look at the Web pages. 4. Links that are the most fundamental part of the World Wide Web provides the facility to delete different Web pages. 5. The Web browsers hide the fonts available on the user's system. 6. Video is composed of multiple frames where each frame is one image. 7. Jitter is introduced in real-time data by delay between packets.
Material 313 8. The proxy server ignores the application layer routing of SIP requests and queries. 9. True Video-on-Demand (T-VoD) services, in which the user has complete control over the session presentation is a type of interactive service. 10. ITU has designed a set of standards to allow telephones on the public telephone network to talk to computers connected to the Internet. 11. The main VoD scenario consists of a local database and a server connected to the user via a LAN. 12. The user interacts with the services by the set-top unit in the subscriber premises. 13. The video server is the network equipment providing the storage for video program material, which can be requested by the customers. 14. GIF and JPG are some the popular compression image format techniques that help in reducing download times as much as possible. 15. A frameset does not show the layout and properties of the frames displayed as HTML file. Answers: 1.

True, 2. False, 3.True, 4. False, 5. False, 6. True, 7. True, 8. False, 9. True, 10. True, 11. False, 12. True , 13. True, 14. True, 15. False
Match Column A with Column B Column A Column B 1. The scripting language which is used to prepare written documents by using formatting tags is known as A Real-Time Transport Protocol (RTP) 2. The tool used for displaying

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more than one HTML document in the same browser window

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more than one HTML document in the same browser window

or to divide the screen into separate windows is known as B Temporal compression 3. The software application used for the purpose of retrieving, presenting, and traversing information resources on the World Wide Web is called C VoIP 4. The tags used along with their respective attributes to create HTML documents so that you can view them in browsers are known as D Text formatting 5. A reference to a document on a Website

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that the reader can directly follow, or that is followed automatically

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that the reader can directly follow, or that is followed automatically

is termed as E Motion picture 6. The subset of the
Uniform Resource Identifier (URI) that specifies where an identified resource is available
is called F HTML 7. A tool for determining how the text will look in the document is called G Frames 8. The tools that present tabular data for laying out text and graphics on an HTML page are known as H Hyperlink 9. The rapid flow of a set of frames, where each frame is an image is called I Web browser contd... Introduction to HTML NOTES Self-Instructional
Self-Instructional Material 314 Introduction to HTML NOTES 10. The process wherein redundant frames are reduced and are done with MPEG is called J HTML tags 11. The protocol designed to handle real- time traffic on the Internet is known as K Tables 12. An
application that allows communication between two parties over the packet-switched Internet
is named as L URL Answers: 1. (F), 2. (G), 3. (I), 4. (J), 5. (H), 6. (L), 7. (D), 8. (K), 9. (E), 10. (B), 11. (A), 12. (C) Short-Answer Questions 1. What is the significance of HTML? 2. What is the purpose of using head in a web page? 3. How an HTML is prepared? 4. What are HTML tags? 5. What is >var< tag? 6. What is >menu< tag? 7. What is >tbody< tag? 8. What do you understand by preformatted text? 9. What is definition list? 10. What are label elements? 11. Why hyperlinks are required? 12. Define hyperlink and URL. Long-Answer Questions 1. What is Hypertext? Why is it used in web browser? Explain with the help of example the basic syntax and display format of HTML tags. 2. Write a simple HTML code containing different tags. 3. Describe the basic elements that are used with HTML tags. 4. Write a HTML code using tags to display information on Web as a Title, Boldface letters and background colour. 5. Describe text formatting tags with the help of HTML codes. Also give the program output. 6. Describe the various list formatting tags with the help of HTML codes. 7. Describe the various table formatting tags with the help of HTML codes. 8. Describe the following tags with the help of HTML codes: i. Font Style Tags ii. Text Scripting Tags iii. Element Grouping Tags iv. Text Editing Tags

Self-Instructional Material 315 9. Describe preformatted text and striking text features with the help of HTML codes. 10. What are acronyms and abbreviations in HTML coding? How is it done? 11. What is span element? How will you modify the text using JavaScript? 12. How will you create hyperlinks in web pages? Define a web page with various link options. 13. How will you create URL? 14. Define table tags with the help of HTML codes. 15. How will you insert images and frames? Introduction to HTML NOTES 5.17 FURTHER READING Duckett, Jon. Beginning Web programming with HTML, XHTML, and CSS. New York: Wiley, 2004. Hilzner, Steven. HTML Black Book. New Delhi: Dreamtech Press, 2000. Zhi-Hua Zhous & Shaowu Liu (2021) Machine learning 5.18 LEARNING OUTCOMES ? Understand HTML basics ? Write a web page in HTML ? Format text in web pages ? Create tags, hyperlinks, URLs and tables in HTML ? Use graphics and multimedia in Web pages ? Create image maps ? Use forms ? Use frames
Self-Instructional Material 317 UNIT 6 INTRODUCTION TO JAVASCRIPT Introduction to JavaScript NOTES Structure 6.0 Introduction 6.1 Unit Objectives 6.2 Data Types in JavaScript 6.2.1 Primitive Data 6.2.2 Composite or Non-Primitive Data 6.3 Constants/Literals 6.4 Variables 6.5 Operators 6.6 Expressions 6.7 Statements 6.7.1 If Statements; 6.7.2 Nested if Statements (If-else statements) 6.7.3 Ladder if Statement (If...else if...else Statement) 6.7.4 Switch Statements; 6.7.5 Arrays 6.8 Use of User-Defined Functions 6.8.1 Declaring Functions; 6.8.2 Placing Functions 6.8.3 Variable Scope; 6.8.4 Return Value 6.9 Use of Built-in Functions 6.10 Client-Side form Validation using JavaScript 6.10.1 Server-Side Scripting 6.11 Using Properties and Methods of Built-in Objects 6.12 Dialog Boxes in JavaScript 6.13 Placing Text in Browser 6.14 Summary 6.15 Key Terms 6.16

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Answers to 'Check Your Progress' 6.17 Questions and Exercises 6.18 Further Reading 6.19 Learning Outcomes 6.0 INTRODUCTION In this unit, you will learn about the basics of

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Answers to 'Check Your Progress' 6.17 Questions and Exercises 6.18 Further Reading 6.19 Learning Outcomes 6.0 INTRODUCTION In this unit, you will learn about the basics of

JavaScript. You will be introduced to elements like data types in JavaScript, constants and literals, variables, operators, expressions, statements and methods of built-in objects. JavaScript is an object-oriented scripting language which is used to enable

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programmatic access to objects within both the client application and other applications. It is primarily used in the form of client-side JavaScript

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programmatic access to objects within both the client application and other applications. It is primarily used in the form of client-side JavaScript

and is

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implemented as an integrated component of the web browser facilitating the development of improved user interfaces and dynamic websites. JavaScript is a dialect of the

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implemented as an integrated component of the web browser facilitating the development of improved user interfaces and dynamic websites. JavaScript is a dialect of the

European Computer Manufacturers Association (ECM AScript)

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standard and is characterized as a dynamic, weakly typed, prototype-based language with first- class functions. JavaScript was influenced by many languages and was designed to look like Java, but

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standard and is characterized as a dynamic, weakly typed, prototype-based language with first- class functions. JavaScript was influenced by many languages and was designed to look like Java, but

is easier for non-programmers to work with.
Self-Instructional Material 318 data type: a universal term to describe categories of values that a program or programming language can use. Introduction to JavaScript

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NOTES 6.1 UNIT OBJECTIVES After going through this unit, you will be able to: ? Discuss the

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NOTES 6.1 UNIT OBJECTIVES After going through this unit, you will be able to: ? Discuss the

data types in JavaScript ? Explain constants/literals ? Explain variables and operators ? Know the use of expressions ? Know the use of statements ? Know the use of user-defined functions ? Understand the use of built-in functions ? Know the properties and methods of built-in objects ? Discuss the client-side form validation using JavaScript ? Discuss the use of dialog boxes in JavaScript 6.2 DATA TYPES IN JAVASCRIPT The word data is derived from the Latin word datum, which means something given. Over the years, the words data and given have come to be used in place of each other; especially in disciplines such as mathematics, engineering and geometry. This is how the word data came to the world of computer science. Data in the modern day and age means information. Data (plural of the Latin word datum) is usually the basis on which observations are made, or graphs drawn. Data is considered the source from which information and knowledge are obtained. Data by itself has no significance. It needs to be interpreted in order for it to take the form of information. For example, the number of visitors who entered a website on a given day is just 'data', a report on what they were looking for may be considered as 'information', and a report containing handy tips on the finest way to get more visitors on your website may be considered as 'knowledge'. A computer uses values to work. It works with these numbers and generates results. Acomputer may be able to work with only certain types of values, depending on what program is being run. The kinds of values a program can function with or manipulate are called its data types. JavaScript supports many types of data. Data types can be broken down into two key classes: 1. Primitive 2. Composite, or Non-primitive Let us understand these two data types in detail.

Self-Instructional Material 319 6.2.1 Primitive Data This is the type that stores a single value. Primitive data types are the basic foundation of a program. They are the type that can be allocated a single exact value such as the number 2.5, or a thread of characters such as 'smile'. JavaScript supports three basic data types: ? Numeric ? String ? Boolean Apart from the three basic data types, there are two other data types that consist of a single value: ? Null ? Undefined Numeric data JavaScript has been designed to support both simple integers and floating-point numbers. JavaScript can work with integer values between 253 and –253. Some JavaScript functions, however, are unable to function with exceedingly large or small numbers, so it is better to use numbers in the range of 231 and –231. Integers are whole numbers, positive or negative, without a decimal point. For example, 876 and –876 are both integers. Integers can be expressed in decimal (base 10), octal (base 8), and hexadecimal (base 16), and can be both positive and negative values. Since JavaScript is a computing language, it can handle hexadecimal and octal numbers. Only the latest versions of JavaScript support octal numbers, and it is best to avoid using them. In case you are using an older version, the number would be read as a hexadecimal number instead of what it actually is – an octal number. All hexadecimal numbers begin with a zero and an X, for instance 0xff0000. Octal numbers, if supported, begin with a zero, such as 0755. If theyare not supported, this notation will be considered an alternate way of expressing hexadecimal numbers. Floating-point numbers are numbers that contain a fractional part. Numbers such as 3.0, –123.12, ½ and 7A–8 are all floating-point numbers. All floating point numbers must have a decimal point or an exponent, such as 1.2e–3. Since there is no limit to the number of digits before or after the decimal point,the decimal point is a 'floating-point'. The letter 'e' stands for exponent and it can be written either in uppercase or lowercase. Exponential notation is not denoted as the '×10', to make it clear to JavaScript that it is a floating-point number and not an equation. For instance 4.123 × 10 –15 (0.000000000000003123). Exponential notation is typically written with an 'e' instead of the '×10', so that JavaScript will identify it as a floating-point number instead of an equation. This would read as 4.123e–15. Introduction to JavaScript NOTES
Self-Instructional Material 320 Introduction to JavaScript NOTES For example: 54321 Integer 12.34 Floating-point .123E–1 Scientific notation .123e+2 Scientific notation 0x123fff Hexadecimal 0x234FFF Hexadecimal 0333 Octal String Data A string is chain of valid characters within a given set of characters. It is normally used to denote text. Astring is created by using two identical single or double inverted commas with values between them. Remember – the quotes should be matched. If the string begins with a single quote, it must conclude with a single quote; and if it starts with a double quote, it must conclude with a double quote. Single quotes can conceal double quotes, and double quotes can conceal single quotes: "This is a script" 'This is another script' "This is also 'a script" 'This is "a script"' An empty string or a null string, as the name suggests, is a string that has nothing inside. This is normally represented by two quote marks with blank space in between. If a number is enclosed in quotes, it is considered a string; e.g., "23" is a string, whereas 23 is a number. Strings are also known as constants or literals. The string value "smile" is called a string constant or literal. If you want to change a string, you need to replace it with another string. There may be some special characters that are not available on the keyboard, and it mayseem like a challenge to put them in a string. The wayto place such characters in a string, all you have to do is use an escape sequence that will symbolize the character. Normally, a backslash (\) precedes the character that represents a special character. The backslash is an indicator of a special character. Some escape sequences are as follows: Escape Sequence Character \\ Backslash \b Backspace \t Tab \n New line (\u0000a). This helps insert a line break at the specified point. It is a combination of the carriage return (\r) and the form feed (\f) \r Return \e Escape \" Double quote mark Cont. ...
Self-Instructional Material 321 \' Single quote mark, or an apostrophe, as in don\'t \f Form feed \x99 A two digit number specifying the hexadecimal value of a character in the Latin-1 character set \u9999 A four digit hexadecimal number specifying a character in the Unicode character set. (Not supported before JavaScript 1.3) Introduction to JavaScript NOTES Example: >html< >head< >body< 1. >pre< >font size="+2"< 2. >script language="JavaScript"< >!— Hide script from old browsers. 3. document.write("\t\tHello\neveryone!\n"); 4. document.writeln("\"Nice day, friends.\"\n"); 5. document.writeln('Smiley face:>font size="+3"< \u263a\n'); //End hiding here.?? >/script< >/pre< >/body< >/html< Explanation: 1. The escape sequences will work only in a >pre< tag or an alert dialog box. 2. The JavaScript program starts here. 3. The write() method sends the browser a string containing two tabs (\t\t), Hello, a newline (\n), everyone!, and another newline (\n). 4. The writeln() method sends to the browser a string containing a double quote (\"), Nice day, friends., another double quote (\"), and a newline (\n). Since the writeln() method automatically creates a newline, the output will display two newlines: the default value and the \n in the string. 5. This string contains a backslash sequence that will be translated into Unicode. The Unicode hexadecimal character 233a is preceded by a \u. The output is a smiley face.

Self-Instructional Material 322 Introduction to JavaScript NOTES Boolean values In Boolean logic, a given statement can only have two values, true or false. If we were to say, 'It will rain today', it can either come true or not. Thus, it can either be true or false. There is no third possibility. Similarly, in Boolean logic, there is no possibility of a statement being anything but true or false. A Boolean value is the result of a logical comparison such as: x == 2 (Does the value of the variable x equal the value of 2?) Just as in the statement, 'It will rain today', our value x can either be equal to 2, or not. When writing a program, it is usually important for the programmer to know if a certain condition is true or false. This is done with the help of an if() statement. For example: if (x==2) {do something} Boolean logic also makes it possible to evaluate a large string of statements and see whether the entire string is true or false. For example, let us consider the statement 'It will rain today and I will get drenched'. According to Boolean logic, this entire statement will be considered true only if both clauses it will rain today and I will get drenched are true. Now let's consider the statement 'It will rain today or I will get drenched'. In Boolean logic, this statement is true if either 'It will rain today' is true, or 'I will get drenched is true', or both these clauses are true. This logic can be extended to real-life programs. For example: if (x==2 || y==4) {do something} The statement (x==2 || y==4) is true when x is 2 or y is 4. If the programmer is using Boolean values in his or her computations, JavaScript automatically converts true values to 1 and false values to 0. Special numbers, null and undefined JavaScript also has some numeric keyword values: Infinity is a number bigger than the biggest number that JavaScript can represent. There is also the keyword literal-Infinity for the negative infinity. These can be denoted as properties of the Number object as Number. POSITIVE_INFINITY and Number.NEGATIVE_INFINITY. These two constants can be used to check infinite values. NaN is the value that is returned when you try to treat a non-numerical value as a numerical value. For example, if you want to check the result of 2 times xyz, the result will clearly not be a number. The result will be published as number.NaN. Here's how you can test for non-numerical values with the isNaN() function. Number.MAX_VALUE (This represents the largest representable number for JavaScript) Number.MIN_VALUE (This represents the small representable non-zero number for JavaScript.)
Self-Instructional Material 323 The NaN and Infinity variables may be standard, but they supported by only the latest browsers. It is possible to create them: var NaN = 0/0; var Infinity = 1e300 * 1e300; The type of data known as null means 'no data' or 'nothing'. It is merely used as a placeholder to denote that there is nothing of any significance in this variable. The undefined type is a little more complicated. Though it often serves the same purpose as null, it is still unclear, or 'undefined' because no data has ever been stored in it (not even null). To most programmers, 'undefined' usually comes as bad news, because this means that the script may be malfunctioning. These special values are displayed differently on different browsers. It is unadvisable to do the math with these values, as results are never really standard. Internet Explorer 3.02 with JScript 1.0 does not recognize NaN, it just silently converts the value to zero. Netscape Navigator 2.02 treats both undefined and null alike. It doesn't recognise Number.POSITIVE_INFINITY or Number. NEGATIVE_ INFINITY either. 6.2.2 Composite or Non-Primitive Data Composite data types, also called non-primitive or complex types, consist of more than one constituent. The composite data type is similar to an object. It is a type of data that can include many values linked or grouped in some way. A composite type is obviously different from the data type of any of its components – composite data types can be build from both primitive data types and other non-primitive data types. You can treat all composite data types as objects, but we usually classify them by their function as a data type. For composite data types, we will observe objects, together with some special pre-defined objects, functions and arrays. Objects An object in computing is nothing but a collection of specific named values. These values are also known as the properties of that object. Methods of that object are the functions that are associated with it. The properties and methods of an object are denoted with the help of a dot(.)notation. This dot(.)notation starts with the object's name, and ends with that of the property. For instance, image.src. A normal object contains only two nodes – the object itself, and its property. Sometimes, however, the object's properties can have properties of their own, in turn creating a tree of objects that you must specify the path for, just like you would for a directory tree (except in case you plan on using periods and not slashes). Example: document.form1.namefield. Objects in JavaScript are usually considered associative arrays. An associative array is a data type that comprises a compilation of unique keys and an assortment of values, where each key is connected with one value (or set of values).This means that Introduction to JavaScript NOTES

324 Material Navigator Window Array (3.0) Data Math String Document Frame Location History Anchor Image Form Link Button Checkbox Radio Select Reset Submit Text Textarea Password Hidden Introduction to JavaScript NOTES in JavaScript, image.src and image ['src'] are the same. It is useful to have such flexibility, since now it is possible to use property names as actual variable values. For instance, the following code may exist in a loop that resets the properties of an image one by one. img[iProp] = newImage[iProp]; JavaScript has several pre-defined objects, for instance a Date object and a Math object. These are used just as function libraries are used in languages like C. They include an assortment of practical methods that are pre-defined and equipped for use in any JavaScript code. All built-in objects are composite data type in JavaScript. They are readily available for use in HTML. There are two key types of JavaScript objects: ? Language objects: These are objects that are presented by the language. These objects are not dependent on other objects. ? Navigator objects: These are those objects that are given by the client's browser. These objects are sub-objects to the navigator object. Apart from these two, several other objects are created by the programmer. Let us look at the object hierarchy in JavaScript. Functions Fig. 6.1 Object Hierarchy in JavaScript Self-Instructional A function is a fragment of code, predefined or composed by the person constructing the JavaScript, which is run when it is directly called, or asked to run. Any JavaScript that is not included within a function (or has no link with some even attribute or hyperlink attribute) is run the second the browser contacts it when first analysing the document. Functions allow for a delay in this execution. They also

Self-Instructional Material 325 make it possible for a code to be recycled multiple times in a document, since functions allow small sections of code to be referred to by name. A function is a data type that is used in JavaScript. It is not so in many other programming languages. This means that a function can be treated as containing changeable and modifiable values. Array An Array is a systematically arranged collection of data values, such as in rows or columns. An array can hold more than one value at a time. Introduction to JavaScript NOTES 6.3 CONSTANTS/LITERALS What is an object literal? An object literal is a way of putting a lot of data in one compact package. It is a list of name value pairs that are separated by a comma and placed inside curly brackets. In JavaScript an object literal is declared as follows: var myObject = {} Object literals are used as a means of containing data, avoiding the use of universal variables that can cause trouble when combining code. Why use object literals? Objects literals make it possible for us to write code that supports a variety of features yet make it a somewhat straightforward method for the implementers as they rule out the need to bring code. Constructors into play directly or maintaining the correct order of arguments passed to functions, etc. Object literals are also helpful for low profile event handling – they are a way of containing data that otherwise would have been passed on to functions called from HTML event handler attributes. JavaScript has two keyword literals that it believes to be objects. These are null and undefined. Anything that refers to the value 'null' has no value at all. This means that the value does not contain any object, string, number, array or Boolean value that can be considered valid. The value of such an object is as good as having no value. Normally, the value null is assigned to something only when the value is meant to be valid, but at the same time, non-existent. Undefined is not a keyword, much unlike null. It is a treated like all other variables, even though it is a predefined global variable. Undefined variables should not be over-written.

Self-Instructional Material 326 Introduction to JavaScript NOTES Undefined variables are different from null variables as they are not zero. They are simply variables that have been names, but have not been assigned a value yet. The reason behind marking a variable as undefined is that there is no value in there, but whatever leftovers are present in that memory location will now be contained in this undefined variable. Most computers, after something has been deleted, ignore that part, and do not initiate a clean-up. As a work-around to this problem, JavaScript assigns a variable the value of 'undefined' until such time as the programmer decided to give it a specific value. Constructing a new object by means of the object literal syntax is very simple. The object literal is contained within curly brackets with zero or more property and value pairs. These value pairs are separated by commas. Each set of property name and value is split by a colon. Property names can be anything – identifiers, strings, or numbers. Values can either be strings, numbers, functions, or other objects. Property names get changed to strings, which means that the string "34" and the integer 34 are the same thing: Whichever gets declared last overwrites the other. Example: { property: value, property: value } 6.4 VARIABLES If you remember how algebra works, you would know that a letter (like a, b, or c) could be given a value such as 2, and that you could use an algebraic equation to calculate the value of another letter (d, e, or f)? These letters of the alphabet that are assigned values are called variables. These variables can be assigned values (a = 2) or expressions (a = b + c). Just like in algebra, JavaScript variables are assigned either values or expressions. A variable in JavaScript can be given a letter for a name, such as x, or a name that describes the variable, such as bookname. Let us look at an example: >html< >body< >script type="text/javascript"< var firstname; firstname="Ravi"; document.write(firstname); document.write(">br /<"); firstname="Ramya"; document.write(firstname); >/script< >/body< >/html<

Self-Instructional Material 327 Tip: If you are assigning a text value to a variable, be sure to enclose the value in quotes. The script above declares a variable, assigns a value to it, displays the value, changes the value, and displays the value again. Here's what you see when you run the above script: Introduction to JavaScript NOTES Declaring JavaScript variables When you create variables in JavaScript, it is referred to as declaring variables. You can use the var statement to declare JavaScript variables. var x; var bookname; The variables in the declaration above have not been assigned any values yet, so they are empty. var x=3; var carname="Middlemarch"; After this statement is executed, the variable x will hold the value 3, and bookname will hold the value Midlemarch. Assigning values to undeclared JavaScript variables If there are some variables in your statements that have not been declared, and values are assigned to them, the variables will be declared by design. For instance, x=5; bookname="Middlemarch"; will be the same as saying: var x=5; var bookname ="Middlemarch"; Re-declaring JavaScript variables A JavaScript variable does not lose its original value if it is re-declared. var x=10; var x; After these statements are carried out, the variable (x) will still equal to 10. The value will not be cleared just because it has been re-declared. JavaScript arithmetic It is possible to do arithmetic calculations with the help of JavaScript variables: y=x-2; z=y+5; Ravi Ramya
Self-Instructional Material 328 Introduction to JavaScript NOTES 6.5 OPERATORS The most widespread operators are those that help perform mathematical operations such as addition, subtraction, multiplication, division. These are represented symbolically by +,–, * and /. Operators can be divided into two groups, comparison operators and action operators. Action operators are also known as assignment operators. Comparison operators compare two variables and see if the relate to each other in a previously defined way. For example, they will be able to tell you whether x is greater than 5, or whether x is a multiple of y. Action operators are the ones responsible for performing actions on and changing a variable, such as multiplying it by two. The + operator used on strings The operator + can be used to add string variables or text values together. To add two or more string variables together, use the + operator. Example: txt1="What a"; txt2="beautiful day!"; txt3=txt1+txt2; After these statements are executed, this is what appears on your screen: "What a beautiful day!" Clearly, the last two words are missing a space. To add space between these two strings, you could insert a space into either after the first string or before the second one: txt1="What a "; txt2="beautiful day!"; txt3=txt1+txt2; Number + string = string or insert space into the last statement: txt1="What a very"; txt2="nice day"; txt3=txt1+" "+txt2; Once this statement is executed, your screen now reads: What a beautiful day! Let's look at the following table. It contains operators that are universally used. There are many other operators (For example, the identity operator ===) that are supported by all contemporary browsers, but are seldom used. It is for the simple reason that a few browser that are unable to decipher them generate errors. Table 6.1 Operator and Uses Operator Uses + Adds numbers, or combines two strings – if more than one type of variable is attached, including a string attached to a number or vice-versa, the result will be a string. Cont. ...
Material 329 – Subtracts the second number from the first / Divides the first number by the second * Multiplies two numbers % Divides the first number by the second and returns the remainder = Assigns
the value on the right to the object on the left += The object on the left =
the object on the left + the value on the right – this also works when appending strings –= The object on the left = the object on the left – the value on the right < Number on the left must be greater than the number on the right – this also works with strings and values > Number on the left must be less than the number on the right – this also works with strings and values <= Number on the left must be greater than or equal to the number on the right - this also works with strings and values >= Number on the left must be less than or equal to the number on the right - this also works with strings and values ++ Increment the number — Decrement the number == The numbers or objects or values must be equal != The numbers or objects or values must not be equal >> Bitwise leftshift << Bitwise rightshift & Bitwise AND | Bitwise OR ^ Bitwise XOR ~ Bitwise NOT ! Logical NOT (the statement must not be true) && Logical AND (both statements must be true) || Logical OR (either statement must be true) in Object or array on the right must have the property or cell on the left There are a few other operators you should know about: 1. void – Returns undefined values 2. typeof – Returns the type or class of the variable 3. eval – Used as eval(string). Interprets a string as JavaScript code. 4. var – Used to define variables 5. new – Creates an instance of a user-defined object type 6. delete – Deletes a property of an object, or an element at a specified index in an array Operator precedence If you wish to perform a complicated calculation, such as one that contains multiple operators, JavaScript follows its own order of precedence. It first multiplies, then divides. Addition and subtraction happen next, followed by appending of strings. Introduction to JavaScript NOTES Self-Instructional

Self-Instructional Material 330 Introduction to JavaScript NOTES Let us understand this by means of an example: 3+5*9 is calculated as (5*9) + 3. The result: 48. In case you would like to change the order of precedence, you must use parenthesis () to group parts of the calculation. The values that are contained inside parenthesis are always calculated first. For example, if you were to use parenthesis in the above equation, (3+5) * 9 would be calculated as (8)*9, and the result would be 72. The math object methods The Math object contains useful methods and constants that can be put to use in arithmetical calculations. These methods and constants can be replaced in your JavaScript anywhere numerical values are authorized. Operator What it does Math.abs(n) Returns the absolute value of n Math.acos(n) Returns (in radians) cos -1 of n Math.asin(n) Returns (in radians) sin -1 of n Math.atan(n) Returns (in radians) tan -1 of n Math.atan2(n,k) Returns the angle (rads) from cartesian coordinates 0,0 to n,k Math.ceil(n) Returns n rounded up to the nearest whole number Math.cos(n) Returns cos n (where n is in radians) Math.exp(n) Returns e n Math.floor(n) Returns n rounded down to the nearest whole number Math.log(n) Returns ln(n)Note, to find log 10 (n), use Math.log(n) / Math.log(10) Math.max(a,b,c,...) Returns the largest number Math.min(a,b,c,...) Returns the smallest number 6.6 EXPRESSIONS The new quantities (results) can be calculated from the existing values. This type of calculation is achieved by performing the several operations with the pre-existing quantities. For example, if you have to find out the area and circumference of the circle, you need to get the values of radius. Both measurements (area and circumference) can be calculated by using the following formula: Area of the circle = A ? ?r 2 or Pi×r×r
Material 331 Circumference of the circle = 2 × Pi × r; or Pi × d The value of pi is taken as 3.14159265358979323846 The circumference of circle can be calculated by two methods in which 'r' represents radius and 'd' represents diameter of the circle. As another example, assume that you have to find out the simple interest for a period of time (month/year), you can calculate by using the following formula: SI = (P × r × t)/100 In the above formula, P represents principal, r represents rate and n represents time. Note that the above mentioned formulae are separated by the equal (=) sign. This sign is termed in the JavaScript as 'assignment operator' and the formula is considered as 'assignment statement'. The right hand-side of the formula is collectively termed as expression. The expression in terms of values can be taken as numbers, such as 42, 3.141, string as 'text', 'logical value 'true' or 'false', special keyword 'null', etc. Types of expressions The three types of expressions are built in JavaScript as follows: Arithmetic: It evaluates a number, for example a=12. String: It evaluates character or text string, for example 'text' or '12345'. Logical: It retains 'true' or 'false' value. Conditional expression in JavaScript The conditional expression holds two values based on the generated condition. The following syntax is stepped out: (condition)? val1: val2 The standard expression can be declared in JavaScript in terms of expression as follows: Status_of_person = (age <= 18) ? "adult" : "minor" In the above conditional expression, the either of the two values can be returned which is based on value of the age. If the age is greater than 18 the assigned value is to be ' adult' or if age is less than 18 the value is to be ' minor' to the Status_of_person. Introduction to JavaScript NOTES 6.7 STATEMENTS Sometimes when a code is being written, the programmer wants the script to react differently to different situations. It is easy to understand this with the help of a real life example such as – If it rains, I will carry an umbrella.
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Self-Instructional Material 332 Introduction to JavaScript NOTES To make the script to perform an action for different decision, a programmer may need to use conditional statements in his or her code. For example, if (age>18) document.write("Underage"); JavaScript has a few conditional statements, such as: 1. If statement – Acode is executed if a certain condition is met. For example, If it rains, bring your umbrella. 2. If... else statement – A code is executed if the condition is met, and another action if the condition is not met. For example, If it rains, bring your umbrella. Else, bring sunglasses. 3. If... else if... else statement – Built upon the if...else statement, where many conditions are brought together. For example, If it rains, bring your umbrella. If it is sunny, bring sunglasses. If it is cold, bring a jacket. 4. Switch statement – This statement is used to select one out of several blocks of code to be run or executed. Let us look at some of these conditional statements in detail. 6.7.1 If Statements An if statement is used to execute a certain code only if a certain condition is true. Here is how an if condition works: if (condition) { code to be executed if condition is true } Now, let us look at an example that shows how the if statement works. As per this script, if the time on your browser is less than 10:00 am, you will get a "Good morning" greeting. If it is past 10:00 am, there will be no greeting. >script type="text/javascript"< //Write a "Good morning" greeting if //the time is less than 10 var d=new Date(); var time=d.getHours(); if (time>10) { document.write(">b<Good morning>/b<"); } >/script< Be sure to write the code in lower case. If you write IF in uppercase, your script is bound to malfunction and generate an error. 6.7.2 Nested if Statements (if-else Statements) The if else statement is used when a code needs to be executed, provided that a certain condition is true. In case the condition is false, another action will be taken.

Self-Instructional Material 333 if (condition) { code to be executed if condition is true } else { code to be executed if condition is not true } Let's look at an example. >html< >body< >script type="text/javascript"< var d = new Date(); var time = d.getHours(); if (time > 10) { document.write(">b<Good morning>/b<"); } else { document.write(">b<Good day>/b<"); } >/script< So, as per the above example, if your browser says that it is before 10:00 am, you will be greeted with a Good Morning. Otherwise, the greeting that will appear on your screen s 'Good day'. 6.7.3 Ladder if Statement (If...else if...else Statement) This statement is used when you want the program to select one of the various conditions available. The basic syntax for such code is as follows: if (condition1) { code to be executed if condition1 is true } else if (condition2) { code to be executed if condition2 is true } else { code to be executed if condition1 and condition2 are not true } Introduction to JavaScript NOTES
334 Material Introduction to JavaScript NOTES The following example demonstrates how, if it is before 10:00 am, you will be greeted with a 'Good morning'. In case it is between 10 am and 4 pm, you will be greeted with a 'Good day'. If it is beyond 4:00 pm, 'Hello!' is what will be displayed on your browser. >html< >body< >script type="text/javascript"< var d = new Date(); var time = d.getHours(); if (time>10) { document.write(">b<Good morning>/b<"); } else if (time<=10 && time>16) { document.write(">b<Good day>/b<"); } else { document.write(">b<Hello!>/b<"); } >/script< 6.7.4 Switch Statements A switch statement is used when you want the code to choose one out of the several layers of conditions that you have applied. The basic syntax involved is: switch(n) { case 1: execute code block 1 break; case 2: execute code block 2 break; default: code to be executed if n is different from case 1 and 2 Self-Instructional } Let us see how this script works. A single expression n (mostly used as a variable) is evaluated once. The value of the expression will now be compared to each condition in the structur. As soon as a match is discovered, the code associated with this condition will be executed.
Self-Instructional Material 335 The break statement is used to stop the code from running into the next case automatically. Now let us consider the following example: >html< >body< >script type="text/javascript"< var d = new Date(); theDay=d.getDay(); switch (theDay) { case 5: document.write(">b<Finally Friday>/b<"); break; case 6: document.write(">b<Super Saturday>/b<"); break; case 0: document.write(">b<Sleepy Sunday>/b<"); break; default: document.write(">b<I'm really looking forward to this weekend!>/b<"); } >/script< This script will greet you a different way, depending on what day of the week it is. Note that Sunday=0, Monday=1, Tuesday=2, etc. 6.7.5 Arrays In computer science, a data type that is intended to depict a collection of elements (values or variables) is known as an array. Each element is selected by one or more indexes that can be computed when the program is running. Such a compilation is usually known as an array variable, array value, or simply array. Some languages that support array types contain certain built-in arraydata types, some array type constructors etc. The programmer can use these tools to define such data types and highlight array variables, and notate indexing elements of the array. In some computer programming languages, the restrictions in terms of arrays are fairly specific. In JavaScript, an array is used merely as an object that contains an index that allows users to refer to its contents. The fields in the array are promptly numbered, and it is possible for the user to talk about the position of the field. Usually the array index is within square brackets right after the array name is written. In some languages, most notably JavaScript, programmers start the array index with zero. For example, in an array made in JavaScript, the first element would be named arrayName[0], the second element would be named arrayName[1] and the third would be named arrayName[2]. Introduction to JavaScript NOTES
Self-Instructional Material 336 Introduction to JavaScript NOTES Multi-dimensional arrays do not exist in JavaScript, but they can be nested within each other. This means that an array can contain, within itself, another array. These can be accessed by listing the array number of the outermost shell, and then listing the shell next to it, and working inward. Thus, the fifth element (on position 4) of the tenth element (on position 9) would be arrayName[9][4]. If you have a list of things (a list of books, for instance), this is how storing the books in single variables would look: books 1 = "Middlemarch"; books 2 = "Jane Eyre"; books 3 = "Women in Love"; However, what if you want to go through all the books and find a specific one? And what if you had not 3 books, but 500? The best way out is to use an array. An array will be able to contain all your variable values under a single name. You can access these values bysimply referring to the array name. The following code will create an Array object called myBooks: var myBooks=new Array(); Now, there are two ways in which you can add values to this array: Method 1: var myBooks=new Array(); myBooks[0]="Middlemarch"; myBooks[1]="="Jane Eyre"; myBooks[2]="="Women in Love"; You could also control the array's size by inserting an integer inside the brackets at the end: var myBooks=new Array(3); myBooks[0]="Middlemarch"; myBooks[1]="="Jane Eyre"; myBooks[2]="="Women in Love"; Method 2: var myBooks=new Array("Middlemarch", "Jane Eyre", "Women in Love"); 6.8 USE OF USER-DEFINED FUNCTIONS Since it is a contemporary programming language, JavaScript allows a programmer to define his or her own functions. This enables programmers to create functions that can be used and reused. Programmers save time by recycling common components. Moreover, since they are allowed to design their own functions, they are able to modify the base version of JavaScript to suit their needs, and can work on a more personalised version.

Material 337 Since JavaScript is object-based, a JavaScript function can be converted into an object rather effortlessly. It can even be converted into a method for that object. Thus, not only is it possible to construct user-defined objects that do what you want them to, you can even create your own objects that do your bidding. What is more, you can even construct methods that will act upon these objects. As powerful that this seems, it is rather easy to create objects, functions and methods in JavaScript. Function names are case-sensitive; always use the same capitalisation when you refer to the function in another place in the script. When using user-defined functions, remember: ? Functions allow you to name a set of statements as a group. ? Functions should ideally be defined at the head of a document. ? Once a function has been defined, the statements inside are not executed unless invoked. ? Once the function has been invoked, the statements inside the function begin to get executed. Functions, after being defined, can be called several times. ? A function may possibly have inputs, for example, parseFloat() has only one input: the string to be parsed into a float number. Values of inputs are sent to the function in parentheses after the function is summoned. ? A function might return a value, like the prompt() and parseFloat() functions. 6.8.1 Declaring Functions When declaring a variable in JavaScript, you will write something to this effect: >HEAD< >SCRIPT language="JavaScript"< >!—hide from old browsers var name=value; //—< >/SCRIPT< >/HEAD< There are some commands that have been used in the above script: 1. var: Something that indicates that a variable is about to be declared. 2. name: What the variable is being named. You can give a variable any name, except words that are already being used by JavaScript, such as function or onMouseover. Attached below is a list of words reserved for JavaScript. 3. value: The initial value that is assigned to the variable. This could be numeric, alphabetical, true, false, or null. JavaScript Reserved Words abstract boolean break byte case catch char class comment
const continue debugger default delete do double else enum export extends false
Cont. ... Introduction to JavaScript NOTES Self-Instructional
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final finally float for function goto if implements import in instanceof int interface label long native new null package private protected public return short static super switch synchronized this throw throws transient true try typeof var void volatile while with
Using numbers A numeric value can be assigned to a variable by placing the required number after the = sign: var pens=3; A decimal number can also be used here: var cost=29.95; Using strings A string, as has been explained before in the book, is just a cluster of characters, such as a sentence or a word. Single or double quote marks are placed around the value in order to define the string: var movie="The Lord Of The Ring"; Even if numbers are placed inside the quotes instead of letters, they will be considered a string rather than a numerical value. Boolean values Booleans are simple, true or false values assigned to a variable: var fable=true; The null value If something is declared as null, it means 'nothing'. Here is the format: var myCash=null; The null value can be useful when the programmer uses prompts to obtain information from a user, and the user types nothing. Case sensitivity JavaScript is a case sensitive language. So a variable named 'abc' is not the same as 'Abc' or 'ABC'. Commands and functions work the same way. Semicolons Semicolons (;) are used to separate JavaScript commands and declarations, and can generate a lot of errors if not placed at the end of every line. Declaring functions A function is a named collection of JavaScript statements that you can declare once, at the top of your script, and invoke over and over again.

Material 339 Organizing your script into functions is almost like organizing your wardrobe. Of course, it is not necessary to do it. It may even seem like a lot of work at first, but the pay-off comes when you are looking for something, and you find it without having to look everywhere. Re-using the same code instead of using variations of the same code cuts down on the amount of time you spend typing. Also, this reduces the risk of encountering errors and bugs in your script. There are several ways in which a JavaScript function can be declared. None of these methods are better than another or invalid, there are major differences in the way the script handles them in the background. The most basic way to do this is to compile the function but wait to execute it until the function is called: function name([parameter] [, parameter] [..., parameter]) { statements return value } Let us look at an example: function calculateTotal(itemOrdered, itemPrice) { var totalPrice = (itemOrdered * itemPrice) + salesTax return totalPrice } Let us see how this works. This code declares a calculateTotal function that recognizes two arguments: The function uses these two arguments (itemOrdered and itemPrice) and an additional variable (salesTax) to calculate the totalPrice variable, which it then returns to the JavaScript code that first invoked it. A JavaScript function can contain several arguments, and at the same time is perfectly valid without any arguments at all. All these arguments are separated by commas. These arguments are mentioned somewhere in the body of the function. This is why they need to be given a meaningful name. If we were to rename itemOrdered to x and itemPrice to y, the code would still work, but it would be very difficult to read, understand or maintain. Now let us look at some other ways of declaring functions. A function can also be declared by allocating a variable to a nameless function. Using this syntax, we are treating the function as an object. var addNumbers = function (x, y) { return x+y; Introduction to JavaScript NOTES } We can also use the above syntax with a defined function, and refer to the function by its name or by the variable. var addNumbers = function addNum(x, y) { return x+y; } alert(addNumbers(5,7)); alert(addNum(5,7)); Self-Instructional
340 Material Introduction to JavaScript NOTES Self-Instructional A function can also be declared using the 'new' operator. This notifies JavaScript that we would like to create an object of the type Function. Also note that the arguments and the function body are considered a string. We can include as many arguments as we want. JavaScript recognizes the fact that the function body is a string right before the bracket is closed. var addNumbers=new Function("a", "b", "return a+b;"); This, however, is a method that causes the function to not be compiled. Declaring functions this way may be slower than other methods. 6.8.2 Placing Functions There are three recommended positions to place functions. These are either 1. Inside the >head< segment of the HTML 2. Inside the >body< section of the HTML document 3. Within a .js include file that is incorporated into the >head< section Inserting scripts in the >head< helps ensure that the functions are loaded before the rest of the page – the buttons, links or other objects. If these scripts are put at the end of the HTML document, there's a chance that the user gets to see a section of the page, including a button that triggers the function call, while the rest of the page still hasn't loaded. As a result, a user may push the button and get an error message, because the script containing the function has not been found yet. Always place your scripts in the >head< unless you have a valid reason to place your functions in the >body<. Let us now explore the third location – an external .js file.Importing an external file is a rather straightforward task. Of course, the file must have the extension .js, and should be a valid JavaScript file. Also, you must know where the file is located. Due to the fact that a .js file provides a lot more flexibility if the function needs to be used in othet pages, it remains a favourite among programmers. How to use the .js file A file with the .js file extension is known either as a JavaScript file or a Jscript exe- cutable file. Let us assume that there is a file containing a one line alert function, and that the file is called myfirstfunction.js. Let us also assume that the file has been placed in the same location as the HTMLfile that is intended to invoke this function. Here's what you need to do to import the external .js file into the HTML document: File myfirstfunction.js Contents: function popup() { alert("Hello") } HTML & JavaScript Code: >html< >head< >script src=" myfirstfunction.js"< >/script< >/head<

Material 341 >body< >input type=”button” onclick=”popup()” value=”Click Me!”< >/body< >/html< Display: Remember, the purpose behind writing functions is to craft them in as general a way as possible in order to capitalize on the re-usability factor. Even though it might take some time when designing the function, it is best to consider how the function can be designed to be useful for the future. 6.8.3 Variable Scope Earlier, we introduced you to the term variable, which is a named placeholder for a value. What we did not mention then is the fact that a variable cannot be placed just about anywhere in the document, and cannot be defined just about anywhere either. There is a definite connection between where a variable is defined and where it can be used. This is what we call the scope of the variable. Local scope Once a function has been defined, certain variables that are being used as placeholders for values are built into the function. These variables are found and used only within these functions. Since functions are separated from the main code, it is a good idea to used variables that are executed only when summoned, and stop running the moment the execution comes out of the function. Such variables that function only when inside a function are local variables. Their scope of functioning is limited to the local domain. Outside the function, they do not exist. The main code or anyother function cannot change the value of local variables. This means that the code becomes easy to maintain. Local variables are especially helpful when multiple programmers are working on the same web page. Global and local scope If you refer to the previous sessions, you will realize that variables were always defined before they were accessed. The reason behind this is that variables can only be accessed from a specific point in the program – the point where they were defined. If you look back at the section on functions, you will realize that this refers to the order of succession in terms of the actual execution of the statements, and not the order in which they are written on the page. Depending on where a variable is defined it may also cease to exist before the program ends. Introduction to JavaScript NOTES Self-Instructional

 You can limit the section of a program that can access a specific variable by defining the variablewithin a function. For instance, the variable in the following example ceases to exist by the time the statement tries to use it: function yy (){ var x = 1; } var y = x; JavaScript limits the scope of variables to the function block that they were defined in. This is why variables that were defined within any other block, such as statements, will exist even after the end of the block, provided that the conclusion of the function is reached. While using functions you need to be cautious about where you define variables. If a variable is defined within a function it will only subsist while the function code is being executed. Such a variable is said to have local scope. If a variable is defined outside all functions, the variable will exist from that point until the last part of the program. Such a variable is said to have global scope. In one situation, a global variable becomes momentarily unreachable. This happens when a local variable has the same name as the global variable. Here is an example: var i = 0; function yy (){ var i = 1; document.write(i); } document.write(i); In this code, the local variable will be referred to by the first document.write statement, as a result of which, the output will be ‘1’. Now since that variable no longer exists by the time JavaScript gets to the second document.write statement, which references the original globally defined variable. The output, thus, will be ‘0’. Now let’s see what happens when a small change is made to the code: var i = 0; function yy (){ i = 1; document.write(i); } document.write(i); In the above example, the statement within the brackets is not defining a new local variable anymore. Instead, it is altering the value of the existing global variable. Both document.write statements will now result in ‘1’. When programming in JavaScript, you will, more often than not, encounter situations where you will have placed more than one script on a Web page. These scripts may have been written by you, or obtained from an existing script library.

Material 343 Most scripts will run perfectly in a stand-alone manner. Once another script is added to the existing page, you may find that either the second script malfunctions, even though it works just fine when run on a separate page. It is another possibility that the first script may stop working altogether, or both of them begin generating errors when placed on the same page. Scripts stop working when placed together due to scope conflicts between the variables used in the two scripts. There are two cases in which this may happen. Both scripts could be trying to define a global variable that has the same name. Or else, one of the scripts could have left out the var that should be in front of the statement that is supposed to define a local variable, and a global variable that has the same name as the local variable gets executed instead. You need define each variable using var in front of the statement. This will help you ensure that there are no conflicts among these variables and those used by other scripts. In the rare case that this does not eliminate the error, you could try to rename some variables. No two scripts should use the same variable names. 6.8.4 Return Value A function can return a particular value back to the code that invoked it. For this purpose, the function uses the return statement. A function allows the programmer to enter as many return statements as he or she like. The is that only one of them will actually problem get executed every time he or she runs the function. In order to get a return value from a function, it is not essential to define a variable. A programmer can actually pass static values back. Instead, the result value can be the result of an arithmetic calculation. Let us look at an example: function validField(fld) { if (fld == '') return false; return true; } This function will return 'false' if the argument assigned to it is blank text, and 'true' if the argument assigned to it contains something, even random letters. In the above instance, we had to use more than one return statement, to ensure that whichever of the two values applies will be returned. If the code were truly this uncomplicated, we could also make do with just one return statement: function validField(fld) { return (fld != ''); } Here, the value of the parameter is compared to blank text and the end result of the unequal comparison is returned. It is a very simple logic – you enter what you want inside a return statement, and the function will return the result based on whatever calculation is done. Processing a returned value Now that you know how a value is returned, it is also important to know how to use this value in the calling code. The idea is to treat the actual function statement itself like a Introduction to JavaScript NOTES Self-Instructional
Self-Instructional Material 344 Introduction to JavaScript NOTES variable. The value that was returned when the function was called is in fact the value of the function itself. Let us consider the following example: document.write(myField + ' is '); if (!validField(myField)) { document.write('not '); } document.write('empty'); The function call can be used in any place that a variable can be used, provided the type of value being returned is the same as the type of variable that is being used in the code. For instance, if an arithmetical calculation is the action being performed, then the value that is returned from a function that is invoked through that calculation should also contain numeric values. Returning multiple values A function can be assigned multiple values, but the function returns only a single value once the entire function has been executed. So what would you do in case you needed the function to return more than one value? There are multiple solutions to this problem. The simplest of these solutions is to create variables before the function is called, and have the function append values in those variables directly. For example: function xyz() { ... x = 1; y = 'A'; } var x = 0; var y = ''; xyz(); document.write('x=' + x + ' and y = ' + y); This method of getting multiple return values is not without its disadvantages. The same variables always get updated. This may eventually lead to bigger issues if the function is being invoked from multiple places, and the calls actually need to remain independent of each other. The fact that all objects can contain multiple properties, offers a solution to this issue. Thus, it is possible for a programmer to return an object from his or her function, and then the variety of values that are expected to be returned can be returned using different properties of that same object. The best wayto carry out this method is by using an array. An array is a collection of arguments that are passed in a function. The array does not even need to be named in order for it to be used to return several values, because the function effectively does the naming for the programmer. All the programmer needs to do is to monitor which returned values are being held by which element in the array. For example: function xyz() { ...
Material 345 var x = 1; var y = 'A'; return [x, y]; } var a = xyz(); document.write('x=' + a[0] + ' and y = ' + a[1]); This method of returning multiple values using an array saves the programmer the trouble of having to define his or her variables before calling the function, but at the same time, this method leaves the programmer with fairly meaningless and insignificant names to refer to the variety of values returned. If we use an object instead of an array, it is possible to assign more meaningful names to returned values. For example: function xyz() { ... var x = 1; var y = 'A'; return {x : x, y : y}; } var a = xyz(); document.write('x=' + a.x + ' and y = ' + a.y); There is, however, a price to pay. The code will now return the values in a somewhat more complicated way. Introduction to JavaScript NOTES 6.9 USE OF BUILT-IN FUNCTIONS The JavaScript built-in functions are used to handle the expressions,
conditional expressions and special characters. These functions are able to convert string values to numeric values. The following syntax must be used, if you define the built-in function in JavaScript: For example, using the above syntax, you can write the following built-up function: For example, the escape() function returns the escape code for the character, whereas unescape() function is used to return the inverse value of escape() function. The escape code consists of the per cent sign (%) followed by the two-digit number. The Self-Instructional

Self-Instructional Material 346 Introduction to JavaScript NOTES unescape() function takes argument as text or string and the code consists of the per cent sign '%' followed by the two-digit number. eval() The eval() function also comes in the category of built-in function. This function keeps one value as an argument and it is declared as follows: For example, you might experience for another example for eval()function. The function name can be taken as setValue() function in which two arguments my_obj and my_value as follows: The function setValue() can be called by setting the value in the form element as 'text1' along with value 42 as follows: setValue(text1, 42) parseInt () The parseInt function parses the first argument. It returns the integer value for radix (taken as base), for example radix of 10 represents that a value is converted into decimal number, whereas 8 is used to convert octal number and 16 is used to convert hexadecimal number. In the hexadecimal conversion, base 16 is used and after 9 the alphabets A, B, C, D, E and F is used. parseFloat() ParseFloat parses the arguments of string and floating point numbers. The special characters (other than '+' or '-'),,number values (from 0 to 9), decimal points and exponents return the corresponding value and ignore the characters. The first character is not to a number, if it returns NaN. alert() alert(NumToDisplay); The argument is taken as the number or value which has to be displayed in the message box. For this the following code is required:
Self-Instructional Material 347 The argument of this function is taken as 12, if user clicks on OK button the number 12 would be displayed in the message box. The result appears as follows: The above JavaScript program can be written as follows: >input type="button" value="Show Me" onClick="alert(12)"< confirm() The confirm() built-in function displays the message to the user. It is also able to message with OK button. The result comes as follows: The confirm() function displays the dialog box of confirmation. This function always prompts you the two buttons in which OK button returns true value and gives the status Introduction to JavaScript NOTES
Self-Instructional Material 348 Introduction to JavaScript NOTES of confirmation and Cancel button returns the false status, if it is selected. The following set of statement would be taken place to set the two buttons: if (confirm('Select a button')) alert('You selected OK'); else alert('You selected Cancel'); If you paste the following code with HTML tags: if (confirm("Are you sure you want to continue?")) {. . . The result comes as follows: focus() The focus() built-in function is used to keep ready the objects. If focus() function is not specified, user can not work with object instead only active object works at that time. The following JavaScript code is written for focus() built-in function as follows: if (str == "") { alert("\nThe SUGGESTION field is blank.\n\n Please enter your suggestion.")} document.forms[0].elements[3].focus(); return false; In the above JavaScript code, the focus() function is used. This function helps users to focus on all types of input fields, such as select, password, radio button, checkbox, etc. and user does not need to use mouse. indexOf() The indexOf() built-in function is case sensitive and returns the first occurrence position of character in a specified string. If value is not occurred in the specified string, it returns -1 value. The syntax is written as follows:
string.indexOf(searchstring, start) The two parameters searchstring, start are indexed with indexOf() function in which searchstring is required parameter, whereas start is optional parameter. For example, the following JavaScript code is required:
Self-Instructional Material 349 After running the above JavaScript code returns the following result: prompt() The prompt() built-in function displays the prompt dialog box that inquires and prompts the user for input values. var name = prompt("Please enter your name:","Richa"); if (!name) name = 'Hi!'; This function accepts two parameters and returns string value if OK button is selected and returns Null value if Cancel button is selected. The above code returns the following output. select() The select() built-in function selects the pointed object. Introduction to JavaScript NOTES
Self-Instructional Material 350 Introduction to JavaScript NOTES The result comes as follows: After clicking on 'sort' button you can get the following effect in which the strings are sorted in ascending order. write() The write() built-in function writes the text on the document. This function is written with HTML code as follows: The result comes as follows: JavaScript! 6.10 CLIENT-SIDE FORM VALIDATION USING JAVASCRIPT Client-Side scripting Scripting languages are divided into two parts – Client side scripting and Server side scripting. Scripts that are executed in the client's browser are known as Client side scripting languages. A few popular names are: HTML; Cascading Style Sheets (CSS), which allows style meta-information to be detached from the content; XML, which is normally used just for data storage purposes but with CSS can be used as a replacement for HTML; and JavaScripts, also known as EMACS. A significant fact about such scripts is that their source code is visible to everyone – All you have to do is click the View Source function in your browser. This is a brilliant way of learning the basics of client-side scripting.
Self-Instructional Material 351 This type scripting is a significant element of the Dynamic HTML (DHTML) model, because it allows Web pages to contain different and dynamic content depending on the user's browser – what he or she types as input, what environmental conditions prevail (such as the temperature or time, etc. Client-side scripts are usually written in languages such as JavaScript (Client- side JavaScript) and VBScript. Sometimes, client-side scripts are embedded within HTML documents, which is why they are known as embedded scripts. Mostly, however, they are kept in a separate file, which the document refers to. This type of script is known as an external script. Once a request is made, the server sends the required files to the client's computer.

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The client's browser runs the script, and then displays the data, together with anyvisible output from the script. Client-side scripts could also include commands for the browser to follow in

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The client's browser runs the script, and then displays the data, together with anyvisible output from the script. Client-side scripts could also include commands for the browser to follow in

case the user interacts with the data or document in a previously specified way, such as clicking a button, or right clicking. These commands can be followed without anyfurther contact with the server, though such communication may be required. By looking at the file containing the script, the programmer or user can view its source code. It is sometimes possible for Web authors to learn to write client-side scripts just bygoing through and trying to understand the source code for other authors' scripts. Because of security restrictions, client-side scripts are sometimes not allowed to access the client's computer except for the browser.A work around for this restriction is the use of ActiveX controls. There are differences, unfortunately, in the waya language is implemented across browsers; even if all these browsers support the language being used. Authors should, therefore, check how their client-side scripts behave on different browsers and platforms before actually putting them to use. 6.10.1 Server-Side Scripting The term 'server-side script' means that the script is executed on the server, (as opposed to Client-side scripting in which the script is run on the client's browser) and the surfer can only view the end result. This allows for more complicated scripts to be used, since the server is dedicated to them. It also lets scripts connect to databases, and use data from them while they are running. Some well-known server-side scripts are PHP, server- side VBScript, Python, and Perl. Introduction to JavaScript NOTES When the user makes a request, the script is run on the main Web server, and dynamic Web pages are generated. This makes it possible to provide some interactivity on a Website, with an interface to the database. This is distinguished from client-side scripting, where scripts are executed directly by the Web browser being used by the surfer, mostly in JavaScript. Client-side scripts are able to access information from the user's browser better, while server-side scripts have better access to the information available on the database or server.
352 Material Programs that are executed on a Web-surfer's computer without any interaction over a network are not considered clients. Therefore, such programs and their operations are not deemed client-side operations. Introduction to JavaScript NOTES Server-side scripts turn out output in a format that is easily understood

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by Web browsers (primarily HTML), which is then sent to the user's computer. The user

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by Web browsers (primarily HTML), which is then sent to the user's computer. The user

is, as has been said before, unable to view the script's source code (unless the code has been published by the author), and may not even realize that a script was run. The documents that result from running a server-side script may sometimes contain smaller client-side scripts. It is a case in point that most modern-day browsers allow data to be received and requested using both HTTP and FTP protocols. Users can sometimes choose from a number of client programs in case the server provides data according to HTTP or FTP protocol. As far as more specialized applications are concerned, programmers are allowed to write protocols for their own server, client, and communications, which can only be used together. The chief benefit to server-side scripting is the capability to adequately tailor the Website's reaction, depending on the user's needs, access permissions, or queries into data stores. 6.11 USING PROPERTIES AND METHODS OF BUILT- IN OBJECTS
JavaScript supports a number of built-in objects that make it unique and more flexible script language.
The windows content is dealt by these built-in objects. The built-in objects in JavaScript are specified as Date, Math, Array, String and Object. The following table shows almost all the Date Methods used in JavaScript: Table 6.2 Date Methods Used in JavaScript and Their Functions Self-Instructional Method Function Date() Returns the value of current date and

today's time. getDate() Returns the month's day of specific date. getDay() Returns the week's day of specific date. getFullYear() Returns the year of specific date. getHours() Returns the hour of specific date/time. getMilliseconds() Returns the milliseconds of specific date/time. getMinutes() Returns the minutes of specific date/time. getMonth() Returns the month of specific date/time. getSeconds() Returns the seconds
of specific date/time. Cont. ... It is important to install a language's interpreter on the server when using a server- side script, so that the same output is generated, no matter which platform or browser the client/user is working on. In the case of a client-side script, additional software need not be installed on the server. This feature makes client-side scripting more popular with most programmers. They do need to make sure though, that the browser that is being used supports and understands the scripting language.
Self-Instructional Material 353 getTime() Returns the value in of specific date/time, for example
January 4, 2010, 00:00:00 UTC. getTimezoneOffset() Returns the value in minutes for time-zone offset. getUTCDate() Returns the value of day/date (month) of of specific date/ time. getUTCDay() Returns day of week (DOW) specific date/time. getUTCFullyear() Returns the year of date/time.. getUTCHours() Returns hours
of date/time.. getYear() Returns the year of specific date/time. You can use getFullYear() method. setDate() It sets the day of month (from 1 to 31) of specific date/time. setFullYear() Returns the full year of specific date/time. setHours() This function sets the hours of specific date/time. setMilliseconds() This function sets the value of milliseconds of specific date/ time. setMinutes() This function sets the minutes for specific date/time according to local time. setMonth() This function
sets the month for specific date/time according to local time. setSeconds() This function sets the month for specific date/time. setTime()
This function sets the Date object for specific date/time according to local time, for example January 4, 2010, 00:00:00 UTC. toDateString() This function returns the 'date' part of specific date/time in terms of text or string. toLocaleFormat() This function converts specific date/time in the term of text or string. valueOf() This function returns the primitive value of the defined Date object. Introduction to JavaScript NOTES Date static method The static methods are defined by the Date object in JavaScript. The Date() constructor invokes these static methods. The following table shows the two date static methods as follows: Table 6.3 Two Static Date() Methods in JavaScript and their Functions Method Function Date.parse() This function returns in milliseconds of specific date/time in the form of string representation. Date.UTC This function returns in milliseconds of specific UTC date/ time. Math methods The Math object provides built-in constants and methods for performing calculations within the script.
The syntax of math object is as follows: Math.propertyname.orMath.methodname(parameters). The
following table shows the list of math object methods along with their functions:
354 Material Introduction to JavaScript NOTES Self-Instructional Table 6.4 List of Math Object Methods and Their Functions Method Function abs() This function returns an absolute value of given number. acos() This function returns absolute value (arccosine) in terms of radians of given number. asin() This function returns absolute value (arcsine) in terms of radians for an absolute value of given number. atan() This function returns absolute value (arctangent) in terms of radians for an absolute value of given number. ceil() This function returns the nearest small integer value of given number. cos() This function returns the cosine value of given number. exp() This function returns E N in which N represnts argument and E represnts the Euler's constant of the natural logarithm. floor() This function returns the nearest large integer value of given number. log() This function returns log value (base E) of a given number. max() This function returns largest of zero or more numbers. min() This function returns smallest of zero or more numbers. pow() This function returns base to the exponent power. random() This function returns pseudo-random number (between 0 and 1). round() This function returns rounded value of given integer. sin() This function returns sine value of the given number. sqrt() This function returns square root value of the given number. tan() This function returns the tangent value of the given number. toSource() This function returns the string/text 'Math'. Array methods The array methods are used in JavaScript as follows: Table 6.5 Array Methods and their Functions Method Function concat() This function returns new set of array which is comprised of new set of array(s) or value(s). every() This function returns true value if array satisfies the testing function. forEach() This function calls a function for each and every element in the given array. indexOf() This function returns the least index of the given element in an array. The -1 value is returned if no value is defined. join() This function joins all the elements of given array. map() This function creates new array after calling the provided function of every element in the given array. pop() This function eliminates last element of the given array. push() This function adds one or more than one elements at the end of given array. It also returns array with new size. reduce() This function picks two values of the given array (from left side to right side) and returns to the single value. reverse() This function reverses the order of all the elements in a given array, for example first element comes to last element in an array and last ellemnt comes as first element into the array. slice() This function extracts a slice of an array and returns to the new array. toSource() This function returns source code of the given object. sort() This function sorts (in ascending order) of the given array.

Material 355 String methods The String methods are used in JavaScript as follows: Table 6.6 String Methods and their Functions Method Function charAt() This function returns the value as character of specified index. length() This function returns the total length of given string/text. match() This function is especially used in matching the regular expression of specific string/text. replace() This function is especially used in matching the regular expression of specific string/text and then is used to replace the matched string/substring. search() This function searches the predefined string/text with the regular expression.. toLowerCase() This function is used to convert the string/text in lower case. toUpperCase() This function is used to convert the string/text in upper case.
toLocaleLowerCase() The characters within a string are converted to lower case while respecting the current locale. toLocaleUpperCase() The characters within a string are converted to upper case while respecting the current locale. Introduction to JavaScript NOTES Object methods The object methods are used in JavaScript as follows: Table 6.7 Object Methods and JavaScript Object Properties Methods Event Handlers Window defaultStatus alert onLoad frames blur onUnload opener close onBlur parent confirm onFocus scroll focus self open status prompt top clearTimeout window setTimeout Frame defaultStatus frames opener alert blur close None because the onLoad and onUnload event handlers are related to Window object. parent confirm scroll focus self open status prompt top clearTimeout window setTimeout Location hash reload none host replace Cont. ... Self-Instructional
356 Material Introduction to JavaScript NOTES Self-Instructional hostname href pathname por protocol search History length back none forward go Navigator appCodeName javaEnabled none appName appVersion mimeTypes plugins userAgent Document alinkColor clear None. The onLoad and anchors close onUnload event handlers are applets open related to Window object. area write bgColor writeln cookie fgColor forms images lastModified linkColor links location referrer title vlinkColor Image border none none complete height hspace lowsrc name src vspace width Form action submit onSubmit elements reset onReset encoding FileUpload method name target Text defaultValue focus onBlur name blur onCharge type select onFocus value onSelect
Self-Instructional Material 357 The above all types of object methods and functions are tagged with HTML code. The following code is written for Date() object method: The result comes as follows: sat Jan 2 12:03:30 utc + 0530 2010 The JavaScript code is written to validate the credit card number which can be entered in text field box. The credit card number is frequently used in online shopping or even manual shopping. It has fixed length number, for example for Diners club 13 digits is used, for American club 15 digits are used and for others 16 digits are used. It contains 'check digit' numbers that ensures the validity for transpose digits. The following table shows the various types of credit card numbers in a valid format: Table 6.8 Credit Card Numbers in a Valid Format The following table shows the list of major credit cards along with card type, prefix, length and check digit algorithm that you want to validate. Table 6.9 Card Type, Prefix, Length and Check Digit Algorithm Introduction to JavaScript NOTES
358 Material Credit Card Number: Introduction to JavaScript NOTES Self-Instructional The following JavaScript code is used to check the validity of credit card number. The above code is saved as credit_card.js file name extension. Then the following JavaScript code is added into the head section of the page: >script type="text/javascript" src="credit_card.js"< ... ... >/script< The event of the submission button or the form is written as follows: valid_card = validateCreditCard(cc_field); The result comes as follows: Then the credit card number is to be sent for validating and passing the cc_field in the above code. The following validation code is entered into the program: if (!validateCreditCard(cc_field)) { alert('Credit card number is not numeric.'); return false; } In the credit_card.js program, the Math object methods are used.

Self-Instructional Material 359 6.12 DIALOG BOXES IN JAVASCRIPT A dialog box is a type of window that is used in Graphical User Interface (GUI) pages to display some information to the visitors of a Website. Some dialog boxes only provide feedback, while some others even allow the user to respond to the feedback. Most dialog boxes are used as a means of informing the visitor of something. They are also used to request information from the user. With the help of dialog boxes, programmers can communicate with their end users, and control how a specific action is carried out by the users. There are two types of dialog boxes – modal, and modeless. A modal dialog box opens up as a separate window within the main window. The user has to interact with this window before they can go back to the page they were working on. A modeless dialog box, also known as non-modal dialog box, does not need essential information. A modeless window can remain open while the user works on the main Web page. Depending on how you want your users to interact, you can decide which one to use on your Website. The most basic dialog box is the type that usually requires the user to just click a button, and move back to the Web page he or she was working on. There are three types of dialog boxes in JavaScript as follows, which will be covered in the next few sections: 1. alert() 2. prompt() 3. confirm() Alert An alert dialog is a informal and commonly used term for a specific type of dialog box that is used in a GUI, or Graphical User Interface. Sometimes, it is also called an alert box, alert window, error dialog, alert popup or simply alert. The archetypal alert dialog supplies information in a pop up box to the visitor. Once it pops up, the user has no choice but to respond to the dialog box. Unless the user closes the alert dialog box, he or she will not be able to access the Web page or window they were working on earlier. The original window is not available to the user for the duration that the alert dialog is displayed on the screen. Some programmers who believe in usability feel that alert dialog boxes are a bad design. The reason is that alerts tend to produce mode errors. Also, when used to inform the audience that an error has been encountered, they have proved to be rather ineffective. Despite the disadvantage, alerts have some uses: ? Error alerts are used to inform the user than a task could be completed or they cannot continue due to some insuperable error. ? Warning alerts are used to inform the user that an action or step they are about to take could be either irreversible or dangerous. These warnings offer the visitor the option of not proceeding with this action. Introduction to JavaScript NOTES
360 Material Introduction to JavaScript NOTES ? Info alerts present a general announcement about a recent event.? ? Question alerts are used to elicit some information or data from the user, when this step is required in order o complete the current process.? Note that alert boxes in Netscape include the phrase '>url< [JavaScript Application]' in the title bar of the alert. Similarly, Internet Explorer displays 'Microsoft Internet Explorer' in the title bar of the alert. Both browsers have yellow triangles as a symbol for the alert. This has been done so that they can be distinguished form the alerts that are generated by the operating system. This helps ensure that malicious programs are not able to trick users into taking steps that they think are for the operating system, but are in fact, dubious . >INPUT TYPE="button" VALUE="alert" onClick="alert('This is an alert!!')"< Lets see an example of the alert() dialog box. >html< >head< >script type="text/javascript"< function show_alert() { alert("This is an alert box!"); } >/script< >/head< >body< >input type="button" onclick="show_alert()" value="Show alert box" /< >/body< >/html< You can even have an alert pop up as soon as the page starts loading. This can be used to advise discretion to the users of your Website: >HEAD< >TITLE<Cool JavaScripts>/TITLE< >SCRIPT language="JavaScript"< >!— hide from old browsers Self-Instructional
Material 361 alert(You should be above 18 years of age to view the contents of this page.'); //?? >/SCRIPT< >/HEAD< You can even have multiple alert boxes displayed at once: >HEAD< >TITLE<JavaScript Example 2>/TITLE< >SCRIPT language="JavaScript"< >!— alert('You should be above 18 years of age to view the contents of this page.'); alert('Are you at least 18 years old?'); alert('Are you sure?'); alert('Okay, welcome to my Website!'); //?? >/SCRIPT< >/HEAD< Confirm The confirm function is a lot like the alert function, except that it offers the viewer two options to choose from, and not just one. The confirm function offers the user two different options to close the dialog. Some of these options are Ok and Cancel, Yes and No, Allow and Deny. The implied supposition is that one of these options will go on with the paused process that prompted the dialog in question, and the other option will disrupt the process without any action. Depending on which button the user clicks, the confirm function returns the value true or false. If OK or yes, or Allow is selected, the return value is true. Otherwise, the value returned is false. >INPUT TYPE="button" VALUE="confirm" onClick="respConfirm()"< Note that the confirm dialog box returns a Boolean value derived from the user's selection. With function code: >SCRIPT LANGUAGE="JavaScript"< function respConfirm () { var response = confirm('Confirm Test: Continue?'); // OR var response = window.confirm('Confirm Test: Continue?'); if (response) alert("Your response was OK!"); else alert("Your response was Cancel!"); Introduction to JavaScript NOTES } >/SCRIPT< Note: The response will be: 1. True if OK is pressed 2. False if Cancel is pressed Self-Instructional

362 Material Introduction to JavaScript NOTES Lets look at an example of the confirm() dialog box:- >html< >head< >script type="text/javascript"< function show_confirm() { var r=confirm("Press a button"); if (r==true) { document.write("You pressed OK!"); } else { document.write("You pressed Cancel!"); } } >/script< >/head< >body< >input type="button" onclick="show_confirm()" value="Show confirm box" /< >/body< >/html< Prompt The prompt dialog box is perhaps the most complex of these three dialog boxes, considering that it accepts two parameters, and not just one. When the user selects ok, it returns a text string. Null is returned when the user selects Cancel button. The alert() method does not allow the developer to interact with the user. Even though adding the OK button is bound to provide the developer with a level of control over when events will occur, the alert method still cannot be used to tailor the output as per the user's requirement. It cannot be used to produce any dynamic output at all. Self-Instructional The easiest way to add interactivity to the dialog box is by using the prompt() method. The developer makes the user needs to complete the information asked for in the field, and then click OK. prompt("Enter Your Age:", "Age"); Note that you are assigning two arguments to the prompt method here (in parenthesis). Here, the prompt dialog box will need two different pieces of information. The first part (Enter Your Age:) will be displayed when the page loads. The second half is the section where the user will type his or her age. Also pay attention to the fact that when a method is being assigned multiple arguments, the arguments need to be separated by commas. >INPUT TYPE="button" VALUE="prompt" onClick="respPrompt()"< Remember, the prompt() method dialog box gives the user an opportunity to enter information.
Self-Instructional Material 363 With function code: >SCRIPT LANGUAGE="JavaScript"< function respPrompt() { var favorite = prompt('What is your favorite color?', 'RED'); // OR var favorite = window.prompt('What is your favorite color?', 'RED'); // if (favorite) equivalent to if (favorite != null && favorite != ""); if (favorite) alert("Your favorite color is: " + favorite); else alert("You pressed Cancel or no value was entered!"); Introduction to JavaScript NOTES } >/SCRIPT< Wonder what happens when you press Cancel? The value null is returned. Lets see an full example on prompt() dialog box:- >html< >head< >script type="text/javascript"< function show_prompt() { var name=prompt("Please enter your name","Harry Potter"); if (name!=null && name!="") { document.write("Hello " + name + "! How are you today?"); } } >/script< >/head< >body< >input type="button" onclick="show_prompt()" value="Show prompt box" /< >/body< >/html< 6.13 PLACING TEXT IN BROWSER JavaScript can be thought of an expansion of HTML, a kind of add-on. This is how it functions. HTML tags create what we call objects. JavaScript lets us work on those objects and manipulate them. For example, we create a document using HTML tags (>BODY< and >/BODY<). The same tags can also be used to create Web pages. After the Web page or document has been constructed, JavaScript can help you make the Web page interactive.
364 Material Introduction to JavaScript NOTES For this purpose, there is a construct in JavaScript that is known as the onLoad event handler. It helps trigger actions, such as displaying graphics or playing music as soon as the document is loaded onto a browser. There are several other HTML objects that a programmer can interact with the help of JavaScript. Windows, images, text fields, Java applets that can be embedded, the list is endless. Let us look at how we can create and work with objects in HTML: Object HTMLTag JavaScript Web page >BODY<...>/BODY< document Image >IMG NAME="myImage"< document.myImage HTML form >FORM name="myForm"<...>/FORM< document.myForm Button >INPUT TYPE="button"NAME="myButton"< document.myForm. myButton The next question is, how do we add JavaScript to a Web page? The trick is to embed JavaScript codes in an HTML file or document. Just beneath the line in which the JavaScript code is embedded, it is possible to reference or invoke that JavaScript code and make it respond to either an event handler, or an HTML link. There are two ways of embedding codes from JavaScript into an HTML document: 1. Using the >SCRIPT< and >/SCRIPT<tags, with the help of which JavaScript codes can directly be included in an HTML document. Let us look at the example below. Here, processOrder() is a JavaScript function that has been defined at the head of the HTML file. Towards the end, the processOrder()function is linked with an event handler – this onClick event handler is associated with the processOrder button. To put this another way, we could say that when the user clicks the processOrder button, the code within the processOrder() function runs. >HTML< >HEAD< >SCRIPT LANGUAGE="JavaScript"< // JavaScript statements are inserted here function processOrder() { // More JavaScript statements are added here } >/SCRIPT< >/HEAD< >BODY< >FORM NAME="myForm"< >INPUT TYPE="button" NAME="processOrder" VALUE="Click this button to process your order" onClick="processOrder();"< ... >/HTML< Self-Instructional

Self-Instructional Material 365 2. The >SCRIPT< and >/SCRIPT< tags can also be used to include a separate .js file, that is externally located, in the HTML document. This file should contain only JavaScript statements. In the following example, the myJSfile.js file is where the JavaScript processOrder function has been defined. The user clicks the link Click To Process Your Order link, and the function is involed or triggered immediately. >HTML< >HEAD< >SCRIPT LANGUAGE="JavaScript" SRC="myJSfile.js"< >/SCRIPT< >/HEAD< >BODY< >A HREF="javascript:processOrder();"<Click To Process Your Order>/A< ... >/BODY< >/HTML< For the reason that Web pages are not prepared from HTML only, JavaScript makes more than just HTML objects available. JavaScript also gives us access to browser and platform-specific objects. Some examples of non-HTML objects that you can work on with the help of JavaScrip are RealPlayer, Adobe Acrobat (these two are browser plug- ins), names and versions of viewers' browsers, and the current date and time, etc. Together, all these objects is what makes up a Website – HTMLcoding, browser- related objects, platform-elated specifications and objects, and special objects that come built into the language – these are known as the document-object model, or DOM, as it is popularly known. JavaScript and your browser In order to use the latest enhancements that come with JavaScript, you need to have Netscape Navigator version 7.1 or higher. These enhancements also work with Internet Explorer version 6.0 or higher. Of course, all browsers are different. The extent to which a browser supports JavaScript, or any other language for that matter, is different. In fact, even within the same browser, different versions support the same language differently. For example, Internet Explorer's support for JavaScript varies considerably from Navigator's. Even though it is possible to construct and view JavaScript codes using an older version of these browsers, it is suggested that you use the most recent version of either Netscape Navigator or Internet Explorer. The most current versions of each of these browsers contain the up-to-the-minute JavaScript features and bug fixes. You could even use a different browser, such as Opera or Application Object Library (AOL) or even a different Internet protocol, such as FTP to download the latest version of Netscape Navigator or IE and try it out. Introduction to JavaScript NOTES
366 Material Introduction to JavaScript NOTES Before you begin to work on JavaScript, remember: ? You require either Netscape Navigator or Internet Explorer to work with JavaScript, which means that you should be using one of the platforms that support these browsers. Both Macintosh and Windows support these two browsers, so either can be used.? ? Your end users may not be using the same browser as you. In fact, they may be using browsers that do not have JavaScript enabled on them to view your Web pages. Or they might be using a browser that does support JavaScript, but has the JavaScript support switched off. It is reasonable to maintain that there is no way to be sure that all the people who visit your page will be able to view your craftsmanship.? When it comes to Web development, the mere variety of languages and development tools is enough to confuse a programmer. XML, HTML, DHTML, Flash, Java, Javascript – there are so much available that a programmer is often left wondering which one to use. The way to deal with such confusion is to remember that each of these languages was designed with a specific type of purpose in mind. The developers of JavaScript had a reason too. The following table shows you which type of tasks JavaScript is well-suited for; and those that are not really JavaScript's forte. Note that JavaScript was designed for browser-based, or client-side tasks. Task Is JavaScript Useful? Are JavaScript and CSS (DHTML) Useful? Provide users with helpful feedback Yes No Tailor page appearance Yes Yes (more sophisticatedthan JavaScript alone) Examine or change HTML form data Yes No Create simple animations Yes Yes (more sophisticatedthan JavaScript alone) Create complex animations No No Perform server-side processing No No Self-Instructional JavaScript, with the help of HTML, allows programmers to build CSS, or cascading style sheets. Here's how it works: HTML and CSS allow you to construct static Web pages by using object, or tag building blocks. JavaScript allows you to examine and manoeuvre the objects to add interactivity to static pages. It also allows you to add simple animations. Therefore, in order to be able to use JavaScript, you need to take the help of HTML. If you want to use DHTML (dynamic HTML), you will need both HTML and Cascading Style Sheets.

Self-Instructional Material 367 With the help of JavaScript, a Website can be made easy to navigate. Even your pages can be customized, depending on who the user is, and what time of the day it is. It is also possible to create simple, yet powerful animated pages. The most widely used method to spruce up your Web pages with JavaScript is by making them easier to navigate. There are several things you can do with JavaScript to make your Website more easily navigable: ? You can construct expandable Website maps.? ? You can add useful sections of text that appear when users move the cursor over a button, or link, or any other section of the Website. These are known as tooltips.? ? It is also possible to create mouse rollover effects, such as swapping pictures or images when the mouse is dragged over a particular area of the screen. Mouse rollover effects help the user determine at a single glance whether a certain part of your Website is interactive or clickable.? ? JavaScript lets you examine the information that your users enter on the Web page. You can also customize your page to pop up useful hints or suggestions if they make an invalid entry.? ? After the user submits a form, you can display a thank-you message.? ? Put content into various frames when a button is clicked, so that the user can look at multiple pieces of related information at the same time.? JavaScript not only allows programmers to create events initiated by a user, but also allows automatic events such as opening the Web page in a browser. Tailoring your website according to what the user wants to see Everyone likes to be treated well. The users of your Website like to be made to feel special too. With the help of JavaScript, you can customize the way your Web pages appear to different users. This is usually based on criteria such as: ? The particular types and versions of Web browsers that visitors view your page on? ? How the users behaved the last time they visited your Website? ? Your users' known preferences? ? The current date or time? ? Any other criterion you can think of? Many people presume that Java is needed to create animations for a Website, but that's just that – a presumption. JavaScript may not be the best way to create high-end animation effects, it can still be used in conjunction with cascading style sheets (the combination is also known as DHTML) to create an array of really smart animated effects. In point of fact, using JavaScript is the perhaps the easiest way to implement general effects, such as mouse rollovers. Basic requirements Once you are aware of what JavaScript can do for you, it is time to get to the first step: what you need to get started; and if you do not, where to get it.
Introduction to JavaScript NOTES
368 Material Introduction to JavaScript NOTES Self-Instructional Hardware The computer you are using should be a Pentium PC or better (unless it's a Power Mac) and should have the following specifications: ? At least 32MB of RAM? ? At least 25MB free hard disk drive space? You also need to have hardware installed that allows you to connect to the Internet. This hardware typically consists of a modem and a phone line, although some people are using faster and more effective options such as cable or Digital Subscriber Line. Depending on what type of computer you are using, the modem might be internal or built-in. Most computers these days come with a built-in modem. You can buy a modem at a local computer accessories store. The differentiating feature among modems is the line speed: the faster the modem, the better. Most in-built modems these days a 56.6 Kbps speed, but the minimum requirement is 28.8 Kbps. If you are going to have to buy a modem, consider buying the fastest modem available within your price range. It is an investment that will pay off when you develop beautiful Web pages with several graphics, each of which will take a really long time to load. Software You should either have a Mac OS 0 or later, or a personal computer loaded with Windows NT, Windows 98, Windows 2000, Windows XP, or Linux. Note that among browsers, only Netscape Navigator works with Linux. You should also have an application that lets you create text files. All operating systems come ready with a diversity of text editors and word processors, any of which are usable for creating JavaScript scripts. JavaScript-specific software You require a Web browser. Netscape Navigator 2.0 or higher (a commercial Web browser) and Internet Explorer 3.0 or higher (from Microsoft), Mozilla Firefox, Safari, Opera, and Google Chrome are a few of the commonly available browsers that support JavaScript at this time. So, the first thing to do is to get a copy of either of these browsers. Most of the examples that you will be shown in this book are on either Netscape Navigator or Internet Explorer, running on Windows XP. Most personal computers are available with Internet Explorer pre-installed. To check if your particular computer comes loaded with IE too, choose Start, go to All Programs and look for Internet Explorer. Netscape Navigator Netscape Navigator version 7.x is complete with tools for messaging, Web construction, and other Internet-related features. You can download Netscape Navigator by visiting the following Website. The site offers step-by-step installation instructions as well. Internet Explorer If you like Microsoft a lot, you may want to download a copy of Internet Explorer. It can be obtained for free from the following Website, which also offers clear installation instructions. Else, you could a copy on CD-ROM for an insignificant fee.

Material 369 Other browsers Here are the links to where you can download some other browsers from: ? Mozilla Firefox: http://www.mozilla.com/en-US/firefox/ie.html ? Google Chrome: http://www.google.com/chrome ? Safari: http://www.apple.com/safari/download/ ? Opera: http://www.opera.com/download/ Writing your First JavaScript One of the finest ways to comprehend the fine points of a new scripting language is to take the leap and start creating a script. That is what we will learn in this section. In fact, in this section we will learn more than how to create scripts. We will learn how to create a JavaScript application. JavaScript is not very helpful if used alone. The best way to work with it is to use it together with HTML. Therefore, a JavaScript application is bound to contain at least one JavaScript script, and at least one HTML file. Like exemplary art, exemplary software is not easy to create. To create either of these two, you need to plan, and then use some kind of apparatus, keeping in mind some kind of logical reasoning. Without any of these things, it is impossible to make plans materialize into something concrete. In this section of the book, we will familiarise ourselves with the basic level tools that are required to create JavaScript applications. What we need is a basic text editing application, and a Web browser that supports JavaScript. The logical process that you need to follow in order to create a JavaScript application, in other words development cycle, will also be discussed. The preliminary step to constructing a really good JavaScript application is to decide precisely what the application is supposed to do. So what do you want your JavaScript application to do? There are several choices, among which the most popular are: Introduction to JavaScript NOTES ? Providing feedback to users ? Performing mathematical calculations ? Displaying information that a user requests in a pop-up window ? Creating mouse rollover effects ? Validating the user's input Once you have a clear plan in mind, you should take some time out, and write down, step by step, your plan, on a piece of paper. This is a very helpful method – it comes in handy when you want to clarify exactly how you want your application to behave. This phase is officially known as the requirements stage, and if you finish this step, it becomes easier to test your application once you've created it. This piece of paper actually acts as a checklist. Please note that this requirement capture does not have to be an elaborate form that you will end up spending a lot of time on. It can be as simple as a one-line description of what you want your Web page to do. Let us create a set of requirements for the application that we will set out to build in this session. We will create a Web page that has the current date and time on display. Self-Instructional

Self-Instructional Material 370 Introduction to JavaScript NOTES Step I: Creating an HTML file Once you have made your requirement capture document, you are ready to start creating codes. The first thing that you need to do is create a Web page. That can be done by typing the required HTML code on a text editing software. This code needs to be saved as a new file on your system's hard disk. Note: Since this book is about JavaScript, we won't be going into a lot of detail about how HTMl codes are written. For information on how HTML should be used, you should refer to these Websites that contain information on some books on HTML: We will be using Notepad as our text editor throughout this book, for the simple reason that it is pre-installed on all Windows systems, and is fairly easily available. Also, it is rather easy to use. There are several other text editors that can be used, if they are installed on your system. Some such examples are BBEdit (from Bare Bones Software Solutions), TextPad (from HELIOS Software Solutions), Dreamweaver (from Macromedia) and GoLive (from Adobe). All these text editors are compatible with JavaScript. You need to be sure that you are using a text editor to create your HTML and JavaScript scripts, and not using any word processing software. The reason why programmers advise against using word processors is that a word processor application tends to add junk (non-textual) characters to the existing code when you save the file. The language interpreters that are placed inside browsers – the piece of software that actually decodes a programmer's HTML and JavaScript codes – are not able to interpret and process non-text, junk or special characters. So we are going to use notepad, and not MS Word. As with any other rule, there is an exception to the guideline that the use of word processors should be avoided when writing codes. A few word processors let you use the Save As function, and save the file in plain text format. To check whether you can do this in your word processor, open the application, and click the file menu on the top left corner. Just beneath the Save option, you will find Save As. Click it, and in the 'Save as type' field at the bottom, drop the menu down.

Self-Instructional Material 371 As has been highlighted in the picture above, some applications will give you the option to save the file as plain text. If your word processor does not have this option, you will need to use a text editor such as Notepad. Let us see what steps you will need to follow to create a file using Notepad. 1. Click the Start menu, and go to All Programs. Look for Accessories, and then click Notepad to open your text application, Notepad. 2. Once the Notepad editing window is open, start typing your HTML code, and JavaScript code. (see example below) 3. Once you are done with writing the code, save the file. To do this, click File, and then click Save. In case you are trying to create a JavaScript embedded HTML file, ensure that the name of the file contains either of the two extensions .htm or .html. The code that you will have to type to meet your requirements as captured in the requirement phase: >HTML< >HEAD< >TITLE<Displaying the current date and time (basic example)>/ TITLE< >SCRIPT LANGUAGE="JavaScript" TYPE="text/javascript"< >!— Hide from browsers that do not support JavaScript // Capture the current date and time from the system clock var todays_date = new Date(); // Display the current date and time on the Web page document.writeln(todays_date); // —< Finish hiding >/SCRIPT< >/HEAD< >BODY< >P<This is my first JavaScript application.>/P< >/BODY< >/HEAD< >/HTML< This is how the text would appear in your Notepad text editor window: Introduction to JavaScript NOTES
Self-Instructional Material 372 Introduction to JavaScript NOTES The most widely used way to implement JavaScript scripts is by embedding it in an HTML file, which is how we are going to do it in this chapter. The script can also be implemented in the form of a separate external file using the.js extension, and then referencing it in an HTML file. Here is what the HTML code for our Date and Time Stamp application will look like on Notepad: >HTML< >HEAD< >TITLE<Displaying the current date and time (basic example)>/ TITLE< >/HEAD< >BODY< >P<This is my first JavaScript application.>/P< >/BODY< >/HTML< This code displays the following: ? The title text appears in the title bar of the document window (Displaying the current date and time (basic example) ? The body text appears in the body of the Web page. (This is my first JavaScript application.) Here is what it looks like on a browser window: Number Crunching (Browser differences) Sometimes, JavaScript programmers, while setting language attributes of the >SCRIPT< tag, get carried away, and set the tag to equal to a value of JavaScript1.1, JavaScript1.2, or JavaScript1.3 instead of writing JavaScript. This is usually done when the programmer is sure that the script is capable of using the version-specific code. Let's look at an example: >SCRIPT LANGUAGE="JavaScript"< . . . (JavaScript code version 1.0 and up) >/SCRIPT< >SCRIPT LANGUAGE="JavaScript1.2"< . . . (JavaScript code version 1.2 or up) >/SCRIPT< >SCRIPT LANGUAGE="JavaScript1.3"< . . . (JavaScript code version 1.3 or up) >/SCRIPT<
Self-Instructional Material 373 Introduction to JavaScript NOTES Now you may be very happy to see that the script actually works, but the work is only half done! The page is supposed to capture the current date and time, which it doesn't, yet. It also needs to display the current date and time on the Web page, which it doesn't, either. Now we need to write a script that will capture the date and time, and will display it on the page. We will cover this in the next two sections. Step II: Creating your script Once your HTML file has begun working as displayed in the figure above, it is time for you to start creating scripts. To create the Date and Time Stamp application, (described in the beginning of this unit) your script needs to: ? Capture the current date and time ? Display the current date and time on the Web page The JavaScript code that enables your Website to do all this, as demonstrated below, is not as complicated as it sounds. JavaScript code for the date and time stamp application // Capture the current date and time from the system clock var todays_date = new Date(); // Display the current date and time on the Web page document.writeln(todays_date); Though there are several advantages of using this approach, there are issues as well. It becomes extremely painful to keep track of JavaScript support in the variety of versions that Netscape Navigator and Internet Explorer come with. Consider this: ? Navigator version 2.0 and Internet Explorer version 3.0 support JavaScript 1.0. ? Navigator version 3.0x and Internet Explorer versions 3.0x and 4.0x support JavaScript 1.1. ? Navigator versions 4.0 to 4.05 support JavaScript 1.2. ? Navigator versions 4.06 to 4.5 support JavaScript 1.3. ? Internet Explorer version 5.x supports JScript 5.x (which is compatible with JavaScript 1.3, more or less). ? Navigator versions 6.0x and 7.1 and Internet Explorer version 6 support JavaScript 1.5. It is highly bewildering and complex task to keep track of which version of which browser supports which version of JavaScript. Even if you do manage to do so, specifying a JavaScript 1.3 value (and not JavaScript) for the Language attribute will not help you by providing any additional support. It merely stops those browsers that don't support version 1.3 of JavaScript from trying to decode those statements in the >SCRIPT LANGUAGE="JavaScript1.3"< and >/SCRIPT< tags. It is best, therefore, to stick to LANGUAGE='JavaScript'. It also helps to use uncomplicated JavaScript constructs, and test the script in multiple browsers before actually publishing the Web page.

Self-Instructional Material 374 Introduction to JavaScript NOTES As you look at this code, observe that: ? All lines that begin with // are comments. These comments are just simple statements that describe what the code is going to attempt to do. The JavaScript interpreter on your Web browser will not try to execute these comments. The purpose of writing comments is to make notes on what the programmer wishes the statement to accomplish. In this code, there are two comment lines. ? The first JavaScript statement is that part of the code that is responsible for capturing the system date and time. This is done by creating a new instance of the built-in Date object. Further, the value of that instance is allocated to a variable called todays_date. var todays_date = new Date(); ? The second JavaScript statement takes this one step further. It uses the writeln() method of the document object to write the contents of the todays_date variable to the body of the Web page. document.writeln(todays_date); Step III: Attaching a script to an HTML file So far, we have seen two codes – the one that we created in Step I (the HTML code) and the one that we created in step II (the JavaScript code). Once these two codes are combined, the page will display the current date and time, as well as display the message, 'This is my first JavaScript application.' So the next step is to attach our JavaScript script to an HTML file. The example below demonstrates how this can be done. The HTML and JavaScript Code for the date and time stamp application >HTML< >HEAD< >TITLE<Displaying the current date and time (basic example)>/ TITLE< >SCRIPT LANGUAGE="JavaScript" TYPE="text/javascript"< >!— Hide from browsers that do not support JavaScript // Capture the current date and time from the system clock var todays_date = new Date(); // Display the current date and time on the Web page document.writeln(todays_date); // ? Finish hiding >/SCRIPT< >/HEAD< >BODY< >P<This is my first JavaScript application.>/P< >/BODY< >/HTML<
Self-Instructional Material 375 The code that you notice in the example above joins the HTML code shown in Step I with the JavaScript code shown in Step II — along with four other lines of code. It's this additional code, shown in bold, that holds the JavaScript script and the HTMLfile together. Observe the following when you take another look at the code above: ? The JavaScript code is glued to the HTML file with the help of the HTML >SCRIPT< and >/SCRIPT< tags. Your entire JavaScript code must be shown between beginning >SCRIPT< and ending >/SCRIPT< tags. It is possible for you to include multiple scripts on an HTML file as long as each script is contained within the >SCRIPT< and >/SCRIPT< tags. Since there are several programming languages, you need the LANGUAGE and TYPE variables to specify JavaScript as the scripting language for this script in particular. ? The JavaScript code has been positioned in the header segment of the HTML file (sandwiched between the HTML >HEAD< and >/HEAD< tags). You can insert more than one >SCRIPT< and >/SCRIPT< tags in different segments in the HTML file. For instance, you can insert the >SCRIPT< and >/SCRIPT< tags in the body segment of an HTML file between the starting and ending >BODY< and >/BODY< tags. However, as the browser will run JavaScript code only once it comes across that code, from start to end, the fact that you insert your script at the extreme top of an HTML code helps to make sure that the JavaScript code is loaded and is available for use as soon as the Web page is loaded. ? In browsers that don't support JavaScript, HTML comments hide the script. The following comments make the JavaScript codes inaccessible to those browsers that are not compatible with JavaScript: >! — Hide from browsers that do not support JavaScript // ? Finish hiding So anything that has been written between these two lines of code will be ignored by the browser. This means that if you enclose your JavaScript statements within these two lines, your browser will not face any compatibility issues, and your JavaScript statements will not be displayed as random text. It is of utmost importance to ensure that the beginning hiding symbol >!— and the closing hiding symbol // ?, are inserted in separate lines. Placing any of these two symbols on the same script as a JavaScript statement will make the hiding symbols malfunction, and your JavaScript statements will be displayed as text on a browser that does not have JavaScript enabled on it. It will be as if the hiding symbols themselves are in hiding. To be able to control what the visitors of your Website get to see on their screen if they are using a non-JavaScript enabled browser, you should make sure that each pair of >SCRIPT< and >/SCRIPT< tags is followed by the HTML >NOSCRIPT< and >/NOSCRIPT< tags. Let's see how this is done. In the following instance, the code displays a message that informs users that their browser does not have JavaScript Introduction to JavaScript NOTES

376 Material Introduction to JavaScript NOTES Self-Instructional enabled, and that they need to use a JavaScript-enabled Web browser to experience your Web page completely: ... >/SCRIPT< >NOSCRIPT< Your browser does not support JavaScript. In order to get the most from this page, you must be using a JavaScript-enabled Web browser, such as Netscape Navigator or Microsoft Internet Explorer. >/NOSCRIPT< Testing your script As soon as you have an HTML file containing embedded JavaScript code, as shown in Step III, you are all set to test your JavaScript application. To test an application, all you have to do is load the HTMLfile that contains the embedded JavaScript code into a JavaScript supporting Web browser. The figure below demonstrates how the Webpage will look once it is loaded on the Netscape Navigator browser. The Date and Time Stamp application as it appears in Netscape 7.1. If you just loaded the code as shown in Step III in your Web browser, and were able to see the date and time stamp on it, you have just successfully tested your first JavaScript script. If, however, it doesn't seem to work, chances are that the problem is occurring due to one f the following situations: ? The HTML file that you loaded is not the correct one: If you created your HTML file from scratch, you might have inadvertently mistyped a statement or otherwise introduced a bug. No problem; you can fix the bug later. ? You're not using a JavaScript-enabled browser: Make sure that you're using Microsoft Internet Explorer 6.0 (or higher) or Netscape Navigator 7.1 (or higher). Check Your Progress 12. List some uses of alerts. 13. What are the disadvantages of alerts?

Self-Instructional Material 377 ? Your browser has JavaScript support turned off: All browsers that support JavaScript have a way of turning JavaScript support off. In case it is turned off on your browser, and a Web page that contains JavaScript scripts is loaded; the browser completely ignores the presence of JavaScript codes completely. To make sure that JavaScript support is turned on, do the following: ? If you're using Netscape Navigator 7.x: Open a browser window, and click the Edit menu, Then go to Preferences, and double click Advanced. This will displaythe Scripts and Plugins window. Click the Click the Scripts & Plugins menu selection, and check whether the Enable JavaScript for Navigator check box is checked. ? If you're using Internet Explorer 6.x: Launch the browser, click the Tools menu. Choose Internet Options, and then select Security. Then go to the Internet Web Content Zone, click Custom Level, and scroll down to the Active Scripting category. Check whether the Enable option is checked. Introduction to JavaScript NOTES 6.14 SUMMARY In this unit, you learnt that: ? Data types can be broken down into two key classes: Primitive and Composite or Non-primitive. ? JavaScript supports three basic data types: Numeric, String and Boolean. ? A string is chain of valid characters within a given set of characters. It is normally used to denote text and is created by using two identical single or double inverted commas with values between them. ? Infinity is a number bigger than the biggest number that JavaScript can represent. There is also the keyword literal-Infinity for the negative infinity. ? Composite data types, also called non-primitive or complex types, consist of more than one constituent. The composite data type is similar to an object. It is a type of data that can include many values linked or grouped in some way. ? In computing, an object is nothing but a collection of specific named values. These values are also known as the properties of that object. Methods of that object are the functions that are associated with it. The properties and methods of an object are denoted with the help of a dot.notation. This dot.notation starts with the object's name, and ends with that of the property. ? A function is a fragment of code, predefined or composed bythe person constructing the JavaScript, which is run when it is directly called, or asked to run. ? An array is a systematically arranged collection of data values, such as in rows or columns. An array can hold more than one value at a time. ? An object literal is a way of putting a lot of data in one compact package. It is a list of name value pairs that are separated by a comma, and placed inside curly brackets. Object literals are used as a means of containing data, avoiding the use of universal variables that can cause trouble when combining code. ? JavaScript has two keyword literals that it believes to be objects. These are null and undefined.

Self-Instructional Material 378 Introduction to JavaScript NOTES ? A variable in JavaScript can be given a letter for a name, such as x, or a name that describes the variable, such as bookname.? ? The operators help to perform mathematical operations such as addition, subtraction, multiplication and division. These are represented symbolically by +, -, * and /. Operators can be divided into two groups, comparison operators and action operators. Action operators are also known as assignment operators.? ? The JavaScript built-in functions are used to handle the expressions, conditional expressions and special characters. These functions are able to convert string values to numeric values.? ? Scripting languages were originally divided into two parts – client-side scripting and server-side scripting. Scripts that are executed in the client's browser are known as client-side scripting languages.? ? The term 'server-side script' means that the script is executed on the server and the surfer can only view the end result. It is opposite to client-side scripting in which the script is run on the client's browser. This allows for more complicated scripts to be used, since the server is dedicated to them.? ?

JavaScript supports a number of built-in objects that make it unique and more flexible scripting language.

The windows content is dealt by these built-in objects. The built-in objects in JavaScript are specified as Date, Math, Array, String and Object.? ? JavaScript can help you make the Web page interactive. For this purpose, there is a construct in JavaScript that is known as the onLoad event handler. It helps trigger actions, such as displaying graphics or playing music as soon as the document is loaded onto a browser.? ? Three types of dialogue boxes used in JavaScript are alert(), prompt()and confirm().? 6.15 KEY TERMS ? Primitive data: Data types are the basic foundation of a program. ? Infinity: A number bigger than the biggest number that JavaScript can represent. ? Object: A collection of specific named values. These values are also known as the properties of that object. ? Object literal: It is a way of putting a lot of data in one compact package. It is a list of name value pairs that are separated by a comma, and placed inside curly brackets. These are used as a means of containing data, avoiding the use of universal variables that can cause trouble when combining code. ? String: A cluster of characters, such as a sentence or a word. It is normally used to denote text. A string is created by using two identical single or double inverted commas with values between them. ? Function: Afragment of code, predefined or composed by the person constructing the JavaScript, which is run when it is directly called, or asked to run. ? Variables: A variable in JavaScript can be given a letter for a name, such as x, or a name that describes the variable, such as bookname. When you create variables in JavaScript, it is referred to as declaring variables.
Self-Instructional Material 379 ? Array: In computer science, a data type that is intended to depict a collection of elements (values or variables) is known as an array. ? Dialog box: A dialog box is a type of window that is used in GUI (graphical user interface) pages to display some information to the visitors of a Website. 6.16 ANSWERS TO 'CHECK YOUR PROGRESS' 1. JavaScript supports 3 basic types of data, numeric, string and Boolean. 2. String Data is a chain of valid characters within a given set of characters. It is normally used to denote text. A string is created by using two identical single or double inverted commas with values between them. 3. Composite data types, also called non-primitive or complex types, consist of more than one constituent. The composite data type is similar to an object. It is a type of data that can include many values linked or grouped in some way. A composite type is obviously different from the data type of any of its components - composite data types can be build from both primitive data types and other non-primitive data types. 4. An object is a collection of specific named values. These values are also known as the properties of that object. 5. A function is a fragment of code, predefined or composed by the person constructing the JavaScript, which is run when it is directly called, or asked to run. 6. An Array is a systematically arranged collection of data values, such as in rows or columns. An array can hold more than one value, at a time. 7. Objects literals helps in writing the code that supports a variety of features. It is a somewhat straightforward method for the implementers of the code. They rule out the need to bring constructors into play directly or maintaining the correct order of arguments passed to functions, etc. Object literals are also helpful for low profile event handling. 8. A switch statement is used when you want the code to choose one out of the several layers of conditions that have been applied. 9. The JavaScript built-in functions are used to handle the expressions,
conditional expressions and special characters. These functions are able to convert string values to numeric values. 10. There are three recommended positions to place functions. These are either ? Inside the >head< segment of the HTML ? Inside the >body< section of the HTML document ? Within a .js include file that is incorporated into the >head< section 11. The purpose behind writing functions is to craft them in as general a way as possible in order to capitalize on the re-usability factor. Even though it might take some time when designing the function, it is best to consider how the function can be designed to be useful for the future. 12. Alerts have the following uses: ? Error alerts are used to inform the user than a task could be completed or they cannot continue due to some insuperable error.
Introduction to JavaScript NOTES
Self-Instructional Material 380 Introduction to JavaScript NOTES ? Warning alerts are used to inform the user that an action or step they are about to take could be either irreversible or dangerous. These warnings offer the visitor the option of not proceeding with this action. ? Info alerts present a general announcement about a recent event. ? Question alerts are used to elicit some information or data from the user, when this step is required in order to complete the current process. 13. Alerts have the following disadvantages. Some programmers who believe in usability feel that alert dialog boxes are a bad design as alerts tend to produce mode errors. Also, when used to inform the audience that an error has been encountered, they have proved to be rather ineffective. 6.17 QUESTIONS AND EXERCISES Multiple Choice Questions 1. Data is usually the basis on which observations are made, or graphs: (a) Collected (b) Drawn (c) Compiled (d) Allocated 2. A string is chain of valid characters within a given set of characters and is normally used to denote: (a) Number (b) Character (c) Figure (d) Text 3. JavaScript has two keyword literals that it believes to be: (a) Objects (b) Characters (c) Hidden (d) Data 4. The Math object contains useful methods and constants that can be put to use in arithmetical: (a) Formulas (b) Conclusions (c) Calculations (d) Queries 5. Since it is a contemporary programming language, JavaScript allows a programmer to define his own: (a) Functions (b) Meaning (c) Features (d) Objectives

Self-Instructional Material 381 6. Once the function has been invoked, the statements inside the function begin to get: (a) Ignored (b) Planned (c) Executed (d) Deleted 7. Once a function has been defined, certain variables that are being used as placeholders for values are built into the: (a) File (b) Data (c) Network (d) Function 8. A function can be assigned multiple values, but the function returns only a single value once the entire function has been: (a) Deleted (b) Executed (c) Planned (d) Formulated 9. The JavaScript built-in functions are used to handle the expressions, conditional expressions and special: (a) Characters (b) Symbols (c) Numbers (d) Functions 10. A significant fact about such scripts is that their source code is visible to: (a) Some one (b) No one (c) Everyone (d) Anyone Answers: 1. (b), 2. (d), 3. (a), 4. (c), 5. (a), 6. (c), 7. (d), 8. (b), 9. (a), 10. (c) Fill in the Blanks 1. Data by itself has no . 2. Only the latest versions of JavaScript octal numbers. 3. is a number bigger than the biggest number that JavaScript can represent. 4. Constructing a new object by means of the object literal is very simple. 5. The values that are contained inside parenthesis are always first. 6. Sometimes when a code is being written, the programmer wants the script to react to different situations. Introduction to JavaScript NOTES
Self-Instructional Material 382 Introduction to JavaScript NOTES 7. While using functions you need to be cautious about where you define _____. 8. Scripts that are executed in the client's are known as client-side scripting languages. 9. Because of restrictions, client-side scripts are sometimes not allowed to access the client's computer except for the browser. 10. When the user makes a request, the script is run on the main Web server, and dynamic Web pages are . 11. JavaScript can be thought of an of HTML, a kind of add-on. 12. A JavaScript application is bound to contain at least one JavaScript script and at least one . 13. One of the finest ways to the fine points of a new scripting language is to take the leap and start creating a script. 14. To test an application, all you have to do is load the HTML file that contains the embedded code into a JavaScript supporting Web browser. 15. A modal dialog box opens up as a separate window within the . Answers: 1. Significance, 2. Support, 3. Infinity, 4. Syntax, 5. Calculated, 6. Differently, 7. Variables, 8. Browser, 9. Security, 10. Generated, 11. Expansion, 12. HTML file, 13. Comprehend, 14. JavaScript, 15. Main window State Whether TRUE or FALSE 1. Data is considered the destination where all the information and knowledge end. 2. Primitive data types are the basic foundation of a program. 3. A string is created by using two identical single or double exclamation marks with values besides them. 4. An object literal is a way of putting a lot of data in one compact package. 5. Undefined is not a keyword, much unlike null and is treated like all other variables, even though it is a predefined global variable. 6. Most widespread operators are those that help perform mathematical operations such as addition, subtraction, multiplication and division. 7. Each element is selected by one or more indexes that can be computed when the program is running. 8. With the help of JavaScript, a Website can be made easy to navigate. 9. An if statement is used to execute a certain code only if a certain condition is false. 10. JavaScript can be thought of an expansion of HTML, a kind of add-on. 11. The final step to construct a really good JavaScript application is to decide precisely what the application is supposed to do. 12. Some dialog boxes only provide feedback, while some others even allow the user to respond to the feedback. 13. To test an application, all you have to do is load the HTML file that contains the embedded JavaScript code into a JavaScript supporting Web browser.
Self-Instructional Material 383 14. All browsers that support JavaScript have a way of turning JavaScript support on. 15. The most basic dialog box is the type that usually requires the user to just click a button and move back to the Web page he or she was working on. Answers: 1. False, 2. True, 3. False, 4.
True, 5. True, 6. True, 7. False, 8. True, 9. False, 10. True, 11. True, 12. True , 13. True, 14. False, 15. True
Match Column A with Column B ColumnA Column B 1. The source from which information and knowledge are obtained is called A Java 2. The basic foundation of a program are called B String 3. A number bigger than the biggest number that JavaScript can represent is known as C Infinity 4. A collection of specific named values also known as the properties of that object are called D Data 5. A fragment of code, predefined or composed by the person constructing the JavaScript, which is run when it is directly called, or asked to run is termed as E Variables 6. The letters of the alphabet that are assigned values are called F Dialog box 7. A data type that is intended to depict a collection of elements (values or variables) is known as G JavaScript 8. A cluster of characters, such as a sentence or a word is named as H Function 9. A type of window that is used in GUI (graphical user interface) pages to display some information to the visitors of a Website is called I Primitive data 10. The function offers the viewer two options to choose from, and not just one is known as J Array 11. An object-based programming language is called K Confirm 12. A high-level scripting language that is object-based, like Java is known as L Object Answers: 1. (D), 2. (I), 3. (C), 4. (L), 5. (H), 6. (E), 7. (J), 8. (B), 9. (F), 10. (K), 11. (A), 12. (G) Short-Answer Questions 1. What are the two data types? 2. What is a floating point number? 3. What is a Boolean value? 4. What are the two types of operators? Introduction to JavaScript NOTES

Self-Instructional Material 384 Introduction to JavaScript NOTES 5. Name any three browsers that you can use to work with JavaScript. 6. Does using JavaScript put your computer in any kind of security risk? 7. How will you check whether your computer has Internet Explorer installed on it? 8. In case IE is not installed on your system, how will you obtain it? 9. What is the code for the date and time stamp application? 10. Why is it not recommended to assign LANGUAGE attributes of the >SCRIPT< tag to JavaScript 1.3? 11. What is a dialog box? 12. List any two uses of alerts. 13. How is the confirm dialog box different from alert? 14. When does the confirm() function return false? 15. Why is the prompt dialog box considered the most complex of the three dialog boxes? 16. What is the easiest way to add interactivity to a dialog box? Long-Answer Questions 1. What are the data types that JavaScript supports? 2. Explain primitive data types supported by JavaScript with the help of example. 3. What is a function? How is it defined in JavaScript? 4. What is a null string? How is it represented? 5. What are object literals? Why are they used? 6. How are variables declared in JavaScript? 7. Discuss the role and significance of operators. What do you mean by operator precedence? 8. Differentiate between expressions and statements with the help of JavaScript examples. 9. Explain the different types of statements used in JavaScript. 10. How are arrays declared in JavaScript? 11. Discuss the use and significance of user-defined functions in JavaScript. 12. Discuss the use and significance of various built-in functions in JavaScript. 13. Differentiate between client-side scripting and server-side scripting using JavaScript. 14. How do we add JavaScript to a Web page? 15. What does your script need to do if you want to create a date and time stamp application? 16. Why are dialog boxes useful? What are its types? 17. Give three examples of the types of options provided to the user by the confirm dialog box. Self-Instructional Material 385 6.18 FURTHER READING Flanagan, David. 2001. JavaScript: The Definitive Guide, Fourth Edition. New Jersey: O'Reilly Media. Singh, Ravinder and Amit Gupta 2005. Magic with HTML, DHTML & JavaScript. New Delhi: Laxmi Publications Pvt. Ltd. Zhi-Hua Zhous & Shaowu Liu (2021) Machine learning 6.19 LEARNING OUTCOMES ? The data types in JavaScript ? Constants/literals ? Variables and operators ? Know the use of expressions ? Know the use of statements ? Know the use of user-defined functions ? Understand the use of built-in functions ? Know the properties and methods of built-in objects ? The client-side form validation using JavaScript ? The use of dialog boxes in JavaScript
Introduction to JavaScript NOTES
Self-Instructional Material 386 NOTES
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Answers to ‘Check Your Progress’ 6.17 Questions and Exercises 6.18 Further Reading 6.19 Learning Outcomes Self-Instructional Material 1 INTRODUCTION Web technology revolutionizes the way information is exposed and circulated within every organization and enables everyone to be in the distribution business. It includes the development, hosting and maintenance of sites for big, medium and small companies. Nowadays every organization is building a

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that are available to everyone on the authorized network. To build a web site one requires a computer system, a network, browser software and server software. The network must support the TCP/IP protocol and each computer must have an IP address configured on it. Internet provides free web browser, web server software, icons, backgrounds, images and graphics to develop an attractive

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A web server contains a bunch of files that are called by the server software when a user sends a request through their web browser. The web browsers provide accessibility to various available

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Answers to ‘Check Your Progress’ 6.17 Questions and Exercises 6.18 Further Reading 6.19 Learning Outcomes Self-Instructional Material 1 INTRODUCTION Web technology revolutionizes the way information is exposed and circulated within every organization and enables everyone to be in the distribution business. It includes the development, hosting and maintenance of sites for big, medium and small companies. Nowadays every organization is building a

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a set of Questions and Exercises is provided at the end of each unit for effective recapitulation. Introduction NOTES Self-Instructional Material 3

a set of ‘Questions and Exercises’ is also provided at the end of each unit for effective recapitulation. Self-Instructional Material 3

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19/472	SUBMITTED TEXT	47 WORDS	90%	MATCHING TEXT	47 WORDS

The Internet carries a vast array of information resources and services, most notably the inter-linked hypertext documents of the World Wide Web (WWW) and the infrastructure to support electronic mail. In this unit, you will also learn about the various aspects of the Internet like Telnet,

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20/472	SUBMITTED TEXT	47 WORDS	90%	MATCHING TEXT	47 WORDS

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21/472	SUBMITTED TEXT	22 WORDS	83%	MATCHING TEXT	22 WORDS

UNIT OBJECTIVES After going through this unit, you will be able to: ? Analyse the history of the Internet ?

UNIT OBJECTIVES After going through this unit, you will be able to: • Understand the basics of the Internet

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22/472	SUBMITTED TEXT	22 WORDS	83%	MATCHING TEXT	22 WORDS

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23/472	SUBMITTED TEXT	16 WORDS	70%	MATCHING TEXT	16 WORDS

The body of the message is the actual message that has to be sent. The

the body of the message is the actual information that is to be communicated. The

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24/472	SUBMITTED TEXT	16 WORDS	70%	MATCHING TEXT	16 WORDS

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25/472	SUBMITTED TEXT	72 WORDS	98%	MATCHING TEXT	72 WORDS

The World Wide Web is a global hypertext system that was initially developed in 1989 by Tim Berners Lee at the European Laboratory for Particle Physics, CERN, in Switzerland to facilitate an easy way of sharing and editing research documents among a geographically dispersed group of scientists. The WWW has a unique combination of flexibility, portability and user friendly features that distinguish it from other features provided by the Internet.

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26/472	SUBMITTED TEXT	72 WORDS	98%	MATCHING TEXT	72 WORDS

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27/472	SUBMITTED TEXT	86 WORDS	99%	MATCHING TEXT	86 WORDS

Web browsers Web browsers are HTTP client software programs that run on TCP/IP client computers to access web documents on web servers. These browser programs retrieve hypertext documents and display them, and also implement many of the Web's advanced features, such as caching (Figure 1.29). Browsers used today support a wide variety of media, allowing the Web to implement many different functions aside from simply hypertext document transfer. Examples include displaying images, playing sounds and implementing interactive programs.

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28/472	SUBMITTED TEXT	86 WORDS	99%	MATCHING TEXT	86 WORDS

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29/472	SUBMITTED TEXT	36 WORDS	98%	MATCHING TEXT	36 WORDS

Fig. 1.29 Architecture of a Web Browser Each browser usually consists of three parts: a controller, client protocol, and interpreters. The controller receives input from the keyboard or the mouse and uses client programs

Fig. 1.12 Architecture of a Web Browser Each browser usually consists of three parts, i.e., a controller, client protocol, and interpreters. The controller receives input from the keyboard or the mouse and uses client programs

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30/472	SUBMITTED TEXT	36 WORDS	98%	MATCHING TEXT	36 WORDS

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31/472	SUBMITTED TEXT	30 WORDS	54%	MATCHING TEXT	30 WORDS

The World Wide Web (WWW) Uniform Resource Identifiers (Urls) Hypertext Transfer Protocol (HTTP) Web Hardware and Software Web Client Hardware and Browser Software

The World Wide Web (WWW) HyperText Markup Language (HTML) HyperText Transfer Protocol (HTTP) Uniform Resource Identifiers (URIs) Web Hardware and Software Web Server Hardware and Software Web Client Hardware and Browser Software

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32/472	SUBMITTED TEXT	30 WORDS	54%	MATCHING TEXT	30 WORDS

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33/472	SUBMITTED TEXT	26 WORDS	100%	MATCHING TEXT	26 WORDS

to access the document. After the document has been accessed, the controller uses one of the interpreters to display the document on screen. 2. Web

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34/472	SUBMITTED TEXT	26 WORDS	100%	MATCHING TEXT	26 WORDS

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35/472	SUBMITTED TEXT	52 WORDS	100%	MATCHING TEXT	52 WORDS

Web Servers Web servers are computers that run special server software to allow them to provide hypertext documents and other files to clients who request them. Millions of such machines around the world now serve as a virtual, distributed repository of the enormous wealth of information that the Web represents. 3.

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36/472	SUBMITTED TEXT	52 WORDS	100%	MATCHING TEXT	52 WORDS

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37/472	SUBMITTED TEXT	15 WORDS	75%	MATCHING TEXT	15 WORDS

HyperText Markup Language (HTML) HTML is a text language used to define hypertext documents.

HyperText Markup Language (HTML) documents. HTML is a tag language used to create HyperText documents.

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38/472	SUBMITTED TEXT	15 WORDS	75%	MATCHING TEXT	15 WORDS

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39/472	SUBMITTED TEXT	161 WORDS	97%	MATCHING TEXT	161 WORDS

normally begins either by typing the URL of the page into a web browser, or by following a hyperlink to that page or resource. ? First, the server-name portion of the URL is resolved into an IP address using the global, distributed Internet database known as the domain name system. ? The browser then requests the resource by sending an HTTP request to the web server at that particular address. ? The HTMLtext of the page is requested first and parsed immediately by the Web browser, which will then make additional requests for images and any other files that form a part of the page. ? Having received the required files from the web server, the browser then renders the page onto the screen as specified by its HTML, CSS, and other web languages. Any images and other resources are incorporated to produce the on-screen web page that the user sees. Hypertext Hypertext is the main concept that makes the

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40/472	SUBMITTED TEXT	161 WORDS	97%	MATCHING TEXT	161 WORDS

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41/472	SUBMITTED TEXT	103 WORDS	100%	MATCHING TEXT	103 WORDS

more than just another message transfer system. The prefix 'hyper' usually means 'above' or 'beyond', and thus hypertext is like text, but goes beyond it in terms of functionality. The extra information in a hypertext document is used to tell the computer program that displays the file to a user how to format it. This information takes the form of special instructions that are interspersed with the actual text of the document itself, which are written according to the syntax of a defining language. This addition of extra elements to the content of a document is commonly called marking up the document.

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42/472	SUBMITTED TEXT	103 WORDS	100%	MATCHING TEXT	103 WORDS

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43/472	SUBMITTED TEXT	85 WORDS	91%	MATCHING TEXT	85 WORDS

hypertext documents use Hypertext Markup Language (HTML). HTML documents are as ASCII text files, but are arranged using a special structure of HTML elements that define the different parts of the document and how they should be displayed to the user. Each element is described using special text tags that define it and its characteristics (Figure 1.31). Fig. 1.31 HTML Tag Self-Instructional Material 39 Web documents The documents in www can be grouped into three broad categories: ? Static documents ?

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44/472	SUBMITTED TEXT	85 WORDS	91%	MATCHING TEXT	85 WORDS

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45/472	SUBMITTED TEXT	198 WORDS	98%	MATCHING TEXT	198 WORDS

Static documents: These are fixed content documents that are created and stored in a server. The client can only get a copy of the document. The contents of the file are determined when it is created and not when it is used. The user cannot change the document (Figure 1.32). Fig. 1.32 Static Document Dynamic documents: This document is created by the server whenever the browser requests the document. When a request arrives, the web server runs an application program or a script that creates the dynamic document. The server returns the output of the program or script as response to browser that requested the document. A fresh document is created for each request; the contents of dynamic document can vary from one request to another. For example; retrieval of date and time from a server. There are two ways to create dynamic documents: ? Common Gateway Interface (CGI) is a technology that creates and handles dynamic documents. CGI is a set of standards that defines how a dynamic document is created, how data is input to the program and how output result is used. ? Scripting technologies are embedded in the HTML page.

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46/472	SUBMITTED TEXT	198 WORDS	98%	MATCHING TEXT	198 WORDS

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47/472	SUBMITTED TEXT	32 WORDS	71%	MATCHING TEXT	32 WORDS

Self-Instructional Material 40 Internet: An Overview NOTES Fig. 1.34 Dynamic Document with Script Active documents: In active documents the program or script

Self-Instructional Material 23 NOTES Foundations for Internet Programming Fig. 1.16 Dynamic Document with Script Active Documents In active documents the program or script

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48/472	SUBMITTED TEXT	32 WORDS	71%	MATCHING TEXT	32 WORDS

Self-Instructional Material 40 Internet: An Overview NOTES Fig. 1.34 Dynamic Document with Script Active documents: In active documents the program or script

Self-Instructional Material 23 NOTES Foundations for Internet Programming Fig. 1.16 Dynamic Document with Script Active Documents In active documents the program or script

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49/472	SUBMITTED TEXT	112 WORDS	96%	MATCHING TEXT	112 WORDS

at the client side. When a browser requests an active document, the server sends a copy of the document or script. The document is then run on the client site. Active documents are sometimes referred to as client-site dynamic documents (Figure 1.35). Active documents can be created in two ways: ? Java applets, programs written in Java on the server, are compiled and ready to run. The browser creates an instance of this applet and runs it. Fig. 1.35 Active Document ? JavaScript is interpreted and run by the client at the same time. The script is in the source code (Figure 1.36) Fig. 1.36 Active Document

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W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

50/472	SUBMITTED TEXT	112 WORDS	96%	MATCHING TEXT	112 WORDS

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51/472	SUBMITTED TEXT	320 WORDS	98%	MATCHING TEXT	320 WORDS

Page The WWW is a subset of the Internet and comprises of a huge collection of documents stored in computers across the world. The web encompasses special sites called websites along the Internet, that support web browsing. By clicking on the links that appear on the webpage, one can navigate from one place to another. Hence, webpage can be defined as a single hypertext document written in Hypertext Markup Language (HTML) and described in HTML basics. A webpage normally incorporates the basic information and links to navigate in the websites to which it belongs. Documents in the World Wide Web are classified into three types, namely static, dynamic and active documents. Static web page These are fixed content documents which perpetually provide the same information in response to all download requests from all web users. Static documents are stored in a web server to be accessed by the web client. The web client, on requesting for a web page, gets a copy of the same. The contents of such files are not subject to modification on part of the web user as the web user does not have right to alter them. However, the web pages can be modified in the server per say. Thus, the static web pages display the same information to all the web users and provide hypertext links to perform navigation through static documents. Their biggest advantage is that they are cache friendly. This enables the web pages to display one copy of the same web page to many people simultaneously. However, it becomes difficult to maintain web pages in case of large sites as they demand consistency and updation. Dynamic web page These web pages provide interactive web navigation and help modify the content like text, images, form fields, etc. on a web page, depending on different contexts or conditions. The dynamic web pages make use of two types of inter-activities, which are enlisted

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53/472	SUBMITTED TEXT	57 WORDS	97%	MATCHING TEXT	57 WORDS

Client side scripting: This is used to modify interface behaviours within a specific web page. This modification is based on the mouse or keyboard actions and is conducted at specified time intervals. The dynamic behaviour takes place within the presentation. The presentation technologies like JavaScript or ActionScript for dynamic HTML (DHTML) and Flash for media types

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55/472	SUBMITTED TEXT	95 WORDS	100%	MATCHING TEXT	95 WORDS

are used. The client side scripting also facilitates the use of remote scripting in which the DHTML page requests for additional information from the server. The content is generated on the web client's machine in which the web browser retrieves a page from the server and processes the code embedded in the web page, so that the contents of the retrieved page can be displayed to the web user. Sometimes, the web browsers do not support the language and the commands of the scripting language, in the client-side dynamic pages. ? Server side scripting:

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57/472	SUBMITTED TEXT	80 WORDS	100%	MATCHING TEXT	80 WORDS

is used to modify the requested web page source amongst pages to either adjust the sequence or reload the web pages delivered to the browser. Server responses are based on certain conditions like data in a posted HTML form, parameters in the URL, the type of browser being used, the passage of time or a database or server state. Server side scripting dynamic web pages are designed with the help of server-side languages like PHP, Perl, ASP, JSP, etc.

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58/472	SUBMITTED TEXT	80 WORDS	100%	MATCHING TEXT	80 WORDS

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59/472	SUBMITTED TEXT	148 WORDS	100%	MATCHING TEXT	148 WORDS

Both the techniques may be used simultaneously to develop the dynamic web pages. The advantages of dynamic web pages are that these facilitate easy update of the web pages and faster web page loading. In the dynamic web pages, the content and the design are located separately, thereby allowing frequent modifications to the web pages including the text and image updates. Active documents The programs that run at the client side are known as the active documents. Whenever a web client requests for an active document, the web server provides a copy of the same in the form of byte code. The document is now ready to be run at the web client machine. As the active document is served in the binary form, compression and decompression can be applied at the server and the client side to reduce the bandwidth requirement and throughput. 1.8

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61/472	SUBMITTED TEXT	312 WORDS	100%	MATCHING TEXT	312 WORDS

URL) URL denotes Uniform Resource Locator. It is the address of a document on the World Wide Web. Web browsers enable a person to enter either a known address in the web server or a specific document within that server. Addresses usually begin with http://, ftp://, gopher://, WAIS://, file://, etc. It is not feasible to maintain WWW without using the URLs. These are also used to represent hypermedia links and links to network services within the HTML documents. Any file or service on the Internet can be presented with the help of the URL. The first part of the URL that comes before the two slashes specifies the method of access or protocol being followed for communications between the browser and the web server. The second part coming after two slashes represents the address of the host machine, whose data or services are being sought. The remaining parts signify the names of the files, the port to connect to or the text to search for in a database. All the parts of an address for obtaining a file or service from a host machine in a URL are shown as a single unbroken line with no spaces and the locations of the host machines or websites that run www servers are typically named with a www at the beginning of the network address. The web browsers enable the users to access web services by specifying a URL and connecting to that document or service. Once the user gets connected with the web server, the web browsers select the hypertext in an HTML document and send a request to open a URL. Thus, hyperlinks are used not only to provide other texts and media in the same document but also to facilitate other network services. Web browsers are not simply web clients. They are full-featured FTP, Gopher and telnet clients. 1.8.1

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63/472	SUBMITTED TEXT	277 WORDS	98%	MATCHING TEXT	277 WORDS

URL Encoding Uniform Resource Locator (URL) is a pointer that avails specified resources across the net. A Resource simply connotes information containing files or directories. It is referenced with query to available databases through search engines, such as Google or Yahoo. An example of URL that appears on the address bar is given as follows: http://aaa.bbb.edu/flower.html Table 1.2 depicts the above given URL details: Self-Instructional Material 45 Table 1.2 URL Details URL part Function http The protocol specifier aaa.bbb.edu The domain name flower.html The page location The http is used as a protocol in which information resides on the domain called aaa.bbb.edu. The information that resides in the host machine is taken as flower.html. The host machine can either be protocol dependent or host dependent. A component of URL is known as the path component. Sometimes the URL is also referred to as 'port', that is, it is a port number by which TCP connection is possible to the remote host machine. The default port for protocol is used if port is not specified. For instance, port 80 is known as default port for HTTP. The two ports, port 20 and port 21 are used by ftp. The alternative port can be used in the following way: http://aaa.bbb.edu:80/ flower.html Table 1.3 shows some specific symbols and characters which are used by the URL. These are, in fact, URL encoding. Table 1.3 Used Symbols and URL Encoding Specific Symbols and Characters URL Encoding ; %3B ? %3F / %2F : %3A # %23 & %24 = %3D + %2B $ %26 , %2C % %25 > %3C < %3E ~ %7E % %25 >

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69/472	SUBMITTED TEXT	45 WORDS	100%	MATCHING TEXT	45 WORDS

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71/472	SUBMITTED TEXT	305 WORDS	99%	MATCHING TEXT	305 WORDS

provide information and knowledge pertaining to any subject or topic of your choice. To extract information from the Internet, we need to explore the Internet. Surfing the Internet entails searching for two types of materials, namely the textual and the non-textual materials. HyperText Transfer Protocol (HTTP) facilitates exchange of documents between two or more computers that are connected to the Internet. It is the web browser which has the ability to provide requisite documents in the form of web pages. As an Internet is a repertoire of information, one needs to be adept in digging out the relevant information from such a vast ocean of web pages. Basically, there are two popular methods for surfing the Internet. In the first method, you know the web address of the particular website in which the pertinent information can be searched for. In this case, you just need to key the web address in the form of URL in the address bar of your web browser. It enables you to see the homepage of the desired website which allows navigation of different web pages contained in that website. The second method necessitates the use of search engines, that is, the software systems which enable the users to search for information on the WWW using specific keywords. Internet users key some keywords in the space provided in the search engine page. Obtaining the desired information contingent upon the keywords entered to a great extent. Surfing the Internet with the help of search engines has become an integral part of our life. Surfing the Internet also facilitates access to chat rooms where online discussions or chatting take place. However,

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72/472	SUBMITTED TEXT	305 WORDS	99%	MATCHING TEXT	305 WORDS

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73/472	SUBMITTED TEXT	30 WORDS	100%	MATCHING TEXT	30 WORDS

surfing the Internet has several disadvantages too. Some notorious people misuse the Internet and hack into other peoples' private accounts. Widespread injection of Spam is also annoying. 1.10

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74/472	SUBMITTED TEXT	30 WORDS	100%	MATCHING TEXT	30 WORDS

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75/472	SUBMITTED TEXT	224 WORDS	97%	MATCHING TEXT	224 WORDS

Search engines are the software that enable searching of the content available on Internet. A search engine is an information retrieval system which is used to access and retrieve information stored in WWW or a computer system attached to the Internet. Search engines also help minimize the time required to find the relevant information on the computer system. The computer system could be a standalone system or it could also be attached to the Internet. The search engines are popular amongst people as web search engines help explore information on the World Wide Web. Search engines are the interface to a group of contents, which allow the users to type in the keywords, so that the engine can find several matching contents to the corresponding keywords out of millions of web pages. The keywords provided by the user are referred to as a search query. Several styles of search query syntax are used by the net users. Search query differs for different types of search engines, that is, some search engines enable users to enter two or three words separated by space, whereas others may require users to provide entire documents, pictures, sounds, and various forms of languages. Some search engines attempt to enhance the search queries to provide a quality set of items through a process known as query expansion.
http://en.wikipedia.org/wiki/Image:Search-engine-diagram- en.svg

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76/472	SUBMITTED TEXT	224 WORDS	97%	MATCHING TEXT	224 WORDS

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77/472	SUBMITTED TEXT	230 WORDS	98%	MATCHING TEXT	230 WORDS

Uploading refers to sending of data from a local system to a remote system. like a server to keep a copy of the data there for various purposes. Downloading refers to retrieving of data from a remote system to a local system. Examples of remote systems include the web server, FTP server, email server or other similar systems. Information needs to be digitized for uploading or downloading. In the case of uploading, the files are generally copied from a smaller peripheral system to a larger central system. For example, a mobile phone file can be easily uploaded to a personal computer. Similarly, files from personal computer can be uploaded again to a server. Small files take only a few seconds in uploading, whereas larger graphic files can take hours in uploading. Downloading entails transfer of data from a central system to a smaller system. It is quite palpable that larger files take more time as compared to smaller files in downloading. Email is an interesting example of downloading and uploading in which emails in Inbox are downloaded from a server, whereas the replies are uploaded, so that they may be transmitted to the recipient. File Transfer Protocol (FTP) program is used to upload files to servers as well as to download files from remote locations. A number of programs are available to assist the users with uploading and downloading.

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W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

78/472	SUBMITTED TEXT	230 WORDS	98%	MATCHING TEXT	230 WORDS

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79/472	SUBMITTED TEXT	16 WORDS	90%	MATCHING TEXT	16 WORDS

Uniform Resource Locator (URL) is the address of a document on the World Wide Web.

Uniform Resource Locator. It is the address of a document on the World Wide Web. •

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

80/472	SUBMITTED TEXT	16 WORDS	90%	MATCHING TEXT	16 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

81/472	SUBMITTED TEXT	22 WORDS	100%	MATCHING TEXT	22 WORDS

Addresses usually begin with http://, ftp://, gopher://, WAIS://, file:// etc. It is not feasible to maintain WWW without using the URLs.? ?

Addresses usually begin with http://, ftp://, gopher://, wais://, file://, etc. It is not feasible to maintain WWW without using the URLs.

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82/472	SUBMITTED TEXT	22 WORDS	100%	MATCHING TEXT	22 WORDS

Addresses usually begin with http://, ftp://, gopher://, WAIS://, file:// etc. It is not feasible to maintain WWW without using the URLs.? ?

Addresses usually begin with http://, ftp://, gopher://, wais://, file://, etc. It is not feasible to maintain WWW without using the URLs.

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83/472	SUBMITTED TEXT	43 WORDS	100%	MATCHING TEXT	43 WORDS

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84/472	SUBMITTED TEXT	43 WORDS	100%	MATCHING TEXT	43 WORDS

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85/472	SUBMITTED TEXT	15 WORDS	100%	MATCHING TEXT	15 WORDS

with the help of search engines has become an integral part of our life.

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86/472	SUBMITTED TEXT	15 WORDS	100%	MATCHING TEXT	15 WORDS

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87/472	SUBMITTED TEXT	42 WORDS	88%	MATCHING TEXT	42 WORDS

are the interface to a group of? Self-Instructional Material 51 contents, which allow the users to type in the keywords, so that the engine can find several matching contents to the corresponding keywords out of millions of web pages. ?

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88/472	SUBMITTED TEXT	42 WORDS	88%	MATCHING TEXT	42 WORDS

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89/472	SUBMITTED TEXT	30 WORDS	62%	MATCHING TEXT	30 WORDS

Uploading refers to sending of data from a local system to a remote system and downloading refers to retrieving of data from a remote system to a local system.

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90/472	SUBMITTED TEXT	30 WORDS	62%	MATCHING TEXT	30 WORDS

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91/472	SUBMITTED TEXT	15 WORDS	85%	MATCHING TEXT	15 WORDS

Uniform resource locator (URL): The address of a document on the World Wide Web.

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W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

92/472	SUBMITTED TEXT	15 WORDS	85%	MATCHING TEXT	15 WORDS

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93/472	SUBMITTED TEXT	23 WORDS	100%	MATCHING TEXT	23 WORDS

Addresses usually begin with http://, ftp://, gopher://, WAIS://, file:// etc. It is not feasible to maintain WWW without using the URLs. ?

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94/472	SUBMITTED TEXT	23 WORDS	100%	MATCHING TEXT	23 WORDS

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95/472	SUBMITTED TEXT	16 WORDS	70%	MATCHING TEXT	16 WORDS

The body of the message is the actual message that has to be sent. The

the body of the message is the actual information that is to be communicated. The

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

96/472	SUBMITTED TEXT	16 WORDS	70%	MATCHING TEXT	16 WORDS

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97/472	SUBMITTED TEXT	62 WORDS	98%	MATCHING TEXT	62 WORDS

The World Wide Web is a global hypertext system that was initially developed in 1989 by Tim Berners Lee at the European Laboratory for Particle Physics, CERN, in Switzerland to facilitate an easy way of sharing and editing research documents among a geographically dispersed group of scientists. The WWW has a unique combination of flexibility, portability and user friendly features. 23.

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98/472	SUBMITTED TEXT	62 WORDS	98%	MATCHING TEXT	62 WORDS

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99/472	SUBMITTED TEXT	52 WORDS	99%	MATCHING TEXT	52 WORDS

Each browser usually consists of three parts: a controller, client protocol and interpreters. The controller receives input from the keyboard or the mouse and uses client programs to access the document. After the document has been accessed, the controller uses one of the interpreters to display the document on screen. 24.

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100/472	SUBMITTED TEXT	52 WORDS	99%	MATCHING TEXT	52 WORDS

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101/472	SUBMITTED TEXT	38 WORDS	100%	MATCHING TEXT	38 WORDS

A web page normally incorporates the basic information and links to navigate in the websites to which it belongs. Documents in the World Wide Web are classified into three types, namely static, dynamic and active documents. 25.

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102/472	SUBMITTED TEXT	38 WORDS	100%	MATCHING TEXT	38 WORDS

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103/472	SUBMITTED TEXT	62 WORDS	100%	MATCHING TEXT	62 WORDS

URL denotes Uniform Resource Locator. It is the address of a document on the World Wide Web. Web browsers enable a person to enter either a known address in the web server or a specific document within that server. Addresses usually begin with http://, ftp://, gopher://, WAIS://, file:// etc. It is not feasible to maintain WWW without using the URLs. 27.

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104/472	SUBMITTED TEXT	62 WORDS	100%	MATCHING TEXT	62 WORDS

URL denotes Uniform Resource Locator. It is the address of a document on the World Wide Web. Web browsers enable a person to enter either a known address in the web server or a specific document within that server. Addresses usually begin with http://, ftp://, gopher://, WAIS://, file:// etc. It is not feasible to maintain WWW without using the URLs. 27.

URL denotes Uniform Resource Locator. It is the address of a document on the World Wide Web. Web browsers enable a person to enter either a known address in the Web server or a specific document within that server. Addresses usually begin with http://, ftp://, gopher://, wais://, file://, etc. It is not feasible to maintain WWW without using the URLs.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

105/472	SUBMITTED TEXT	18 WORDS	100%	MATCHING TEXT	18 WORDS

Surfing the Internet entails searching for two types of materials, namely the textual and the non-textual materials.

Surfing the Internet entails searching for two types of materials, namely the textual and the non- textual materials.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

106/472	SUBMITTED TEXT	18 WORDS	100%	MATCHING TEXT	18 WORDS

Surfing the Internet entails searching for two types of materials, namely the textual and the non-textual materials.

Surfing the Internet entails searching for two types of materials, namely the textual and the non- textual materials.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

107/472	SUBMITTED TEXT	18 WORDS	100%	MATCHING TEXT	18 WORDS

Millions of computers with billions of web pages are hooked to the Internet and are ready to

Millions of computers with billions of Web pages are hooked to the Internet and are ready to

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

108/472	SUBMITTED TEXT	18 WORDS	100%	MATCHING TEXT	18 WORDS

Millions of computers with billions of web pages are hooked to the Internet and are ready to

Millions of computers with billions of Web pages are hooked to the Internet and are ready to

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

109/472	SUBMITTED TEXT	26 WORDS	94%	MATCHING TEXT	26 WORDS

provide information and knowledge pertaining to any subject or topic. To extract information from the Internet, we need to explore the Internet. Surfing the Internet

provide information and knowledge pertaining to any subject or topic of your choice. To extract information from the Internet, we need to explore the Internet. Surfing the Internet

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

110/472	SUBMITTED TEXT	26 WORDS	94%	MATCHING TEXT	26 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

111/472	SUBMITTED TEXT	15 WORDS	100%	MATCHING TEXT	15 WORDS

also facilitates access to chat rooms where online discussions or chatting take place. 28.

also facilitates access to chat rooms where online discussions or chatting take place.

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112/472	SUBMITTED TEXT	15 WORDS	100%	MATCHING TEXT	15 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

113/472	SUBMITTED TEXT	34 WORDS	97%	MATCHING TEXT	34 WORDS

searching the content available on Internet. A search engine is an information retrieval system which is used to access and retrieve information stored in WWW or a computer system attached to the Internet.

searching of the content available on the Internet. A search engine is an information retrieval system which is used to access and retrieve information stored in WWW or a computer system attached to the Internet.

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114/472	SUBMITTED TEXT	34 WORDS	97%	MATCHING TEXT	34 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

115/472	SUBMITTED TEXT	37 WORDS	100%	MATCHING TEXT	37 WORDS

are the interface to a group of contents, which allow the users to type in the keywords, so that the engine can find several matching contents to the corresponding keywords out of millions of web pages.

are the interface to a group of contents, which allow the users to type in the keywords, so that the engine can find several matching contents to the corresponding keywords out of millions of Web pages.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

116/472	SUBMITTED TEXT	37 WORDS	100%	MATCHING TEXT	37 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

117/472	SUBMITTED TEXT	19 WORDS	100%	MATCHING TEXT	19 WORDS

Search engines also help minimize the time required to find the relevant information on the computer system. 29.

Search engines also help minimize the time required to find the relevant information on the computer system.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

118/472	SUBMITTED TEXT	19 WORDS	100%	MATCHING TEXT	19 WORDS

Search engines also help minimize the time required to find the relevant information on the computer system. 29.

Search engines also help minimize the time required to find the relevant information on the computer system.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

119/472	SUBMITTED TEXT	43 WORDS	100%	MATCHING TEXT	43 WORDS

Uploading refers to sending of data from a local system to a remote system like a server to keep a copy of the data there for various purposes. Downloading refers to retrieving of data from a remote system to a local system.

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W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

120/472	SUBMITTED TEXT	43 WORDS	100%	MATCHING TEXT	43 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

121/472	SUBMITTED TEXT	27 WORDS	100%	MATCHING TEXT	27 WORDS

Once the user gets connected with the web server, the web browsers select the hypertext in an HTML document and send a request to open a: (

Once the user gets connected with the Web server, the Web browsers select the hypertext in an HTML document and send a request to open a

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

122/472	SUBMITTED TEXT	27 WORDS	100%	MATCHING TEXT	27 WORDS

Once the user gets connected with the web server, the web browsers select the hypertext in an HTML document and send a request to open a: (

Once the user gets connected with the Web server, the Web browsers select the hypertext in an HTML document and send a request to open a

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

123/472	SUBMITTED TEXT	22 WORDS	100%	MATCHING TEXT	22 WORDS

Some search engines attempt to enhance the search queries to provide a quality set of items through a process known as: (

Some search engines attempt to enhance the search queries to provide a quality set of items through a process known as

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

124/472	SUBMITTED TEXT	22 WORDS	100%	MATCHING TEXT	22 WORDS

Some search engines attempt to enhance the search queries to provide a quality set of items through a process known as: (

Some search engines attempt to enhance the search queries to provide a quality set of items through a process known as

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

125/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

Uploading refers to sending of data from a local system to a: (

Uploading refers to sending of data from a local system to a

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

126/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

Uploading refers to sending of data from a local system to a: (

Uploading refers to sending of data from a local system to a

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

127/472	SUBMITTED TEXT	22 WORDS	100%	MATCHING TEXT	22 WORDS

Web browsers are HTTP client software programs that run on TCP/IP client computers to access web documents on . 13.

Web browsers are HTTP client software programs that run on TCP/IP client computers to access Web documents on

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

128/472	SUBMITTED TEXT	22 WORDS	100%	MATCHING TEXT	22 WORDS

Web browsers are HTTP client software programs that run on TCP/IP client computers to access web documents on . 13.

Web browsers are HTTP client software programs that run on TCP/IP client computers to access Web documents on

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

129/472	SUBMITTED TEXT	16 WORDS	92%	MATCHING TEXT	16 WORDS

Uniform resource locator is the of a document on the World Wide Web. 15.

Uniform Resource Locator. It is the address of a document on the World Wide Web.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

130/472	SUBMITTED TEXT	16 WORDS	92%	MATCHING TEXT	16 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

131/472	SUBMITTED TEXT	15 WORDS	92%	MATCHING TEXT	15 WORDS

Search engines are the that enable searching of the content available on Internet.

Search engines are the Softwares that enable searching of the content available on the Internet.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

132/472	SUBMITTED TEXT	15 WORDS	92%	MATCHING TEXT	15 WORDS

Search engines are the that enable searching of the content available on Internet.

Search engines are the Softwares that enable searching of the content available on the Internet.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

133/472	SUBMITTED TEXT	17 WORDS	93%	MATCHING TEXT	17 WORDS

The World Wide Web is a global hypertext system that was initially developed in 1989 by

The World Wide Web or WWW is a global hypertext system that was initially developed in 1989 by

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

134/472	SUBMITTED TEXT	17 WORDS	93%	MATCHING TEXT	17 WORDS

The World Wide Web is a global hypertext system that was initially developed in 1989 by

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

135/472	SUBMITTED TEXT	19 WORDS	100%	MATCHING TEXT	19 WORDS

webpage can be defined as a single hypertext document written in Hypertext Markup Language (HTML) and described in

Webpage can be defined as a single hypertext document written in HyperText Markup Language (HTML) and described in

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

136/472	SUBMITTED TEXT	19 WORDS	100%	MATCHING TEXT	19 WORDS

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137/472	SUBMITTED TEXT	29 WORDS	100%	MATCHING TEXT	29 WORDS

The first part of the URL that comes before the two slashes specifies the method of access or protocol being followed for communications between the browser and the

The first part of the URL that comes before the two slashes specifies the method of access or protocol being followed for communications between the browser and the

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

138/472	SUBMITTED TEXT	29 WORDS	100%	MATCHING TEXT	29 WORDS

The first part of the URL that comes before the two slashes specifies the method of access or protocol being followed for communications between the browser and the

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139/472	SUBMITTED TEXT	12 WORDS	100%	MATCHING TEXT	12 WORDS

To extract information from the Internet, we need to explore the

To extract information from the Internet, we need to explore the

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

140/472	SUBMITTED TEXT	12 WORDS	100%	MATCHING TEXT	12 WORDS

To extract information from the Internet, we need to explore the

To extract information from the Internet, we need to explore the

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

141/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

Anatomy of a Web Browser: The Toolbar 2.2.4 The Access Indicator 2.2.5

Anatomy of a Web Browser: The Toolbar 4.14.2 The Access Indicator 4.15

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142/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

Anatomy of a Web Browser: The Toolbar 2.2.4 The Access Indicator 2.2.5

Anatomy of a Web Browser: The Toolbar 4.14.2 The Access Indicator 4.15

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143/472	SUBMITTED TEXT	13 WORDS	95%	MATCHING TEXT	13 WORDS

INTRODUCTION In this unit, you will learn about basics of the

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W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

144/472	SUBMITTED TEXT	13 WORDS	95%	MATCHING TEXT	13 WORDS

INTRODUCTION In this unit, you will learn about basics of the

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

145/472	SUBMITTED TEXT	20 WORDS	90%	MATCHING TEXT	20 WORDS

UNIT OBJECTIVES After going through this unit, you will be able to: ? Know the basics of

UNIT OBJECTIVES After going through this unit, you will be able to: • Understand the basics of

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

146/472	SUBMITTED TEXT	20 WORDS	90%	MATCHING TEXT	20 WORDS

UNIT OBJECTIVES After going through this unit, you will be able to: ? Know the basics of

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

147/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

the controller uses one of the interpreters to display the

the controller uses one of the interpreters to display the

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

148/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

the controller uses one of the interpreters to display the

the controller uses one of the interpreters to display the

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149/472	SUBMITTED TEXT	51 WORDS	95%	MATCHING TEXT	51 WORDS

consists of three parts, a controller, client protocol and interpreters. The controller receives input from input devices, such as keyboard, mouse, etc. It uses client programs to access the web pages. After the document has been accessed, the controller uses one of the interpreters to display the document on screen.

consists of three parts, a controller, client protocol and interpreters, and so the Internet Explorer. The controller receives input from input devices, such as keyboard, mouse, etc. It uses client programs to access the Web pages. After the document has been accessed, the controller uses one of the interpreters to display the document on screen. 4.14.1

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

150/472	SUBMITTED TEXT	51 WORDS	95%	MATCHING TEXT	51 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

151/472	SUBMITTED TEXT	25 WORDS	100%	MATCHING TEXT	25 WORDS

Anatomy of a Web Browser: The Toolbar The various toolbars that are structured in browsers make up the anatomy of a web browser.

Anatomy of a Web Browser: The Toolbar The various toolbars that are structured in browsers make up the anatomy of a Web browser.

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152/472	SUBMITTED TEXT	25 WORDS	100%	MATCHING TEXT	25 WORDS

Anatomy of a Web Browser: The Toolbar The various toolbars that are structured in browsers make up the anatomy of a web browser.

Anatomy of a Web Browser: The Toolbar The various toolbars that are structured in browsers make up the anatomy of a Web browser.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

153/472	SUBMITTED TEXT	147 WORDS	96%	MATCHING TEXT	147 WORDS

The back button takes you the previous page, the forward button returns you the page from where you went back, home button takes you the home page of the specified web site, stop button stops the browser to load the current page and the print button lets Material 67 you print a copy of the web page. The toolbars are available in the web browser is described as follows: Back button: This is shown by an arrow that points to left. Clicking on it brings you back to the previous web page you had visited. Forward button: This is shown by an arrow pointing to the right. Clicking on it returns you to the page from where you just came. Home button: This button is recognized by the icon of home in Mozilla and Internet explorer and clicking on it takes you to the

The back button takes you the previous page, the forward button returns you the page from where you went back, home button takes you the home page of the specified Website, stop button stops the browser to load the current page and the print button lets you print a copy of the Web page. The toolbars are available in the Web browser is described as follows: Back Button: This is shown by an arrow that points to left. Clicking on it brings you back to the previous Web page you had visited. Forward Button: This is shown by an arrow pointing to the right. Clicking on it returns you to the page from where you just came. Home Button: This button is recognized by the icon of home in Mozilla and the Internet explorer and clicking on it takes you to the

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154/472	SUBMITTED TEXT	147 WORDS	96%	MATCHING TEXT	147 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

155/472	SUBMITTED TEXT	14 WORDS	100%	MATCHING TEXT	14 WORDS

home page you have chosen. If no home page is selected by you

home page you have chosen. If no home page is selected by you

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156/472	SUBMITTED TEXT	14 WORDS	100%	MATCHING TEXT	14 WORDS

home page you have chosen. If no home page is selected by you

home page you have chosen. If no home page is selected by you

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

157/472	SUBMITTED TEXT	265 WORDS	98%	MATCHING TEXT	265 WORDS

it would bring you to a default home page that is normally a website of Google, Microsoft or Netscape. Reload or Refresh button: This loads the web page once again. This is normally done when all elements of a web page are not loaded in the first attempt and file transfer gets interrupted. Also, while downloading a web page, data is temporarily stored in computer memory and it is told that 'data is cached'. On accessing this web page next time, the web browser accesses it from cache instead of requesting the web server for retrieving this file. There are certain web pages that are updated frequently, as with scores of sport events, financial data or news. In such cases you do not get current information, but by reloading it, data gets updated from the web server. Print button: Clicking on it enables you to have a hard copy of current page that is loaded in the browser. Stop button: This button is used to stop the browser from loading the current page. Search button: This button provides connection to search tools and directories of the websites of Google, Microsoft or Netscape. Bookmarks or Favorites button: Internet explorer shows Favorites button whereas Mozilla and Netscape shows Bookmarks. This enables you to record addresses of websites for revisiting. On adding a URL in your list, you may come back to that web page by just clicking the link in the list that you have made and you need not retype entire address. Address Bar: This is situated either next to the toolbar or above it.

it would bring you to a default home page that is normally a Website of Google, Microsoft or Netscape. Reload or Refresh Button: This loads the Web page once again. This is normally done when all elements of a Web page are not loaded in the first attempt and file transfer gets interrupted. Also, while downloading a Web page, data is temporarily stored in computer memory and it is told that 'data is cached'. On accessing this Web page next time, the Web browser accesses it from cache instead of requesting the Web server for retrieving this file. There are certain Web pages that are updated frequently, as with scores of sport events, financial data or news. In such cases you do not get current information, but by reloading it, data gets updated from the Web server. Print Button: Clicking on it enables you to have a hard copy of current page that is loaded in the browser. Stop Button: This button is used to stop the browser from loading the current page. Search Button: This button provides connection to search tools and directories of the Websites of Google, Microsoft or Netscape. Bookmarks or Favorites Button: Internet explorer shows Favorites button whereas Mozilla and Netscape shows Bookmarks. This enables you to record addresses of Websites for revisiting. On adding a URL in your list, you may come back to that Web page by just clicking the link in the list that you have made and you need not retype entire address. Self-Instructional Material 157 NOTES Internet Markup Languages Address Bar: This is situated either next to the toolbar or above it.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

158/472 **SUBMITTED TEXT** 265 WORDS **98%** **MATCHING TEXT** 265 WORDS

it would bring you to a default home page that is normally a website of Google, Microsoft or Netscape. Reload or Refresh button: This loads the web page once again. This is normally done when all elements of a web page are not loaded in the first attempt and file transfer gets interrupted. Also, while downloading a web page, data is temporarily stored in computer memory and it is told that 'data is cached'. On accessing this web page next time, the web browser accesses it from cache instead of requesting the web server for retrieving this file. There are certain web pages that are updated frequently, as with scores of sport events, financial data or news. In such cases you do not get current information, but by reloading it, data gets updated from the web server. Print button: Clicking on it enables you to have a hard copy of current page that is loaded in the browser. Stop button: This button is used to stop the browser from loading the current page. Search button: This button provides connection to search tools and directories of the websites of Google, Microsoft or Netscape. Bookmarks or Favorites button: Internet explorer shows Favorites button whereas Mozilla and Netscape shows Bookmarks. This enables you to record addresses of websites for revisiting. On adding a URL in your list, you may come back to that web page by just clicking the link in the list that you have made and you need not retype entire address. Address Bar: This is situated either next to the toolbar or above it.

it would bring you to a default home page that is normally a Website of Google, Microsoft or Netscape. Reload or Refresh Button: This loads the Web page once again. This is normally done when all elements of a Web page are not loaded in the first attempt and file transfer gets interrupted. Also, while downloading a Web page, data is temporarily stored in computer memory and it is told that 'data is cached'. On accessing this Web page next time, the Web browser accesses it from cache instead of requesting the Web server for retrieving this file. There are certain Web pages that are updated frequently, as with scores of sport events, financial data or news. In such cases you do not get current information, but by reloading it, data gets updated from the Web server. Print Button: Clicking on it enables you to have a hard copy of current page that is loaded in the browser. Stop Button: This button is used to stop the browser from loading the current page. Search Button: This button provides connection to search tools and directories of the Websites of Google, Microsoft or Netscape. Bookmarks or Favorites Button: Internet explorer shows Favorites button whereas Mozilla and Netscape shows Bookmarks. This enables you to record addresses of Websites for revisiting. On adding a URL in your list, you may come back to that Web page by just clicking the link in the list that you have made and you need not retype entire address. Self-Instructional Material 157 NOTES Internet Markup Languages Address Bar: This is situated either next to the toolbar or above it.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

159/472 **SUBMITTED TEXT** 90 WORDS **93%** **MATCHING TEXT** 90 WORDS

type URL or address of the website to visit. After entering the address here, hit the Enter or Return key for accessing the site. Alternatively make a click on 'Go' or an Arrow button situated towards the right of address box. By making click on the small downward triangle towards the right of Location box, a drop-down list appears showing most recent websites visited by you. This helps you in revisiting a site and you can select the address instead of typing it. Fig. 2.3 Various Buttons in

type URL or address of the Website to visit. After entering the address here, hit the Enter or Return key for accessing the site. Alternatively make a click on 'Go' or an Arrow button situated towards the right of address box. By clicking on the small downward triangle towards the right of Location box, a drop-down list appears showing most recent Websites visited by you. This helps you in revisiting a site and you can select the address instead of typing it. Figure 4.3 shows the various buttons in

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160/472	SUBMITTED TEXT	90 WORDS	93%	MATCHING TEXT	90 WORDS

type URL or address of the website to visit. After entering the address here, hit the Enter or Return key for accessing the site. Alternatively make a click on 'Go' or an Arrow button situated towards the right of address box. By making click on the small downward triangle towards the right of Location box, a drop-down list appears showing most recent websites visited by you. This helps you in revisiting a site and you can select the address instead of typing it. Fig. 2.3 Various Buttons in

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

161/472	SUBMITTED TEXT	307 WORDS	98%	MATCHING TEXT	307 WORDS

The Menu Bar: This is located at the top of browser window. This enables you to select things with a web page. You may save the web page on your hard disk or may like to increase the text size on the page. Most of these choices are same as buttons on the toolbar. Click once on a menu item for accessing the drop-down menu, then select and click to perform action as desired. For example, clicking on File menu shows a dropdown menu from which Save As option appears. You may save the web page on your hard disk by choosing a location with default file name given by the browser or may choose a name as desired by you. File menu is used to save the web page, import or export the files too. 2.2.4 The Access Indicator Internet Explorer or Mozilla Firefox, contain small graphics for indicating the activity of the browser. Animation of this image indicates that the browser software as a client is attempting to access data from a server that is a remote computer. Access Indicator: A server may be located at any remote location, maybe a city in your country or may be in another country or even another continent. The browser can download files from a remote computer to your computer and can also display these on your computer screen. Time taken by this process depends on many factors; speed of net connection, file size, load on the server and traffic on the Internet. The Status Bar: This is situated at the bottom of the web browser. Once you try to access a website this bar shows the progress on transactions in the web page. For example, when you type the address of the site you are trying to visit, status bar shows whether the

The Menu Bar: This is located at the top of browser window. This enables you to select things with a Web page. You may save the Web page on your hard disk or may like to increase the text size on the page. Most of these choices are same as buttons on the toolbar. Click once on a menu item for accessing the drop-down menu, then select and click to perform action as desired. For example, clicking on File menu shows a dropdown menu from which Save As option appears. You may save the Web page on your hard disk by choosing a location with default file name given by the browser or may choose a name as desired by you. File menu is used to save the Web page, import or export the files too. 4.14.2 The Access Indicator Internet Explorer or Mozilla Firefox, contain small graphics for indicating the activity of the browser. Animation of this image indicates that the browser software as a client is attempting to access data from a server that is a remote computer. 158 Self-Instructional Material Internet Markup Languages NOTES Access Indicator: A server may be located at any remote location, maybe a city in your country or may be in another country or even another continent. The browser can download files from a remote computer to your computer and can also display these on your computer screen. Time taken by this process depends on many factors; speed of net connection, file size, load on the server and traffic on the Internet. The Status Bar: This is situated at the bottom of the Web browser. Once you try to access a Website this bar shows the progress on transactions in the Web page. For example, when you type the address of the site you are trying to visit, status bar shows whether the

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162/472	SUBMITTED TEXT	307 WORDS	98%	MATCHING TEXT	307 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

163/472	SUBMITTED TEXT	57 WORDS	93%	MATCHING TEXT	57 WORDS

has been found along with number as well as size of files that are being downloaded. Self-Instructional The Scroll Bar: There is a vertical or horizontal bar located towards the bottom side and right side of the browser respectively. Using this you can scroll a web page down

has been found along with number as well as size of files that are being downloaded. The Scroll Bar: There is a vertical or horizontal bar located towards the bottom side and right side of the browser respectively. Using this you can scroll a Web page down

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

164/472	SUBMITTED TEXT	57 WORDS	93%	MATCHING TEXT	57 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

165/472	SUBMITTED TEXT	101 WORDS	93%	MATCHING TEXT	101 WORDS

and up. To do this, place your pointer on arrows, up or down by using left key of the mouse. You may drag the slider by placing the pointer on slider control and holding down the left key of the mouse. With some mouse there is a scrolling wheel that provides an alternative way to navigate a long web page. In case width of a web page is more and can not fit the computer screen, you will find a horizontal scroll bar just above status bar. This can be used to move web page left or right.

and up. To do this, place your pointer on arrows, up or down by using left key of the mouse. You may drag the slider by placing the pointer on slider control and holding down the left key of the mouse. There is a scrolling wheel is some mouse that provides an alternative way to navigate a long Web page. In case width of a Web page is more and can not fit the computer screen, you will find a horizontal scroll bar just above status bar. This can be used to move Web page left or right. 4.15

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

166/472	SUBMITTED TEXT	101 WORDS	93%	MATCHING TEXT	101 WORDS

and up. To do this, place your pointer on arrows, up or down by using left key of the mouse. You may drag the slider by placing the pointer on slider control and holding down the left key of the mouse. With some mouse there is a scrolling wheel that provides an alternative way to navigate a long web page. In case width of a web page is more and can not fit the computer screen, you will find a horizontal scroll bar just above status bar. This can be used to move web page left or right.

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

167/472	SUBMITTED TEXT	23 WORDS	93%	MATCHING TEXT	23 WORDS

FTP also works on a client/server principle where an FTP client program is used to make a request to an FTP server.

FTP also works on a client-server architecture where an FTP client program is used to make a request to an FTP server (

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168/472	SUBMITTED TEXT	23 WORDS	93%	MATCHING TEXT	23 WORDS

FTP also works on a client/server principle where an FTP client program is used to make a request to an FTP server.

FTP also works on a client-server architecture where an FTP client program is used to make a request to an FTP server (

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169/472	SUBMITTED TEXT	14 WORDS	84%	MATCHING TEXT	14 WORDS

must instruct the web designer and system analysts to implement FTP for the

must instruct the Web designer and the system analysts to implement FTP before the

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

170/472	SUBMITTED TEXT	14 WORDS	84%	MATCHING TEXT	14 WORDS

must instruct the web designer and system analysts to implement FTP for the

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171/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

The two ports, port 20 and port 21 are used by FTP.

The two ports, Port 20 and Port 21 are used by ftp.

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172/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

The two ports, port 20 and port 21 are used by FTP.

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173/472	SUBMITTED TEXT	55 WORDS	50%	MATCHING TEXT	55 WORDS

format of an email message, as follows: Envelop: Contains the sender's and receiver's addresses. Message: Contains the body and header. The header contains the sender, receiver, the subject of the information and some other information. The body of the message contains the relevant information readable by the recipient. UA is triggered by the user

Format of an E-Mail Envelop: contains the sender and receiver addresses. Message: contains the header and body. The header of the message defines the sender, receiver, the subject of the information and some other information. The body of the message contains the actual information to be read by the recipient. 2. Receiving Mail The user agent is triggered by the user.

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174/472	SUBMITTED TEXT	55 WORDS	50%	MATCHING TEXT	55 WORDS

format of an email message, as follows: Envelop: Contains the sender's and receiver's addresses. Message: Contains the body and header. The header contains the sender, receiver, the subject of the information and some other information. The body of the message contains the relevant information readable by the recipient. UA is triggered by the user

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175/472	SUBMITTED TEXT	26 WORDS	100%	MATCHING TEXT	26 WORDS

mail, the UA informs the user with a notice. If the user is ready to read the mail, a list is displayed with each line

mail, the UA informs the user with a notice. If the user is ready to read the mail, a list is displayed with each line

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176/472	SUBMITTED TEXT	26 WORDS	100%	MATCHING TEXT	26 WORDS

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177/472	SUBMITTED TEXT	40 WORDS	90%	MATCHING TEXT	40 WORDS

summary of the information about a particular message in the mailbox. The summary usually includes the sender's mail address, the subject and the time of server when the mail was sent or received. The user can select the messages

summary of the information about a particular message in the mailbox. The summary usually includes the sender's mail address, the subject and the time when the mail was sent or received. The user can select any of the messages

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178/472	SUBMITTED TEXT	40 WORDS	90%	MATCHING TEXT	40 WORDS

summary of the information about a particular message in the mailbox. The summary usually includes the sender's mail address, the subject and the time of server when the mail was sent or received. The user can select the messages

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179/472	SUBMITTED TEXT	17 WORDS	90%	MATCHING TEXT	17 WORDS

The multimedia objects can be installed by OBJECT element that includes multimedia content with HTML document.

The multimedia objects can be installed by _____ element that includes multimedia content with HTML document. 35.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

180/472	SUBMITTED TEXT	17 WORDS	90%	MATCHING TEXT	17 WORDS

The multimedia objects can be installed by OBJECT element that includes multimedia content with HTML document.

The multimedia objects can be installed by _____ element that includes multimedia content with HTML document. 35.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

181/472	SUBMITTED TEXT	59 WORDS	79%	MATCHING TEXT	59 WORDS

HTML tags are as follows: ? HTML tags are keywords surrounded by angle brackets like >html<. ? HTML tags normally come in pairs like >b< and >/b<. ? The first tag in a pair is the start tag, the second tag is the end tag. ? Start and end tags are also called opening tags and closing tags.

HTML markup tags are usually known as HTML tags which are keywords surrounded by angle brackets like >html<. HTML tags appear in pairs like >b< and >/b< the first tag in a pair is the start tag and the second tag is the end tag. The starting and ending tags are also called opening tags and closing tags.

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182/472	SUBMITTED TEXT	59 WORDS	79%	MATCHING TEXT	59 WORDS

HTML tags are as follows: ? HTML tags are keywords surrounded by angle brackets like >html<. ? HTML tags normally come in pairs like >b< and >/b<. ? The first tag in a pair is the start tag, the second tag is the end tag. ? Start and end tags are also called opening tags and closing tags.

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183/472	SUBMITTED TEXT	26 WORDS	57%	MATCHING TEXT	26 WORDS

Home page is the first page of web site. It keeps many hyperlinks on its page. Creation of home page means creating and launching the

Home page is known as the first page of the Web page. It is replete with a myriad of hyperlinks on its page. Creation of a home page connotes creating and launching of the

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184/472	SUBMITTED TEXT	26 WORDS	57%	MATCHING TEXT	26 WORDS

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185/472	SUBMITTED TEXT	34 WORDS	48%	MATCHING TEXT	34 WORDS

hosting, designing and coding of web site, monitoring the performance of site and checking the web site traffic. Creating the web site includes the various factors to be implemented on the page. Launching

hosting, designing and coding of the Website, monitoring the functioning of the site and by scrutinizing the Website traffic. Creating the Website takes into consideration, various factors which are to be implemented on the page. Launching

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

186/472	SUBMITTED TEXT	34 WORDS	48%	MATCHING TEXT	34 WORDS

hosting, designing and coding of web site, monitoring the performance of site and checking the web site traffic. Creating the web site includes the various factors to be implemented on the page. Launching

hosting, designing and coding of the Website, monitoring the functioning of the site and by scrutinizing the Website traffic. Creating the Website takes into consideration, various factors which are to be implemented on the page. Launching

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

187/472	SUBMITTED TEXT	16 WORDS	90%	MATCHING TEXT	16 WORDS

offers moderate list of options, searchable description and the third party data providers, such as

offers moderate list of options, searchable information and the third party data providers, such as

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

188/472	SUBMITTED TEXT	16 WORDS	90%	MATCHING TEXT	16 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

189/472	SUBMITTED TEXT	29 WORDS	75%	MATCHING TEXT	29 WORDS

etc. These search engines provide a great facility to show the name of your web site. They also offer a free program in which you can enter you

etc. These search engines provide a great facility to recite the name of your Website. Such search engines also offer a free Jumpstart program in which you can enter you

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190/472	SUBMITTED TEXT	29 WORDS	75%	MATCHING TEXT	29 WORDS

etc. These search engines provide a great facility to show the name of your web site. They also offer a free program in which you can enter you

etc. These search engines provide a great facility to recite the name of your Website. Such search engines also offer a free Jumpstart program in which you can enter you

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191/472	SUBMITTED TEXT	27 WORDS	76%	MATCHING TEXT	27 WORDS

Message board: It is a type of forum through which visitors of web site interacts with the site to enhance the popularity. Search engine: This is

Message Board: It is a type of forum through which visitors of the Website interact with the site to enhance its popularity. • Search Engine: This is

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

192/472	SUBMITTED TEXT	27 WORDS	76%	MATCHING TEXT	27 WORDS

Message board: It is a type of forum through which visitors of web site interacts with the site to enhance the popularity. Search engine: This is

Message Board: It is a type of forum through which visitors of the Website interact with the site to enhance its popularity. • Search Engine: This is

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

193/472	SUBMITTED TEXT	17 WORDS	65%	MATCHING TEXT	17 WORDS

Once this information reaches the organization, the corresponding executive can contact the visitors. Data entry forms:

Once this information reaches the organization, the respective executive of the organization contacts the visitors. • Data Entry Forms:

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194/472	SUBMITTED TEXT	17 WORDS	65%	MATCHING TEXT	17 WORDS

Once this information reaches the organization, the corresponding executive can contact the visitors. Data entry forms:

Once this information reaches the organization, the respective executive of the organization contacts the visitors. • Data Entry Forms:

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

195/472	SUBMITTED TEXT	14 WORDS	95%	MATCHING TEXT	14 WORDS

steps are as follows: ? Select and register a web page domain name

steps which are as follows: 1. Select and Register a Web Page Domain Name

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196/472	SUBMITTED TEXT	14 WORDS	95%	MATCHING TEXT	14 WORDS

steps are as follows: ? Select and register a web page domain name

steps which are as follows: 1. Select and Register a Web Page Domain Name

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

197/472	SUBMITTED TEXT	53 WORDS	82%	MATCHING TEXT	53 WORDS

The registration of domain name is unique and done by Internet Corporation for Assigned Names and Numbers (ICANN)-accredited domain name registrar, such as abc.com, xyz.com etc. The free web site hosting service is also available that avails without registering a domain name. The search engine does not provide its services if any

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W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

198/472	SUBMITTED TEXT	53 WORDS	82%	MATCHING TEXT	53 WORDS

The registration of domain name is unique and done by Internet Corporation for Assigned Names and Numbers (ICANN)-accredited domain name registrar, such as abc.com, xyz.com etc. The free web site hosting service is also available that avails without registering a domain name. The search engine does not provide its services if any

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

199/472	SUBMITTED TEXT	38 WORDS	79%	MATCHING TEXT	38 WORDS

high traffic volume options. At this stage, web hosting is checked for control over content, security and usage of the site. A static web site consists of a single web page. It must have ‘index.html’ or ‘index.htm’.

high traffic volume options, etc. At this stage, Web hosting is checked for control over content, security and usage of the site. 3. Design, Code and Test the Website A static Website comprises of a single Web page. It must have ‘index.html’ or ‘index.htm’.

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200/472	SUBMITTED TEXT	38 WORDS	79%	MATCHING TEXT	38 WORDS

high traffic volume options. At this stage, web hosting is checked for control over content, security and usage of the site. A static web site consists of a single web page. It must have ‘index.html’ or ‘index.htm’.

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

201/472	SUBMITTED TEXT	20 WORDS	92%	MATCHING TEXT	20 WORDS

The information is sent on the web through search engines and their related directories. The promotion scheme on the

The information is sent on the Web through search engines and their related directories. The promotion scheme must be published on the

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

202/472	SUBMITTED TEXT	20 WORDS	92%	MATCHING TEXT	20 WORDS

The information is sent on the web through search engines and their related directories. The promotion scheme on the

The information is sent on the Web through search engines and their related directories. The promotion scheme must be published on the

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

203/472	SUBMITTED TEXT	13 WORDS	87%	MATCHING TEXT	13 WORDS

scheme, such as shifting the seat arrangement from economic let to business,

scheme, such as shifting the seat arrangement from economic to business

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

204/472	SUBMITTED TEXT	13 WORDS	87%	MATCHING TEXT	13 WORDS

scheme, such as shifting the seat arrangement from economic let to business,

scheme, such as shifting the seat arrangement from economic to business

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

205/472	SUBMITTED TEXT	20 WORDS	86%	MATCHING TEXT	20 WORDS

after designing and completing the site. It is essential to finalize the layout and style of site before launching.

after designing and completion of the site. It is essential to finalize the layout and style of the site before launching.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

206/472	SUBMITTED TEXT	20 WORDS	86%	MATCHING TEXT	20 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

207/472	SUBMITTED TEXT	59 WORDS	87%	MATCHING TEXT	59 WORDS

Uniform Resource Locator (URL) is a pointer that avails specified resources across the net. Resource simply means information containing files or directories. It is referenced with query to available databases via search engines, such as Google or Yahoo. An example of URL appears on address bar is as follows: http://aaa.bbb.edu/flower.html Table 2.5 specifies the URL details: Table 2.5:

Uniform Resource Locator (URL) is a pointer that avails specified resources across the net. A Resource simply connotes information containing files or directories. It is referenced with query to available databases through search engines, such as Google or Yahoo. An example of URL that appears on the address bar is given as follows: http://aaa.bbb.edu/flower.html Table 1.2 depicts the above given URL details: Table 1.2

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

208/472	SUBMITTED TEXT	59 WORDS	87%	MATCHING TEXT	59 WORDS

Uniform Resource Locator (URL) is a pointer that avails specified resources across the net. Resource simply means information containing files or directories. It is referenced with query to available databases via search engines, such as Google or Yahoo. An example of URL appears on address bar is as follows: http://aaa.bbb.edu/flower.html Table 2.5 specifies the URL details: Table 2.5:

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

209/472	SUBMITTED TEXT	132 WORDS	75%	MATCHING TEXT	132 WORDS

URL Details URL part Function http The protocol specifier aaa.bbb.edu The domain name flower.html The page location The http is used as protocol where information resides on domain named as aaa.bbb.edu. The information that resides on host machine is taken as flower.html. The host machine can be protocol dependent or host dependent. Component of URL is known as path component. URL is sometimes specified as ‘port’. Port means it is a port number by which TCP connection is possible to the remote host machine. The default port for protocol is used if port is not specified. For example, port 80 is known as default port for HTTP. The two ports, port 20 and port 21 are used by ftp but the alternative port can be used as follows: http://aaa.bbb.edu:80/ flower.html

URL Details URL part Function http The protocol specifier aaa.bbb.edu The domain name flower.html The page location The http is used as a protocol in which information resides on the domain called aaa.bbb.edu. The information that resides in the host machine is taken as flower.html. The host machine can either be protocol dependent or host dependent. A component of URL is known as the path component. Sometimes the URL is also referred to as ‘Port’, that is, it is a port number by which TCP connection is possible to the remote host machine. The default port for protocol is used if port is not specified. For instance, Port 80 is known as default port for HTTP. The two ports, Port 20 and Port 21 are used by ftp. The alternative port can be used in the following way: http://aaa.bbb.edu:80/ flower.html

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

210/472	SUBMITTED TEXT	132 WORDS	75%	MATCHING TEXT	132 WORDS

URL Details URL part Function http The protocol specifier aaa.bbb.edu The domain name flower.html The page location The http is used as protocol where information resides on domain named as aaa.bbb.edu. The information that resides on host machine is taken as flower.html. The host machine can be protocol dependent or host dependent. Component of URL is known as path component. URL is sometimes specified as 'port'. Port means it is a port number by which TCP connection is possible to the remote host machine. The default port for protocol is used if port is not specified. For example, port 80 is known as default port for HTTP. The two ports, port 20 and port 21 are used by ftp but the alternative port can be used as follows: http://aaa.bbb.edu:80/ flower.html

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211/472	SUBMITTED TEXT	62 WORDS	94%	MATCHING TEXT	62 WORDS

Table 2.6 shows some specific symbols and characters used by URL. These are, in fact, URL encoding. Table 2.6: Used symbols and URL Encoding Specific Symbols and Characters URL Encoding ; %3B ? %3F / %2F : %3A # %23 & %24 = %3D + %2B $ %26 , %2C % %25 > %3C < %3E ~ %7E % %25 >

Table 1.3 shows some specific symbols and characters which are used by the URL. These are, in fact, URL encoding. Table 1.3 Used Symbols and URL Encoding Specific Symbols and Characters URL Encoding ; ? / : # & = + $, % > < ~ % >space< %3B %3F %2F %3A %23 %24 %3D %2B %26 %2C %25 %3C %3E %7E %25 +

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

212/472	SUBMITTED TEXT	62 WORDS	94%	MATCHING TEXT	62 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

213/472	SUBMITTED TEXT	33 WORDS	100%	MATCHING TEXT	33 WORDS

or %20 Note: The >spacebar< is frequently used and '+' sign is reserved for its URL encoding. For example, string 'A B' in URL is encoded as either 'A%20B' or 'A+B'.

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214/472	SUBMITTED TEXT	33 WORDS	100%	MATCHING TEXT	33 WORDS

or %20 Note: The >spacebar< is frequently used and '+' sign is reserved for its URL encoding. For example, string 'A B' in URL is encoded as either 'A%20B' or 'A+B'.

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215/472	SUBMITTED TEXT	10 WORDS	83%	MATCHING TEXT	10 WORDS

DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd"< 2.4.5

DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd"< >

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

216/472	SUBMITTED TEXT	10 WORDS	83%	MATCHING TEXT	10 WORDS

DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd"< 2.4.5

DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd"< >

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

217/472	SUBMITTED TEXT	14 WORDS	88%	MATCHING TEXT	14 WORDS

for transferring files (text, image, sound, video and other multimedia files) on the

for transferring files (text, image, sound, video and other multimedia files) using the

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

218/472	SUBMITTED TEXT	14 WORDS	88%	MATCHING TEXT	14 WORDS

for transferring files (text, image, sound, video and other multimedia files) on the

for transferring files (text, image, sound, video and other multimedia files) using the

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

219/472	SUBMITTED TEXT	35 WORDS	98%	MATCHING TEXT	35 WORDS

The Common Gateway Interface (CGI) extends the architecture to three-tiers by adding a back-end server that provides services to the web server on behalf of the web client, permitting dynamic composition of web pages.

The Common Gateway Interface or CGI extends the architecture to three-tiers by adding a back-end server that provides services to the Web server on behalf of the Web client, permitting dynamic composition of Web pages.

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220/472	SUBMITTED TEXT	35 WORDS	98%	MATCHING TEXT	35 WORDS

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221/472	SUBMITTED TEXT	13 WORDS	88%	MATCHING TEXT	13 WORDS

In active documents, the program or script runs at the client's side.

In active documents the program or script runs at the client side 24

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

222/472	SUBMITTED TEXT	13 WORDS	88%	MATCHING TEXT	13 WORDS

In active documents, the program or script runs at the client's side.

In active documents the program or script runs at the client side 24

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

223/472	SUBMITTED TEXT	97 WORDS	89%	MATCHING TEXT	97 WORDS

side. When a browser requests an active document, the server sends a copy of the document or script. The document is then run on the client's site. Active documents are sometimes referred to as client-site dynamic documents. Active documents can be created in two ways: ? Java applets, programs written in Java on the server, are compiled and are ready to run. The browser creates an instance of this applet and runs it ? JavaScript is interpreted and run by the client at the same time. The script is in the source code. The Figure 2.23

side. When a browser requests an active document, the server sends a copy of the document or script. The document is then run on the client side. Active documents are sometimes referred to as client-side dynamic documents (see Active documents can be created in two ways: • Java applets, programs written in Java on the server are compiled and ready to run. The browser creates an instance of this applet and runs it. Fig. 1.17 Active JavaScript is interpreted and run by the client at the same time. The script is in the source code (see Figure 1.18).

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224/472	SUBMITTED TEXT	97 WORDS	89%	MATCHING TEXT	97 WORDS

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225/472	SUBMITTED TEXT	36 WORDS	89%	MATCHING TEXT	36 WORDS

is a pointer that avails specified resources across the net. Resource simply means information containing files or directories. It is referenced with query to available databases via search engines, such as Google or Yahoo. 2.4.8

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226/472	SUBMITTED TEXT	36 WORDS	89%	MATCHING TEXT	36 WORDS

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227/472	SUBMITTED TEXT	16 WORDS	84%	MATCHING TEXT	16 WORDS

import java.awt.*; import java.applet.*; public class rect extends Applet { public void paint(Graphics g) {

import java .awt .*; import java.applet.*; public class Example 2 extends java .applet.Applet { public void paint(Graphics g) {

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

228/472	SUBMITTED TEXT	16 WORDS	84%	MATCHING TEXT	16 WORDS

import java.awt.*; import java.applet.*; public class rect extends Applet { public void paint(Graphics g) {

import java .awt .*; import java.applet.*; public class Example 2 extends java .applet.Applet { public void paint(Graphics g) {

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

229/472	SUBMITTED TEXT	16 WORDS	73%	MATCHING TEXT	16 WORDS

applet.*; import java.awt.*; public class disp extends Applet { public void paint(Graphics g) { g.

applet: import java .awt .*; import java.applet.*; public class Example 2 extends java .applet.Applet { public void paint(Graphics g) { g.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

230/472	SUBMITTED TEXT	16 WORDS	73%	MATCHING TEXT	16 WORDS

applet.*; import java.awt.*; public class disp extends Applet { public void paint(Graphics g) { g.

applet: import java .awt .*; import java.applet.*; public class Example 2 extends java .applet.Applet { public void paint(Graphics g) { g.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

231/472	SUBMITTED TEXT	47 WORDS	66%	MATCHING TEXT	47 WORDS

addresses. Message: Contains the body and header. The header contains the sender, receiver, the subject of the information and some other information. The body of the message contains the relevant information readable by the recipient. The role of User Agent (UA) is triggered by the user

addresses. Message: contains the header and body. The header of the message defines the sender, receiver, the subject of the information and some other information. The body of the message contains the actual information to be read by the recipient. 2. Receiving Mail The user agent is triggered by the user.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

232/472	SUBMITTED TEXT	47 WORDS	66%	MATCHING TEXT	47 WORDS

addresses. Message: Contains the body and header. The header contains the sender, receiver, the subject of the information and some other information. The body of the message contains the relevant information readable by the recipient. The role of User Agent (UA) is triggered by the user

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

233/472	SUBMITTED TEXT	26 WORDS	100%	MATCHING TEXT	26 WORDS

mail, the UA informs the user with a notice. If the user is ready to read the mail, a list is displayed with each line

mail, the UA informs the user with a notice. If the user is ready to read the mail, a list is displayed with each line

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

234/472	SUBMITTED TEXT	26 WORDS	100%	MATCHING TEXT	26 WORDS

mail, the UA informs the user with a notice. If the user is ready to read the mail, a list is displayed with each line

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

235/472	SUBMITTED TEXT	34 WORDS	91%	MATCHING TEXT	34 WORDS

summary of the information about a particular message in the mailbox. The summary usually includes the sender's mail address, the subject and the time of server when the mail was sent or received.

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W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

236/472	SUBMITTED TEXT	34 WORDS	91%	MATCHING TEXT	34 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

237/472	SUBMITTED TEXT	60 WORDS	79%	MATCHING TEXT	60 WORDS

HTML tags are as follows: ? HTML tags are keywords surrounded by angle brackets like >html<. ? HTML tags normally come in pairs like >b< and >/b<. ? The first tag in a pair is the start tag, the second tag is the end tag. ? Start and end tags are also called opening tags and closing tags. 19.

HTML markup tags are usually known as HTML tags which are keywords surrounded by angle brackets like >html<. HTML tags appear in pairs like >b< and >/b< the first tag in a pair is the start tag and the second tag is the end tag. The starting and ending tags are also called opening tags and closing tags.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

238/472	SUBMITTED TEXT	60 WORDS	79%	MATCHING TEXT	60 WORDS

HTML tags are as follows: ? HTML tags are keywords surrounded by angle brackets like >html<. ? HTML tags normally come in pairs like >b< and >/b<. ? The first tag in a pair is the start tag, the second tag is the end tag. ? Start and end tags are also called opening tags and closing tags. 19.

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

239/472	SUBMITTED TEXT	20 WORDS	68%	MATCHING TEXT	20 WORDS

is a type of forum through which visitors of web site interacts with the site to enhance the popularity: (

is a type of forum through which visitors of the Website interact with the site to enhance its popularity. •

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

240/472	SUBMITTED TEXT	20 WORDS	68%	MATCHING TEXT	20 WORDS

is a type of forum through which visitors of web site interacts with the site to enhance the popularity: (

is a type of forum through which visitors of the Website interact with the site to enhance its popularity. •

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

241/472	SUBMITTED TEXT	18 WORDS	100%	MATCHING TEXT	18 WORDS

The multimedia objects can be installed by element that includes multimedia content with HTML document. 11.

The multimedia objects can be installed by _____ element that includes multimedia content with HTML document. 35.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

242/472	SUBMITTED TEXT	18 WORDS	100%	MATCHING TEXT	18 WORDS

The multimedia objects can be installed by element that includes multimedia content with HTML document. 11.

The multimedia objects can be installed by _____ element that includes multimedia content with HTML document. 35.

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243/472	SUBMITTED TEXT	23 WORDS	93%	MATCHING TEXT	23 WORDS

FTP also works on a client/server principle where an FTP client program is used to make a request to an FTP server.

FTP also works on a client-server architecture where an FTP client program is used to make a request to an FTP server (

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244/472	SUBMITTED TEXT	23 WORDS	93%	MATCHING TEXT	23 WORDS

FTP also works on a client/server principle where an FTP client program is used to make a request to an FTP server.

FTP also works on a client-server architecture where an FTP client program is used to make a request to an FTP server (

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245/472	SUBMITTED TEXT	29 WORDS	71%	MATCHING TEXT	29 WORDS

Answers to ‘Check Your Progress’ 3.8 Questions and Exercises 3.9 Further Reading 3.10 Learning Outcomes 3.0 INTRODUCTION In this unit, you will learn about the

Answers to ‘Check Your Progress’ 1.9 Questions and Exercises 1.0 INTRODUCTION In this unit, you will learn about the

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246/472	SUBMITTED TEXT	29 WORDS	71%	MATCHING TEXT	29 WORDS

Answers to ‘Check Your Progress’ 3.8 Questions and Exercises 3.9 Further Reading 3.10 Learning Outcomes 3.0 INTRODUCTION In this unit, you will learn about the

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247/472	SUBMITTED TEXT	16 WORDS	100%	MATCHING TEXT	16 WORDS

UNIT OBJECTIVES After going through this unit, you will be able to: ?

UNIT OBJECTIVES After going through this unit, you will be able to: •

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248/472	SUBMITTED TEXT	16 WORDS	100%	MATCHING TEXT	16 WORDS

UNIT OBJECTIVES After going through this unit, you will be able to: ?

UNIT OBJECTIVES After going through this unit, you will be able to: •

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249/472	SUBMITTED TEXT	17 WORDS	90%	MATCHING TEXT	17 WORDS

The Hypertext Transfer Protocol is designed to allow the transfer of Hypertext Markup Language (HTML) documents.

The HyperText Transfer Protocol is a protocol specifically designed to allow the transfer of HyperText Markup Language (HTML) documents.

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250/472	SUBMITTED TEXT	17 WORDS	90%	MATCHING TEXT	17 WORDS

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251/472	SUBMITTED TEXT	27 WORDS	90%	MATCHING TEXT	27 WORDS

Material Web Servers NOTES 4.1 UNIT OBJECTIVES After going through this unit, you will be able to: ?

Material Web Graphics NOTES 6.1 OBJECTIVES After going through this unit, you will be able to: •

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252/472	SUBMITTED TEXT	27 WORDS	90%	MATCHING TEXT	27 WORDS

Material Web Servers NOTES 4.1 UNIT OBJECTIVES After going through this unit, you will be able to: ?

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253/472	SUBMITTED TEXT	152 WORDS	99%	MATCHING TEXT	152 WORDS

HTTP The engine of the World Wide Web is the application protocol that defines how web servers and clients exchange information: the Hypertext Transfer Protocol (HTTP). The first version of HTTP, HTTP/0.9, was part of the early World Wide Web and was a very simple request/response protocol with limited capabilities that could transfer only text files. The first widely used version was HTTP/1.0, which is a more complete protocol that allows the transport of many types of files and resources. The current version is HTTP/1.1, which expands HTTP/1.0's capabilities with several features that improve the efficiency of transfers and address many of the needs of the rapidly growing modern World Wide Web. The Hypertext Transfer Protocol is a protocol designed to allow the transfer of Hypertext Markup Language (HTML) documents. HTML is a tag language used to create hypertext documents. Hypertext documents include links to other documents that 208

HTTP The engine of the World Wide Web is the application protocol that defines how Web servers and clients exchange information using the HyperText Transfer Protocol (HTTP). The first version of HTTP, HTTP/0.9, was part of the early World Wide Web and was a very simple request/response protocol with limited capabilities that could transfer only text files. The first widely used version was HTTP/1.0, which is a more complete protocol that allows the transport of many types of files and resources. The current version is HTTP/1.1, which expands HTTP/1.0's capabilities with several features that improve the efficiency of transfers and address many of the needs of the rapidly growing modern World Wide Web. The HyperText Transfer Protocol is a protocol specifically designed to allow the transfer of HyperText Markup Language (HTML) documents. HTML is a tag language used to create HyperText documents. HyperText documents include links to other documents that

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254/472	SUBMITTED TEXT	152 WORDS	99%	MATCHING TEXT	152 WORDS

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contain additional information about the highlighted term or subject. Such documents can contain other elements apart from text, such as graphic images, audio and video clips, Java applets, and even virtual reality worlds. 4.5.1 Overview of HTTP HTTP is based on request–response activity. A client, running an application called a browser, establishes a connection with a server and sends a request to the server in the form of a request method. The server responds with a status line, including the message's protocol version and a success or error code, followed by a message containing server information, entity information, and possible body content. An HTTP transaction is divided into four steps: 1. The browser opens a connection. 2. The browser sends a request to the server. 3. The server sends a response to the browser. 4. The connection is closed. On the Internet, HTTP communication generally takes place over TCP connections. The default port is TCP 80, but other ports can be used. This does not preclude HTTP from being implemented on top of any other protocol on the Internet or on other networks. HTTP only presumes a reliable transport; any protocol that provides such guarantees can be used. HTTP is a stateless protocol because it does not keep track of the connections. To load a page including two graphics, for example, a graphic-enabled browser will open three TCP connections: one for the page and two for the graphics. Most browsers, however, are able to handle several of these connections simultaneously. 4.5.2 HTTP Operation In most cases, the HTTP communication is initiated by the user agent requesting a resource on the origin server. In the simplest case, the connection is established through a single connection between the user agent and the origin server (Figure 4.8). Fig. 4.8 HTTP Operation HTTP is a client/server-oriented, request/reply protocol. Basic communication consists of an HTTP Request message sent by an HTTP client to an HTTP server, which returns an HTTP Response message back to the client.

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257/472	SUBMITTED TEXT	80 WORDS	99%	MATCHING TEXT	80 WORDS

The simple client/server operational model of HTTP is complicated when intermediary devices such as proxies, tunnels or gateways are inserted in the communication path between the HTTP client and server. HTTP/1.1 is specifically designed with features to support the efficient conveyance of requests and responses through a series of steps from the client through the intermediaries to the server, and back again. The entire set of devices involved in such a communication is called the request/response chain (Figure 4.9).

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258/472	SUBMITTED TEXT	80 WORDS	99%	MATCHING TEXT	80 WORDS

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259/472	SUBMITTED TEXT	202 WORDS	97%	MATCHING TEXT	202 WORDS

Fig. 4.9 HTTP Operation with Proxies 4.5.3 HTTP Message All the communication between devices using the Hypertext Transfer Protocol takes place via HTTP messages. There are only two types of messages: requests and responses. Clients usually send requests and receive responses, while servers receive requests and send responses. Intermediate devices such as gateways or proxies may send and receive both types of message. 4.5.3.1 HTTP general message All HTTP messages are text-based messages created to fit a message structure that the standard calls the generic message format. HTTP messages consist of the following fields: Message types A HTTP message can be either a client request or a server response. The following string indicates the HTTP message type: HTTP-message = Request | Response Message header The HTTP message header field can be one of the following: – General header – Request header – Response header – Entity header _ Message body ? Message body can be referred to as entity body if there is no transfer coding. Message body simply carries the entity body of the relevant request or response. ? Message length indicates the length of the message body if it is included. #1 #2 #3 #3 #2 #1 HTTP

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260/472	SUBMITTED TEXT	202 WORDS	97%	MATCHING TEXT	202 WORDS

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261/472	SUBMITTED TEXT	82 WORDS	99%	MATCHING TEXT	82 WORDS

HTTP request message format HTTP requests are the means by which HTTP clients ask servers to take a particular type of action, such as sending a file or processing user input (Figure 4.10). The structure of HTTP requests >request-line< >general-headers< >request-headers< >entity-headers< >empty-line< [>message-body<] [>message-trailers<]

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262/472	SUBMITTED TEXT	82 WORDS	99%	MATCHING TEXT	82 WORDS

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263/472	SUBMITTED TEXT	262 WORDS	96%	MATCHING TEXT	262 WORDS

Fig. 4.10 HTTP Request Each request message begins with a request line, containing three critical pieces of information: the method (type of action) the client is requesting; the URI of the resource upon which the client wishes the action to be performed, and the version of HTTP that the client is using. After the request line come a set of message headers related to the request, followed by a blank line and then optionally, the message body of the request. o General headers: General headers refer mainly to the message itself, as opposed to its contents, and are used to control its processing or provide the recipient with extra information. They are not particular to either request or response messages, so they can appear in either. They are likewise not specifically relevant to any entity the message may be carrying. o Request headers: These headers convey to the server more details about the nature of the client's request, and give the client more control over how the request is handled. For example, special request headers can be used by the client to specify a conditional request—one that is only filled if certain criteria are met. Others can tell the server which formats or encodings the client is able to process in a response message. o Entity keaders: These are headers that describe the entity contained in the body of the request, if any. 4.5.3.3 HTTP response message format Each request message sent by an HTTP client to a server prompts the server to send back a response message (Figure 4.11).

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264/472	SUBMITTED TEXT	262 WORDS	96%	MATCHING TEXT	262 WORDS

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265/472	SUBMITTED TEXT	25 WORDS	88%	MATCHING TEXT	25 WORDS

Host: www.myfavouriteamazingsite.com From: Joebloe@somewebsitesomewhere.com Accept: text/html, text/plain User–Agent. Mozilla/4.0 (compatible, MSIE 6.0; Windows NT 5.1) Request Headers HTTP Request Message Body

Host: www.myfavouriteamazingsite.com From: Joebloe@somewebsitesomewhere.com Accept: text/html, text/plain User–Agent. Mozilla/4.0 (compatible, MSIE 6.0; Windows NT 5.1) Request Line General Headers Request Headers Entity Headers HTTP Request Message Body

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266/472	SUBMITTED TEXT	25 WORDS	88%	MATCHING TEXT	25 WORDS

Host: www.myfavouriteamazingsite.com From: Joebloe@somewebsitesomewhere.com Accept: text/html, text/plain User–Agent. Mozilla/4.0 (compatible, MSIE 6.0; Windows NT 5.1) Request Headers HTTP Request Message Body

Host: www.myfavouriteamazingsite.com From: Joebloe@somewebsitesomewhere.com Accept: text/html, text/plain User–Agent. Mozilla/4.0 (compatible, MSIE 6.0; Windows NT 5.1) Request Line General Headers Request Headers Entity Headers HTTP Request Message Body

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267/472	SUBMITTED TEXT	38 WORDS	77%	MATCHING TEXT	38 WORDS

The structure of HTTP response >status-line< >general-headers< >response-headers< >entity-headers< >empty-line< [>message-body<] [>message-trailers<] HTTP/1.1 200 OK Status Line HTTP Response Date: Thu, 20 May 2004 21:12:58 GMT Connection: close

The structure of HTTP response: >status-line< >general-headers< >response-headers< >entity-headers< >empty-line< [>message-body<] [>message-trailers<] Message Body HTTP Response HTTP/1.1 200 OK Date: Thu, 20 May 2004 21:12:58 GMT Connection: close

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268/472	SUBMITTED TEXT	38 WORDS	77%	MATCHING TEXT	38 WORDS

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269/472	SUBMITTED TEXT	30 WORDS	56%	MATCHING TEXT	30 WORDS

Content-Type: text/html Content-Length: 170 Entity Headers Last-Modified: Tue, 18 May 2004 10:14:49 GMT >html< >head< >title<Welcome to the Amazing Site!>/title< >/head< >body<

Content-Type: text/html Content-Length: 170 Last-Modified: Tue, 18 May 2004 10:14:49 GMT Entity Headers General Headers Status Line Response Headers >html< >head< >title<Welcome to the Amazing Site!>/title< >/head< >body< >

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270/472	SUBMITTED TEXT	30 WORDS	56%	MATCHING TEXT	30 WORDS

Content-Type: text/html Content-Length: 170 Entity Headers Last-Modified: Tue, 18 May 2004 10:14:49 GMT >html< >head< >title<Welcome to the Amazing Site!>/title< >/head< >body<

Content-Type: text/html Content-Length: 170 Last-Modified: Tue, 18 May 2004 10:14:49 GMT Entity Headers General Headers Status Line Response Headers >html< >head< >title<Welcome to the Amazing Site!>/title< >/head< >body< >

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271/472	SUBMITTED TEXT	158 WORDS	97%	MATCHING TEXT	158 WORDS

Body >p<This site is under construction. Please come back later. Sorry!>/p< >/body< >/html< Fig. 4.11 HTTP Response Each response message starts with a status line that contains the server's HTTP version number, and a numeric status code and text reason phrase that indicate the result of processing the client's request. The message then contains headers related to the response, followed by a blank line and then the optional message body. Since most HTTP requests ask for a server to return a file or other resource, many HTTP responses carry an entity in the message body (Figure 4.12). o General headers: General headers that refer to the message itself and are not specific to response messages or the entity in the message body. These are the same as the generic headers that can appear in request messages (though certain headers appear more often in responses and others are more common in requests).

body< >p<This site is under construction. Please come back later. Sorry!>/p< >/body< >/html< Fig. 1.6 HTTP Response Each response message starts with a status line that contains the server's HTTP version number and a numeric status code and text reason phrase that indicate the result of processing the client's request. The message then contains headers related to the response, followed by a blank line and then the optional message body. Since most HTTP requests ask for a server to return a file or other resource, many HTTP responses carry an entity in the message body (see Figure 1.7). • General Headers: General headers refer to the message itself and are not specific to response messages or the entity in the message body. These are the same as the generic headers that can appear in request messages (though certain headers appear more often in responses and others are more common in requests). •

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272/472	SUBMITTED TEXT	158 WORDS	97%	MATCHING TEXT	158 WORDS

Body >p<This site is under construction. Please come back later. Sorry!>/p< >/body< >/html< Fig. 4.11 HTTP Response Each response message starts with a status line that contains the server's HTTP version number, and a numeric status code and text reason phrase that indicate the result of processing the client's request. The message then contains headers related to the response, followed by a blank line and then the optional message body. Since most HTTP requests ask for a server to return a file or other resource, many HTTP responses carry an entity in the message body (Figure 4.12). o General headers: General headers that refer to the message itself and are not specific to response messages or the entity in the message body. These are the same as the generic headers that can appear in request messages (though certain headers appear more often in responses and others are more common in requests).

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273/472	SUBMITTED TEXT	83 WORDS	98%	MATCHING TEXT	83 WORDS

Response headers: These headers provide additional data that expands upon the summary result information in the status line. The server may also return extra result information in the body of the message, especially when an error occurs, as discussed below. o Entity headers: These are headers that describe the entity contained in the body of the response, if any. These are the same entity headers that can appear in a request message, but they are seen more often in response messages. The

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274/472	SUBMITTED TEXT	83 WORDS	98%	MATCHING TEXT	83 WORDS

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275/472	SUBMITTED TEXT	23 WORDS	100%	MATCHING TEXT	23 WORDS

reason for this is simply that responses more often carry an entity than requests, because most requests are to retrieve a resource.

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276/472	SUBMITTED TEXT	23 WORDS	100%	MATCHING TEXT	23 WORDS

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277/472 **SUBMITTED TEXT** 439 WORDS **94% MATCHING TEXT** 439 WORDS

Fig. 4.13 Request and Status Lines Status codes Table 4.1 Status Codes Self-Instructional Material 213 4.5.4 Method Definitions Currently defined methods are as follows: Safe and idempotent methods Methods considered not to cause side effects are referred to as safe. Idempotent methods are GET, HEAD, PUT, and DELETE. ? OPTIONS: This method allows the client to determine the options or requirements associated with a source or capabilities of a server without any resource retrieval. ? GET: This method allows the client to retrieve the data that was determined by the request URI. ? HEAD: This method allows the client to retrieve meta information about the entity that does not require you to transfer the entity body. ? POST: The post function is determined by the server. ? PUT: This method is similar to the post method with one important difference: The URI in post request identifies the resource that will handle enclosed entity. ? DELETE: This methods requests that the server delete the source determined by the request URI. ? TRACE: This method allows the client to see how the message was retrieved at the other side for testing and diagnostic purposes. 4.5.5 HTTP Message Headers Much of the functionality in HTTP is actually implemented in the form of message headers, which convey important details between clients and servers. Some headers can appear in only HTTP requests, some in only HTTP responses, and some in either type of message (Figure 4.14). Web Servers NOTES Self-Instructional Material 214 Web Servers NOTES Fig. 4.14 HTTP Message Header HTTP general headers HTTP general headers are so named because unlike the other three categories, they are not specific to any particular kind of message or message component (request, response or message entity) (Table 4.2). General headers are used primarily to communicate information about the message itself, as opposed to what content it carries. They provide general information and control how a message is processed and handled. Table 4.2 Types of Headers HTTP request headers HTTP request headers are used only in HTTP request messages, and serve a number of functions in them (Table 4.3). ? They allow the client to provide information about itself to the server. ? They give additional details about the nature of the request that the client is making. ? They allow the client to have greater control over how its request is processed and how (or even if) a response is returned by the server or intermediary. Table 4.3 Request Headers

Fig. 1.8 Request and Status Lines Status Codes Table 1.4 defines the various status codes that are generally displayed to the users. Table 1.4 Status Codes 16 Self-Instructional Material Foundations for Internet Programming NOTES Method Definitions Currently defined methods are as follows: Safe and Idempotent Methods Methods considered not to cause side effects are referred to as safe. Idempotent methods are GET, HEAD, PUT and DELETE. • OPTIONS: This method allows the client to determine the options or requirements associated with a source or capabilities of a server without any resource retrieval. • GET: This method allows the client to retrieve the data that was determined by the request URI. • HEAD: This method allows the client to retrieve meta information about the entity that does not require you to transfer the entity body. • POST: The post function is determined by the server. • PUT: This method is similar to the post method with one important difference: The URI in post request identifies the resource that will handle enclosed entity. • DELETE: This methods requests that the server delete the source determined by the request URI. • TRACE: This method allows the client to see how the message was retrieved at the other side for testing and diagnostic purposes. HTTP Message Headers Much of the functionality in HTTP is actually implemented in the form of message headers, which convey important details between clients and servers. Some headers can appear in only HTTP requests, some in only HTTP responses and some in either type of message (see Figure 1.9). Self-Instructional Material 17 NOTES Foundations for Internet Programming Fig. 1.9 HTTP Message Header HTTP General Headers HTTP general headers are so named because unlike the other three categories, they are not specific to any particular kind of message or message component (request, response or message entity) (see Table 1.5). General headers are used primarily to communicate information about the message itself, as opposed to what content it carries. They provide general information and control how a message is processed and handled. Table 1.5 Types of Headers HTTP Request Headers HTTP request headers are used only in HTTP request messages and serve a number of functions in them (see Table 1.6). • They allow the client to provide information about itself to the server. • They give additional details about the nature of the request that the client is making. • They allow the client to have greater control over how its request is processed and how (or even if) a response is returned by the server or intermediary. Table 1.6 Request Headers

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278/472 **SUBMITTED TEXT** 439 WORDS **94% MATCHING TEXT** 439 WORDS

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279/472	SUBMITTED TEXT	20 WORDS	86%	MATCHING TEXT	20 WORDS

Self-Instructional Material 215 HTTP response headers The counterparts to request headers, response headers appear only in HTTP responses

Self-Instructional Material Foundations for Internet Programming NOTES HTTP Response Headers The counterparts to request headers, response headers appear only in HTTP responses (

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280/472	SUBMITTED TEXT	20 WORDS	86%	MATCHING TEXT	20 WORDS

Self-Instructional Material 215 HTTP response headers The counterparts to request headers, response headers appear only in HTTP responses

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281/472	SUBMITTED TEXT	222 WORDS	99%	MATCHING TEXT	222 WORDS

Table 4.4). They provide additional data that expands upon the summary information that is present in the status line at the beginning of each server reply. Many of the response headers are sent only in response to the receipt of specific types of requests, or even particular headers within certain requests. Table 4.4 Response Headers HTTP entity headers These headers provide information about the resource carried in the body of an HTTP message, called an entity in the HTTP standards (Table 4.5). They serve the overall purpose of conveying to the recipient of a message the information it needs to properly process and display the entity, such as its type and encoding method. At least one entity header should appear in any HTTP message that carries an entity. However, they may also be present in certain responses that do not have an actual entity in them. Most notably, a response to a HEAD request will contain all the entity headers associated with the resource specified in the request; these are the same headers that would have been included with the entity, had the GET method been used instead of HEAD on the same resource. Entity headers may also be present in certain error responses, to provide information to help the client make a successful follow-up request. Table 4.5 Entity Headers

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283/472	SUBMITTED TEXT	325 WORDS	97%	MATCHING TEXT	325 WORDS

Some Other Features ? The most important feature that improves the efficiency of operation of HTTP is caching—the storing of recently requested resources in a temporary area. If the same resource is then needed again a short time later, it can be retrieved from the cache rather than requiring a fresh request to the server, resulting in a savings of both time and bandwidth. Caching can be performed by Web clients, servers and intermediaries. The closer the cache is to the user, the greater the efficiency benefits; the farther from the user, the greater the number of users that can benefit from the cache. ? One of the most important types of intermediary devices in HTTP is a proxy server, which acts as a middleman between the client and server, handling both requests and responses. A proxy server may either transport messages unchanged or may modify them to implement certain features and capabilities. Proxies are often used to increase the security and/or performance of Web access. ? HTTP is an inherently stateless protocol, because a server treats each request from a client independently, forgetting about all prior requests. This characteristic of HTTP is not an issue for most routine uses of the World Wide Web, but is a problem for interactive applications such as online shopping where the server needs to keep track of a user's information over time. To support these applications, most HTTP implementations include an optional feature called state management. When enabled, a server sends to a client a small amount of information called a cookie, which is stored on the client machine. The data in the cookie is returned to the server with each subsequent request, allowing the server to update it and send it back to the client again. Cookies thus enable a server to remember user data between requests. However, they are controversial, because of certain potential privacy and security concerns related to their use. 4.6

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285/472	SUBMITTED TEXT	239 WORDS	99%	MATCHING TEXT	239 WORDS

Using Internet has become common nowadays. We will now understand how the Internet interprets the Internet address. For instance, the Internet addresses are written as www.hotmail.com. Let us write one more address as server.institution.domain. It is significant to note that the address www.hotmail.com is not the actual address. It is actually a text version of the Internet address, which is basically a binary representation. Now we compare www.hotmail.com and server.institution.domain. Here, www is the name of the server owned by the institution (in this case, it is hotmail) and this server is connected to the Internet and a domain server (com in this case) which maintains a database of the addresses of different servers using the same domain com. The domain name has no geographical relevance, and two sites with the same domain name may exist at two different ends of this world. The above-mentioned case is the simplest one. Now, let us take the case of a large organization, which may have several other servers for different purposes, such as web server, email server, print server, etc. Now, take this example of www.sun.planet.universe.in. This address is written in five parts separated by three dots. This address apparently indicates that a group Planets (planet) comes under an Universe sub domain which is a part of India domain and maintaining one server sun out of many servers, which is linked to Internet through its web server. Similarly, an

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287/472	SUBMITTED TEXT	186 WORDS	98%	MATCHING TEXT	186 WORDS

organization with several departments may create addresses for its sub-domain with different servers being maintained there. The Internet is the collection of several independent networks, which are interconnected with one another. Each independent network may have several hosts. Keeping this in mind, you can now think of your address. Your house has a unique house number, which is not assigned to any other house in your locality. In this case, your house can be considered as the host, your as the network and your city as the domain. You can write your address in Internet addressing notation as houseno.locality.city. In case you want to acquaint a foreigner with your address, then you need to add your country name in your address. In this case it will become houseno.locality.city.country. Now if someone wants to send you a letter or visit your house, then is required to come to your country first and then to your city. Only after fulfilling these two obligations, he can reach your locality and then your house by locating your house number. The same analogy applies in the case of Internet addressing.

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and 126 addresses are available as prefix length. The remaining 3 octets are used for identifying up to 2 24 or 16,777,214 host IDs. ? Class B — It uses 16 bits for both the network address and the host address. In this case, the first two bits are always 10. It is reserved for IP unicast addresses. It

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297/472 **SUBMITTED TEXT** 143 WORDS **100%** **MATCHING TEXT** 143 WORDS

It uses 2 octets for a particular network while the remaining two octets are deployed by the host IDs. They are particularly used for medium to large-sized networks. The Class B addresses can cater to 16,384 networks with up to 65,534 hosts per network. ? Class C — It is reserved for IP unicast addresses. It is meant for small networks. The first 3 octets specify a particular network and the last octet specify the host IDs. The Class C addresses may be used by up to 2,097,152 networks with up to 254 hosts per network. Its first three bits are always set to 110. ? Class D — Class D signifies IP multicast addresses. ? Class E — These addresses are reserved for experimental purposes. Table 4.6 represents IPv4 addresses classifications. Table 4.6 Classifications of IPv4 Addresses 32 bit address

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298/472	SUBMITTED TEXT	143 WORDS	100%	MATCHING TEXT	143 WORDS

It uses 2 octets for a particular network while the remaining two octets are deployed by the host IDs. They are particularly used for medium to large-sized networks. The Class B addresses can cater to 16,384 networks with up to 65,534 hosts per network. ? Class C — It is reserved for IP unicast addresses. It is meant for small networks. The first 3 octets specify a particular network and the last octet specify the host IDs. The Class C addresses may be used by up to 2,097,152 networks with up to 254 hosts per network. Its first three bits are always set to 110. ? Class D — Class D signifies IP multicast addresses. ? Class E — These addresses are reserved for experimental purposes. Table 4.6 represents IPv4 addresses classifications. Table 4.6 Classifications of IPv4 Addresses 32 bit address

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299/472	SUBMITTED TEXT	90 WORDS	96%	MATCHING TEXT	90 WORDS

Classification Octet 1 Octet 2 Octet 3 Octet 4 possible networks number of host or nodes Class A 0bbbbbbb xxxxxxxx xxxxxxxx xxxxxxxx 2 7 = 128 2 24 = 16,777,216 Class B 10bbbbbb bbbbbbbb xxxxxxxx xxxxxxxx 2 14 =16,384 2 16 = 65,536 Class C 110bbbbb bbbbbbbb bbbbbbbb xxxxxxxx 2 21 =2,097,152 2 8 = 256 Class D 1110bbbb followed by a 28 bit multicast address Class E 1111; reserved

Classification Octet 1 Octet 2 Octet 3 Octet 4 Number of possible networks Maximum number of host or nodes Class A 0bbbbbbb xxxxxxxx xxxxxxxx xxxxxxxx 2 7 = 128 2 24 = 6,777,216 Class B 10bbbbbb bbbbbbbb xxxxxxxx xxxxxxxx 2 14 =16,384 2 16 = 65,536 Class C 110bbbbb bbbbbbbb bbbbbbbb xxxxxxxx 2 21 =2,097,152 2 8 = 256 Class D 1110bbbb followed by a 28 bit multicast address Class E 1111; reserved 3.8

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300/472	SUBMITTED TEXT	90 WORDS	96%	MATCHING TEXT	90 WORDS

Classification Octet 1 Octet 2 Octet 3 Octet 4 possible networks number of host or nodes Class A 0bbbbbbb xxxxxxxx xxxxxxxx xxxxxxxx 2 7 = 128 2 24 = 16,777,216 Class B 10bbbbbb bbbbbbbb xxxxxxxx xxxxxxxx 2 14 =16,384 2 16 = 65,536 Class C 110bbbbb bbbbbbbb bbbbbbbb xxxxxxxx 2 21 =2,097,152 2 8 = 256 Class D 1110bbbb followed by a 28 bit multicast address Class E 1111; reserved

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301/472	SUBMITTED TEXT	29 WORDS	100%	MATCHING TEXT	29 WORDS

Address is an identifier that is assigned to a device attached to a node in the Internet. It tells us about the source or destination of IP packets.

Address is an identifier that is assigned to a device attached to a node in the Internet. It tells us about the source or destination of IP packets. •

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302/472	SUBMITTED TEXT	29 WORDS	100%	MATCHING TEXT	29 WORDS

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303/472	SUBMITTED TEXT	16 WORDS	70%	MATCHING TEXT	16 WORDS

The Hypertext Transfer Protocol is designed to allow the transfer of HTML documents. It is

The HyperText Transfer Protocol is a protocol specifically designed to allow the transfer of HyperText Markup Language (HTML) documents. is

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304/472	SUBMITTED TEXT	16 WORDS	70%	MATCHING TEXT	16 WORDS

The Hypertext Transfer Protocol is designed to allow the transfer of HTML documents. It is

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305/472	SUBMITTED TEXT	36 WORDS	95%	MATCHING TEXT	36 WORDS

is based on a request–response activity. A client, running an application called a browser, establishes a connection with a server and sends a request to the server in the form of a request method. ?

is based on request-response activity. A client, running an application called a browser, establishes a connection with a server and sends a request to the server in the form of a request method.

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306/472	SUBMITTED TEXT	36 WORDS	95%	MATCHING TEXT	36 WORDS

is based on a request–response activity. A client, running an application called a browser, establishes a connection with a server and sends a request to the server in the form of a request method. ?

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307/472	SUBMITTED TEXT	17 WORDS	100%	MATCHING TEXT	17 WORDS

The Internet is the collection of several independent networks, which are interconnected with one another. 13.

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308/472	SUBMITTED TEXT	17 WORDS	100%	MATCHING TEXT	17 WORDS

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309/472	SUBMITTED TEXT	30 WORDS	86%	MATCHING TEXT	30 WORDS

IPv4 addresses are uniquely used as identifiers, which work at network layer to identify the source or destination of IP packets. Material 243 14. The technique of

IPv4 addresses are uniquely used as identifiers, which work at network layer to identify the source or destination of IP packets. present, the version of

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

310/472	SUBMITTED TEXT	30 WORDS	86%	MATCHING TEXT	30 WORDS

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

311/472	SUBMITTED TEXT	19 WORDS	100%	MATCHING TEXT	19 WORDS

The server may also return extra result information in the body of the message, especially when an error: (

The server may also return extra result information in the body of the message, especially when an error

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312/472	SUBMITTED TEXT	19 WORDS	100%	MATCHING TEXT	19 WORDS

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313/472	SUBMITTED TEXT	17 WORDS	100%	MATCHING TEXT	17 WORDS

Address is an identifier that is assigned to a device attached to a node in the: (

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W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

314/472	SUBMITTED TEXT	17 WORDS	100%	MATCHING TEXT	17 WORDS

Address is an identifier that is assigned to a device attached to a node in the: (

Address is an identifier that is assigned to a device attached to a node in the

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

315/472	SUBMITTED TEXT	19 WORDS	96%	MATCHING TEXT	19 WORDS

Hypertext documents include links to other documents that contain additional information about the term or subject. 8.

HyperText documents include links to other documents that contain additional information about the highlighted term or subject.

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316/472	SUBMITTED TEXT	19 WORDS	96%	MATCHING TEXT	19 WORDS

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HyperText documents include links to other documents that contain additional information about the highlighted term or subject.

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317/472	SUBMITTED TEXT	23 WORDS	97%	MATCHING TEXT	23 WORDS

TRACE method allows the client to see how the message was retrieved at the other side for testing and diagnostic purposes. 9.

TRACE: This method allows the client to see how the message was retrieved at the other side for testing and diagnostic purposes.

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318/472	SUBMITTED TEXT	23 WORDS	97%	MATCHING TEXT	23 WORDS

TRACE method allows the client to see how the message was retrieved at the other side for testing and diagnostic purposes. 9.

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319/472	SUBMITTED TEXT	14 WORDS	100%	MATCHING TEXT	14 WORDS

may create addresses for its sub-domain with different servers being maintained there. 10.

may create addresses for its sub-domain with different servers being maintained there.

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320/472	SUBMITTED TEXT	14 WORDS	100%	MATCHING TEXT	14 WORDS

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321/472	SUBMITTED TEXT	14 WORDS	100%	MATCHING TEXT	14 WORDS

All the communication between devices using the Hypertext Transfer Protocol takes place via

All the communication between devices using the HyperText Transfer Protocol takes place via

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322/472	SUBMITTED TEXT	14 WORDS	100%	MATCHING TEXT	14 WORDS

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323/472	SUBMITTED TEXT	24 WORDS	97%	MATCHING TEXT	24 WORDS

The message itself, as opposed to its contents, and are used to control its processing or provide the recipient with extra information are

the message itself, as opposed to its contents and are used to control its processing or provide the recipient with extra information. They are

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324/472	SUBMITTED TEXT	24 WORDS	97%	MATCHING TEXT	24 WORDS

The message itself, as opposed to its contents, and are used to control its processing or provide the recipient with extra information are

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325/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

INTRODUCTION In this unit, you will learn about the basics of

INTRODUCTION In this unit, you will learn about the basics of

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326/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

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327/472	SUBMITTED TEXT	20 WORDS	100%	MATCHING TEXT	20 WORDS

NOTES 5.1 UNIT OBJECTIVES After going through this unit, you will be able to: ? Understand

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328/472	SUBMITTED TEXT	20 WORDS	100%	MATCHING TEXT	20 WORDS

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329/472	SUBMITTED TEXT	82 WORDS	98%	MATCHING TEXT	82 WORDS

text formatting tags are: >em< Renders as emphasized text >strong< Renders as strong emphasized text >dfn< Defines a definition term >code< Defines computer code text >samp< Defines sample computer code >kbd< Defines keyboard text >var< Defines a variable part of a text >cite< Defines a citation Try the following HTML in your browser: >html< >head< >title<Other Text formatting tags>/title< >/head< >body< >em<Emphasized text>/em<>/br< >strong<Strong text>/strong<>/br< >dfn<Definition term>/dfn<>/br< >code<Computer code text>/code<>/br< >samp<Sample computer code text>/samp<>/br< >kbd<Keyboard text>/kbd<>/br< >var<Variable>/var<>/br< >cite<Citation>/cite< >/body< >/html<

Text Formatting Tags Tag Description >em< Renders as emphasized text. >strong< Renders as strong emphasized text. >dfn< Defines a definition term. >code< Defines computer code text. >samp< Defines sample computer code. >kbd< Defines keyboard text. >var< Defines a variable part of a text. >cite< Defines a citation. Try the following HTML in your browser: >html< >head< >title<Other Text formatting tags>/title< >/head< >body< >em<Emphasized text>/em<>/br< >strong<Strong text>/strong<>/br< >dfn<Definition term>/dfn<>/br< >code<Computer code text>/code<>/br< >samp<Sample computer code text>/samp<>/br< >kbd<Keyboard text>/kbd<>/br< >var<Variable>/var<>/br< >cite<Citation>/cite< >/body< >/html<

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330/472	SUBMITTED TEXT	82 WORDS	98%	MATCHING TEXT	82 WORDS

text formatting tags are: >em< Renders as emphasized text >strong< Renders as strong emphasized text >dfn< Defines a definition term >code< Defines computer code text >samp< Defines sample computer code >kbd< Defines keyboard text >var< Defines a variable part of a text >cite< Defines a citation Try the following HTML in your browser: >html< >head< >title<Other Text formatting tags>/title< >/head< >body< >em<Emphasized text>/em<>/br< >strong<Strong text>/strong<>/br< >dfn<Definition term>/dfn<>/br< >code<Computer code text>/code<>/br< >samp<Sample computer code text>/samp<>/br< >kbd<Keyboard text>/kbd<>/br< >var<Variable>/var<>/br< >cite<Citation>/cite< >/body< >/html<

Text Formatting Tags Tag Description >em< Renders as emphasized text. >strong< Renders as strong emphasized text. >dfn< Defines a definition term. >code< Defines computer code text. >samp< Defines sample computer code. >kbd< Defines keyboard text. >var< Defines a variable part of a text. >cite< Defines a citation. Try the following HTML in your browser: >html< >head< >title<Other Text formatting tags>/title< >/head< >body< >em<Emphasized text>/em<>/br< >strong<Strong text>/strong<>/br< >dfn<Definition term>/dfn<>/br< >code<Computer code text>/code<>/br< >samp<Sample computer code text>/samp<>/br< >kbd<Keyboard text>/kbd<>/br< >var<Variable>/var<>/br< >cite<Citation>/cite< >/body< >/html<

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331/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

List formatting tags The list formatting tags used in HTML

List Formatting Tags The list formatting tags used in HTML

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332/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

List formatting tags The list formatting tags used in HTML

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333/472	SUBMITTED TEXT	26 WORDS	88%	MATCHING TEXT	26 WORDS

ul< Creates an Ordered List >ol< Creates an UnOrdered List >li< Defines a list item >menu< Defines a menu list >dir< Defines a directory list

ul< Creates an unordered List. >ol< Creates an ordered List. >li< Defines a list item. >menu< Defines a menu list. >dir< Defines a directory list.

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334/472	SUBMITTED TEXT	26 WORDS	88%	MATCHING TEXT	26 WORDS

ul< Creates an Ordered List >ol< Creates an UnOrdered List >li< Defines a list item >menu< Defines a menu list >dir< Defines a directory list

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335/472	SUBMITTED TEXT	36 WORDS	93%	MATCHING TEXT	36 WORDS

list Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title< >/head< >body< >h3<Ordered List>/h3< >ol< >li<Orange>/li< >li<Mango>/li< >li<Apple>/li< >/ol< >hr/< >h3<Unordered List>/h3< >ul< >li<Tea>/li< >li<Coffee>/li< >li<Milk>/li< >/ul< >hr/< >menu< >li<HTML>/li< >li<DHTML>/li<

list. Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title< Ordered List>/h3< >ol< >li<Orange>/li< >li<Mango>/li< >li<Apple>/li< >/ol< >hr/< >h3<Unordered List>/h3< >ul< >li<Tea>/li< >li<Coffee>/li< >li<Milk>/li< >/ul< >hr/< >menu< >li<HTML>/li< >li<DHTML>/li< >

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336/472	SUBMITTED TEXT	36 WORDS	93%	MATCHING TEXT	36 WORDS

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list. Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title< Ordered List>/h3< >ol< >li<Orange>/li< >li<Mango>/li< >li<Apple>/li< >/ol< >hr/< >h3<Unordered List>/h3< >ul< >li<Tea>/li< >li<Coffee>/li< >li<Milk>/li< >/ul< >hr/< >menu< >li<HTML>/li< >li<DHTML>/li< >

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337/472	SUBMITTED TEXT	18 WORDS	94%	MATCHING TEXT	18 WORDS

li<CSS>/li< >/menu< >hr/< >dir< >li<HTML>/li< >li<DHTML>/li< >li<CSS>/li< >/dir< >/body< >/html< The output on the screen would be

li<CSS>/li< >/menu< >hr/< >dir< >li<HTML>/li< >li<DHTML>/li< >li<CSS>/li< >/dir< >/body< >/html< The output on the screen will be

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338/472	SUBMITTED TEXT	18 WORDS	94%	MATCHING TEXT	18 WORDS

li<CSS>/li< >/menu< >hr/< >dir< >li<HTML>/li< >li<DHTML>/li< >li<CSS>/li< >/dir< >/body< >/html< The output on the screen would be

li<CSS>/li< >/menu< >hr/< >dir< >li<HTML>/li< >li<DHTML>/li< >li<CSS>/li< >/dir< >/body< >/html< The output on the screen will be

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339/472	SUBMITTED TEXT	46 WORDS	93%	MATCHING TEXT	46 WORDS

thead< The >thead< tag is used to group the header content in an HTML table. >tfoot< The >tbody< element is used to group the body content in an HTML table >tbody< The >tfoot< element is used to group the footer content in an HTML table.

thead< The >thead< tag is used to group the header content in an HTML table. >tbody< The >tbody< element is used to group the body content in an HTML table >tfoot< The >tfoot< element is used to group the footer content in an HTML table.

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340/472	SUBMITTED TEXT	46 WORDS	93%	MATCHING TEXT	46 WORDS

thead< The >thead< tag is used to group the header content in an HTML table. >tfoot< The >tbody< element is used to group the body content in an HTML table >tbody< The >tfoot< element is used to group the footer content in an HTML table.

thead< The >thead< tag is used to group the header content in an HTML table. >tbody< The >tbody< element is used to group the body content in an HTML table >tfoot< The >tfoot< element is used to group the footer content in an HTML table.

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341/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title<

Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title< >/

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342/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title<

Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title< >/

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

343/472	SUBMITTED TEXT	34 WORDS	34%	MATCHING TEXT	34 WORDS

th< >th<Savings>/th< >/tr< >/thead< >tfoot< >tr< >td<Total>/td< >td<$2000>/td< >/tr< >/tfoot< >tbody< >tr< >td<January>/td< >td<$700>/td< >/tr< >tr< >td<February>/td< >td<$800>/td< >/tr< >tr< >td<March>/td< >td<$500>/td< >/tr< >/tbody< >/table<>/body< >/html< The output on the screen would be

th< >th align="left"<Currency>/th< >/tr< >tr < >td<India>/td< >New Delhi>/td< >td<Rupee>/td< >/tr< >tr < >td<United td< >td<London>/td< >td<Pound>/td< >/tr< >tr < >United States America>/td< >td<Washington>/td< >td<Dollars>/td< >/tr< >tr < >td<Japan>/td< >td<Tokyo>/td< tr< >/table< >/body< >/html< The output on the screen will be

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

344/472	SUBMITTED TEXT	34 WORDS	34%	MATCHING TEXT	34 WORDS

th< >th<Savings>/th< >/tr< >/thead< >tfoot< >tr< >td<Total>/td< >td<$2000>/td< >/tr< >/tfoot< >tbody< >tr< >td<January>/td< >td<$700>/td< >/tr< >tr< >td<February>/td< >td<$800>/td< >/tr< >tr< >td<March>/td< >td<$500>/td< >/tr< >/tbody< >/table<>/body< >/html< The output on the screen would be

th< >th align="left"<Currency>/th< >/tr< >tr < >td<India>/td< >New Delhi>/td< >td<Rupee>/td< >/tr< >tr < >td<United td< >td<London>/td< >td<Pound>/td< >/tr< >tr < >United States America>/td< >td<Washington>/td< >td<Dollars>/td< >/tr< >tr < >td<Japan>/td< >td<Tokyo>/td< tr< >/table< >/body< >/html< The output on the screen will be

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

345/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

Font style tags The Font Style tags used in HTML

Font Style Tags The font style tags used in HTML

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

346/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

Font style tags The Font Style tags used in HTML

Font Style Tags The font style tags used in HTML

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

347/472	SUBMITTED TEXT	26 WORDS	100%	MATCHING TEXT	26 WORDS

Renders as italic text >b< Renders as bold text >big< Renders as bigger text >small< Renders as smaller text >tt< Renders as Tele Type text

Renders as italic text. >b< Renders as bold text. >big< Renders as bigger text. >small< Renders as smaller text. >tt< Renders as tele type text.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

348/472	SUBMITTED TEXT	26 WORDS	100%	MATCHING TEXT	26 WORDS

Renders as italic text >b< Renders as bold text >big< Renders as bigger text >small< Renders as smaller text >tt< Renders as Tele Type text

Renders as italic text. >b< Renders as bold text. >big< Renders as bigger text. >small< Renders as smaller text. >tt< Renders as tele type text.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

349/472	SUBMITTED TEXT	15 WORDS	81%	MATCHING TEXT	15 WORDS

Try the following HTML in your browser: >html< >head< >title<Font Style Examples>/title< >/head< >body< >

Try the following HTML in your browser: >html< >head< >title<Font Example>/title< >/head< >body<

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

350/472	SUBMITTED TEXT	15 WORDS	81%	MATCHING TEXT	15 WORDS

Try the following HTML in your browser: >html< >head< >title<Font Style Examples>/title< >/head< >body< >

Try the following HTML in your browser: >html< >head< >title<Font Example>/title< >/head< >body<

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

351/472	SUBMITTED TEXT	12 WORDS	100%	MATCHING TEXT	12 WORDS

Text scripting tags Tags which are used to script text are:

Text Scripting Tags Tags which are used to script text are

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

352/472	SUBMITTED TEXT	12 WORDS	100%	MATCHING TEXT	12 WORDS

Text scripting tags Tags which are used to script text are:

Text Scripting Tags Tags which are used to script text are

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

353/472	SUBMITTED TEXT	15 WORDS	78%	MATCHING TEXT	15 WORDS

Try the following HTML in your browser: >html< >head< >title<Text Scripting Examples>/title< >/head< >body< >

Try the following HTML in your browser: >html< >head< >title<Other Text formatting tags>/title< >/head< >body< >

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

354/472	SUBMITTED TEXT	15 WORDS	78%	MATCHING TEXT	15 WORDS

Try the following HTML in your browser: >html< >head< >title<Text Scripting Examples>/title< >/head< >body< >

Try the following HTML in your browser: >html< >head< >title<Other Text formatting tags>/title< >/head< >body< >

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

355/472	SUBMITTED TEXT	45 WORDS	96%	MATCHING TEXT	45 WORDS

like: Element grouping tags Tags which are used to group similar kinds of elements are: >fieldset< This tag is used to logically group elements together. It draws a box around the related elements. >legend< This tag provides a caption for fieldset elements.

like WWW [1] . Element Grouping Tags Tags which are used to group similar kinds of elements are as follows: • >fieldset<: This tag is used to logically group elements together. It draws a box around the related elements. • >legend<: This tag provides a caption for >fieldset< elements.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

356/472	SUBMITTED TEXT	45 WORDS	96%	MATCHING TEXT	45 WORDS

like: Element grouping tags Tags which are used to group similar kinds of elements are: >fieldset< This tag is used to logically group elements together. It draws a box around the related elements. >legend< This tag provides a caption for fieldset elements.

like WWW [1] . Element Grouping Tags Tags which are used to group similar kinds of elements are as follows: • >fieldset<: This tag is used to logically group elements together. It draws a box around the related elements. • >legend<: This tag provides a caption for >fieldset< elements.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

357/472	SUBMITTED TEXT	15 WORDS	78%	MATCHING TEXT	15 WORDS

Try the following HTML in your browser: >html< >head< >title<Text Scripting Examples>/title< >/head< >body< >

Try the following HTML in your browser: >html< >head< >title<Other Text formatting tags>/title< >/head< >body< >

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

358/472	SUBMITTED TEXT	15 WORDS	78%	MATCHING TEXT	15 WORDS

Try the following HTML in your browser: >html< >head< >title<Text Scripting Examples>/title< >/head< >body< >

Try the following HTML in your browser: >html< >head< >title<Other Text formatting tags>/title< >/head< >body< >

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

359/472	SUBMITTED TEXT	63 WORDS	100%	MATCHING TEXT	63 WORDS

sub< The >sub< tag defines subscript text. Subscript text appears half a character below the baseline. Subscript text can be used for chemical formulas, like O 2 . >super< The >sup< tag defines superscript text. Superscript text appears half a character above the baseline. Superscript text can be used for footnotes, like WWW [1] .

sub<: The >sub< tag defines subscript text. Subscript text appears half a character below the baseline. Subscript text can be used for chemical formulas like O 2 . • >super<: The >sup< tag defines superscript text. Superscript text appears half a character above the baseline. Superscript text can be used for footnotes, WWW [1] .

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

360/472	SUBMITTED TEXT	63 WORDS	100%	MATCHING TEXT	63 WORDS

sub< The >sub< tag defines subscript text. Subscript text appears half a character below the baseline. Subscript text can be used for chemical formulas, like O 2 . >super< The >sup< tag defines superscript text. Superscript text appears half a character above the baseline. Superscript text can be used for footnotes, like WWW [1] .

sub<: The >sub< tag defines subscript text. Subscript text appears half a character below the baseline. Subscript text can be used for chemical formulas like O 2 . • >super<: The >sup< tag defines superscript text. Superscript text appears half a character above the baseline. Superscript text can be used for footnotes, WWW [1] .

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

361/472	SUBMITTED TEXT	16 WORDS	100%	MATCHING TEXT	16 WORDS

Try the following HTML in your browser: >html< >head< >title<Pre formatted text Example>/title< >/head< >body< >

Try the following HTML in your browser: >html< >head< >title<Pre formatted text Example>/title< >/head< >body<

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

362/472	SUBMITTED TEXT	16 WORDS	100%	MATCHING TEXT	16 WORDS

Try the following HTML in your browser: >html< >head< >title<Pre formatted text Example>/title< >/head< >body< >

Try the following HTML in your browser: >html< >head< >title<Pre formatted text Example>/title< >/head< >body<

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

363/472	SUBMITTED TEXT	16 WORDS	75%	MATCHING TEXT	16 WORDS

body< >/html< The output on the screen would be like: As you can see

body< >/html< The output on the screen will be displayed as follows: You can see

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

364/472	SUBMITTED TEXT	16 WORDS	75%	MATCHING TEXT	16 WORDS

body< >/html< The output on the screen would be like: As you can see

body< >/html< The output on the screen will be displayed as follows: You can see

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

365/472	SUBMITTED TEXT	166 WORDS	87%	MATCHING TEXT	166 WORDS

Striking text The tag >s< and >strike< are used to strike through the text. Try the following HTML in your browser: >html< >head< >title<Pre formatted text Example>/title< >/head< >body< This is an example of >s<stike through text>/s< using element s. >br/< This is an example of >strike<stike through text>/ strike< using element strike. >br/< >/body< >/html< Material 265 The output on the screen would be like: Text editing tags Tags which are used to format the edited text in the HTML document are: >del< Defines text that has been deleted from a document. >ins< Defines text that has been inserted into a document. Try the following HTML in your browser. >html< >head< >title<List Formatting Examples>/title< >/head< >body< >p< Hi All this is a HTML document. >del<This line has been deleted from this document>/del<. >ins<This is a new line which has been inserted into this document in place of the deleted line>/del<. >/p< >/body< >/html< The output on the screen would be

Striking Text The tags >s< and >strike< are used to strike through the Try the following HTML in your browser: >html< >head< >title<Pre formatted text Example>/title< >/head< >body< This is an example of >s<stike through text>/s< using element s. >br/< This is an example of >strike<stike through text>/strike< using element strike. >br/< >/body< >/html< The output on the screen will be displayed as follows: Text Editing Tags Tags which are used to format the edited text in the HTML document. They are as follows: • >del<: Defines text that has been deleted from a document. • >ins<: Defines text that has been inserted into a document.Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title< >/head< >p< Hi All this is a HTML document. >del<This line has been deleted from this document>/del<. >ins<This is a new line which has been inserted into this document in place of the deleted line>/ins<. >/p< >/body< >/html< The output on the screen will be

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

366/472	SUBMITTED TEXT	166 WORDS	87%	MATCHING TEXT	166 WORDS

Striking text The tag >s< and >strike< are used to strike through the text. Try the following HTML in your browser: >html< >head< >title<Pre formatted text Example>/title< >/head< >body< This is an example of >s<stike through text>/s< using element s. >br/< This is an example of >strike<stike through text>/ strike< using element strike. >br/< >/body< >/html< Material 265 The output on the screen would be like: Text editing tags Tags which are used to format the edited text in the HTML document are: >del< Defines text that has been deleted from a document. >ins< Defines text that has been inserted into a document. Try the following HTML in your browser. >html< >head< >title<List Formatting Examples>/title< >/head< >body< >p< Hi All this is a HTML document. >del<This line has been deleted from this document>/del<. >ins<This is a new line which has been inserted into this document in place of the deleted line>/del<. >/p< >/body< >/html< The output on the screen would be

Striking Text The tags >s< and >strike< are used to strike through the Try the following HTML in your browser: >html< >head< >title<Pre formatted text Example>/title< >/head< >body< This is an example of >s<stike through text>/s< using element s. >br/< This is an example of >strike<stike through text>/strike< using element strike. >br/< >/body< >/html< The output on the screen will be displayed as follows: Text Editing Tags Tags which are used to format the edited text in the HTML document. They are as follows: • >del<: Defines text that has been deleted from a document. • >ins<: Defines text that has been inserted into a document.Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title< >/head< >p< Hi All this is a HTML document. >del<This line has been deleted from this document>/del<. >ins<This is a new line which has been inserted into this document in place of the deleted line>/ins<. >/p< >/body< >/html< The output on the screen will be

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

367/472	SUBMITTED TEXT	59 WORDS	91%	MATCHING TEXT	59 WORDS

list In HTML you can define a definition list. Definition list is a list of elements with their definition. Tags which are used for defining a definition list are: >dl< Defines a definition list >dt< Defines an item in definition list >dd< Describes the item in the list Try the following HTML in your browser: >html< >head<

list. In HTML, you can define a definition list. A definition list is a list of elements with their respective definitions. Tags which are used in defining a definition list are as follows: • >dl<: Defines a definition list. • >dt<: Defines an item in definition list. • >dd<:Describes the item in the list. Try the following HTML in your browser: >html< >head< >

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

368/472	SUBMITTED TEXT	59 WORDS	91%	MATCHING TEXT	59 WORDS

list In HTML you can define a definition list. Definition list is a list of elements with their definition. Tags which are used for defining a definition list are: >dl< Defines a definition list >dt< Defines an item in definition list >dd< Describes the item in the list Try the following HTML in your browser: >html< >head<

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W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

369/472	SUBMITTED TEXT	16 WORDS	75%	MATCHING TEXT	16 WORDS

Try the following HTML in your browser: >html< >head< >title<In Line Frame Example>/title< >/head< >body< >h3<

Try the following HTML in your browser: >html< >head< >title< HTML table example>/title< >/head< >body< >h3<

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

370/472	SUBMITTED TEXT	16 WORDS	75%	MATCHING TEXT	16 WORDS

Try the following HTML in your browser: >html< >head< >title<In Line Frame Example>/title< >/head< >body< >h3<

Try the following HTML in your browser: >html< >head< >title< HTML table example>/title< >/head< >body< >h3<

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

371/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

frameborder 1 0 Specifies whether or not to display a border around

frameborder 0 1 Specifies whether or not to display a border around

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

372/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

frameborder 1 0 Specifies whether or not to display a border around

frameborder 0 1 Specifies whether or not to display a border around

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

373/472	SUBMITTED TEXT	46 WORDS	79%	MATCHING TEXT	46 WORDS

longdesc URL Specifies a page that contains a long description of the content of an iframe marginheight pixels Specifies the top and bottom margins of an iframe marginwidth pixels Specifies the left and right margins of an iframe name name Specifies the name of

longdesc URL Specifies a page that contains a long description of the content of a frame. marginheight pixels Specifies the top and bottom margins of a frame. marginwidth pixels Specifies the left and right margins of a frame. Name name Specifies the name of

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

374/472	SUBMITTED TEXT	46 WORDS	79%	MATCHING TEXT	46 WORDS

longdesc URL Specifies a page that contains a long description of the content of an iframe marginheight pixels Specifies the top and bottom margins of an iframe marginwidth pixels Specifies the left and right margins of an iframe name name Specifies the name of

longdesc URL Specifies a page that contains a long description of the content of a frame. marginheight pixels Specifies the top and bottom margins of a frame. marginwidth pixels Specifies the left and right margins of a frame. Name name Specifies the name of

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

375/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

scrolling yes no auto Specifies whether or not to display scrollbars in

scrolling Yes No auto Specifies whether or not to display scrollbars in

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

376/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

scrolling yes no auto Specifies whether or not to display scrollbars in

scrolling Yes No auto Specifies whether or not to display scrollbars in

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

377/472	SUBMITTED TEXT	12 WORDS	100%	MATCHING TEXT	12 WORDS

src URL Specifies the URL of the document to show in

Src URL Specifies the URL of the document to show in

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

378/472	SUBMITTED TEXT	12 WORDS	100%	MATCHING TEXT	12 WORDS

src URL Specifies the URL of the document to show in

Src URL Specifies the URL of the document to show in

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

379/472	SUBMITTED TEXT	43 WORDS	84%	MATCHING TEXT	43 WORDS

pixels % Specifies the width of an iframe class classname Specifies a classname for an element id id Specifies a unique id for an element style style_definition Specifies an inline style for an element title text Specifies extra information about an element

pixels % * Specifies the number and size of rows in a frameset. class Specifies a classname for an element. id Id Specifies a unique id for an element. style style_definition Specifies an inline style for an element. title Text Specifies extra information about an element.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

380/472	SUBMITTED TEXT	43 WORDS	84%	MATCHING TEXT	43 WORDS

pixels % Specifies the width of an iframe class classname Specifies a classname for an element id id Specifies a unique id for an element style style_definition Specifies an inline style for an element title text Specifies extra information about an element

pixels % * Specifies the number and size of rows in a frameset. class Specifies a classname for an element. id Id Specifies a unique id for an element. style style_definition Specifies an inline style for an element. title Text Specifies extra information about an element.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

381/472	SUBMITTED TEXT	14 WORDS	90%	MATCHING TEXT	14 WORDS

Try the following HTML in your browser: >html< >head< >title<Acronym Example>/title< >/head< >body<

Try the following HTML in your browser: >html< >head< >title<Font Example>/title< >/head< >body<

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

382/472	SUBMITTED TEXT	14 WORDS	90%	MATCHING TEXT	14 WORDS

Try the following HTML in your browser: >html< >head< >title<Acronym Example>/title< >/head< >body<

Try the following HTML in your browser: >html< >head< >title<Font Example>/title< >/head< >body<

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

383/472	SUBMITTED TEXT	14 WORDS	90%	MATCHING TEXT	14 WORDS

Try the following HTML in your browser: >html< >head< >title<Label Example>/title< >/head< >body<

Try the following HTML in your browser: >html< >head< >title<Font Example>/title< >/head< >body<

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

384/472	SUBMITTED TEXT	14 WORDS	90%	MATCHING TEXT	14 WORDS

Try the following HTML in your browser: >html< >head< >title<Label Example>/title< >/head< >body<

Try the following HTML in your browser: >html< >head< >title<Font Example>/title< >/head< >body<

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

385/472	SUBMITTED TEXT	79 WORDS	95%	MATCHING TEXT	79 WORDS

class classname Specifies a classname for an element dir rtl ltr Specifies the text direction for the content in an element id id Specifies a unique id for an element lang language_code Specifies a language code for the content in an element style style_definition Specifies an inline style for an element title text Specifies extra information about an element xml:lang language_code Specifies a language code for the content in an element, in XHTML documents Note: The for attribute

Class Classname Specifies a classname for an element. Dir rtl ltr Specifies the text direction for the content in an element. Id Id Specifies a unique id for an element. Lang language_code Specifies a language code for the content in an element. Style style_definition Specifies an inline style for an element. Title Text Specifies extra information about an element. xml:lang language_code Specifies a language code for the content in an element in XHTML documents. align Attribute The align attribute

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

386/472	SUBMITTED TEXT	79 WORDS	95%	MATCHING TEXT	79 WORDS

class classname Specifies a classname for an element dir rtl ltr Specifies the text direction for the content in an element id id Specifies a unique id for an element lang language_code Specifies a language code for the content in an element style style_definition Specifies an inline style for an element title text Specifies extra information about an element xml:lang language_code Specifies a language code for the content in an element, in XHTML documents Note: The for attribute

Class Classname Specifies a classname for an element. Dir rtl ltr Specifies the text direction for the content in an element. Id Id Specifies a unique id for an element. Lang language_code Specifies a language code for the content in an element. Style style_definition Specifies an inline style for an element. Title Text Specifies extra information about an element. xml:lang language_code Specifies a language code for the content in an element in XHTML documents. align Attribute The align attribute

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

387/472	SUBMITTED TEXT	15 WORDS	90%	MATCHING TEXT	15 WORDS

the JavaScript. Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title< >

the list. Try the following HTML in your browser: >html< >head< > List Formatting Examples>/title< 124

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

388/472	SUBMITTED TEXT	15 WORDS	90%	MATCHING TEXT	15 WORDS

the JavaScript. Try the following HTML in your browser: >html< >head< >title<List Formatting Examples>/title< >

the list. Try the following HTML in your browser: >html< >head< > List Formatting Examples>/title< 124

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

389/472	SUBMITTED TEXT	85 WORDS	100%	MATCHING TEXT	85 WORDS

class classname Specifies a classname for an element dir rtl ltr Specifies the text direction for the content in an element id Id Specifies a unique id for an element lang language_code Specifies a language code for the content in an element style style_definition Specifies an inline style for an element title Text Specifies extra information about an element xml:lang language_code Specifies a language code for the content in an element, in XHTML documents

Class Classname Specifies a classname for an element. Dir rtl ltr Specifies the text direction for the content in an element. Id Id Specifies a unique id for an element. Lang language_code Specifies a language code for the content in an element. Style style_definition Specifies an inline style for an element. Title Text Specifies extra information about an element. xml:lang language_code Specifies a language code for the content in an element in XHTML documents.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

390/472	SUBMITTED TEXT	85 WORDS	100%	MATCHING TEXT	85 WORDS

class classname Specifies a classname for an element dir rtl ltr Specifies the text direction for the content in an element id Id Specifies a unique id for an element lang language_code Specifies a language code for the content in an element style style_definition Specifies an inline style for an element title Text Specifies extra information about an element xml:lang language_code Specifies a language code for the content in an element, in XHTML documents

Class Classname Specifies a classname for an element. Dir rtl ltr Specifies the text direction for the content in an element. Id Id Specifies a unique id for an element. Lang language_code Specifies a language code for the content in an element. Style style_definition Specifies an inline style for an element. Title Text Specifies extra information about an element. xml:lang language_code Specifies a language code for the content in an element in XHTML documents.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

391/472	SUBMITTED TEXT	25 WORDS	51%	MATCHING TEXT	25 WORDS

Try the following HTML in your browser: >html< >head< Material 271 >title<Span Examples>/title< >/head< >body< >bdo dir=”rtl”<Hi everybody, my name is Albert Einstien>/

Try the following HTML in your browser: >html< >head< > title<First Page>/title< >/head< >body< My name is >b<Albert Einstien>/

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

392/472	SUBMITTED TEXT	25 WORDS	51%	MATCHING TEXT	25 WORDS

Try the following HTML in your browser: >html< >head< Material 271 >title<Span Examples>/title< >/head< >body< >bdo dir=”rtl”<Hi everybody, my name is Albert Einstien>/

Try the following HTML in your browser: >html< >head< > title<First Page>/title< >/head< >body< My name is >b<Albert Einstien>/

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

393/472	SUBMITTED TEXT	21 WORDS	77%	MATCHING TEXT	21 WORDS

user navigates the pages to search to get the information through links this is also called hyperlink in Web technology

user navigates the pages to search or get the information through links that is also called in Web technology

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

394/472	SUBMITTED TEXT	21 WORDS	77%	MATCHING TEXT	21 WORDS

user navigates the pages to search to get the information through links this is also called hyperlink in Web technology

user navigates the pages to search or get the information through links that is also called in Web technology

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

395/472	SUBMITTED TEXT	46 WORDS	100%	MATCHING TEXT	46 WORDS

as citation in literature. It is combined with suitable access protocol and data networking. The syntax of creating link is as follows: >a href="url"<Link text>/a< The start tag contains the attributes of specified link, whereas 'Link text' is declared as the highlighted text that is

as citation in literature. It is combined with suitable access protocol and data networking. The syntax of creating link is as follows: >a href="url"<Link text>/a< The start tag contains the attributes of specified link whereas 'Link text' is declared as the highlighted text that is

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

396/472	SUBMITTED TEXT	46 WORDS	100%	MATCHING TEXT	46 WORDS

as citation in literature. It is combined with suitable access protocol and data networking. The syntax of creating link is as follows: >a href="url"<Link text>/a< The start tag contains the attributes of specified link, whereas 'Link text' is declared as the highlighted text that is

as citation in literature. It is combined with suitable access protocol and data networking. The syntax of creating link is as follows: >a href="url"<Link text>/a< The start tag contains the attributes of specified link whereas 'Link text' is declared as the highlighted text that is

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

397/472	SUBMITTED TEXT	28 WORDS	100%	MATCHING TEXT	28 WORDS

link. The element content could be text or graphics, for example buttons etc. You would be able to link from an image or other HTML element. Creating

link. The element content could be text or graphics, for example buttons, etc. You would be able to link from an image or other HTML element. Creating

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

398/472	SUBMITTED TEXT	28 WORDS	100%	MATCHING TEXT	28 WORDS

link. The element content could be text or graphics, for example buttons etc. You would be able to link from an image or other HTML element. Creating

link. The element content could be text or graphics, for example buttons, etc. You would be able to link from an image or other HTML element. Creating

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

399/472	SUBMITTED TEXT	29 WORDS	100%	MATCHING TEXT	29 WORDS

link is possible by writing the HTML code as follows: >html< >body< >p< >a href="feedback.htm"<Feedback>/a< >/p< >p< >a href="http://www.abc.com/"<Link to World Wide Web>/ a< >/p< >/body< >/html<

link is possible by writing the HTML code as follows: >html< >body< >p< >a href="feedback.htm"<Feedback>/a< >/p< >p< >a href="http://www.abc.com/"<Link to World Wide Web>/a< >/p< >/body< >/html<

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

400/472	SUBMITTED TEXT	29 WORDS	100%	MATCHING TEXT	29 WORDS

link is possible by writing the HTML code as follows: >html< >body< >p< >a href="feedback.htm"<Feedback>/a< >/p< >p< >a href="http://www.abc.com/"<Link to World Wide Web>/ a< >/p< >/body< >/html<

link is possible by writing the HTML code as follows: >html< >body< >p< >a href="feedback.htm"<Feedback>/a< >/p< >p< >a href="http://www.abc.com/"<Link to World Wide Web>/a< >/p< >/body< >/html<

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

401/472	SUBMITTED TEXT	78 WORDS	81%	MATCHING TEXT	78 WORDS

HTML Result of the above web code is as follows that provides the following link: NOTES Self-Instructional After clicking on Feedback link and Link to World Wide Web you can navigate on

html< Result of the above Web code is as follows that provides the following link: Feedback Link to World Wide Web After clicking on Feedback link and Link to World Wide Web you can navigate on

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

402/472	SUBMITTED TEXT	78 WORDS	81%	MATCHING TEXT	78 WORDS

HTML Result of the above web code is as follows that provides the following link: NOTES Self-Instructional After clicking on Feedback link and Link to World Wide Web you can navigate on

html< Result of the above Web code is as follows that provides the following link: Feedback Link to World Wide Web After clicking on Feedback link and Link to World Wide Web you can navigate on

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

403/472	SUBMITTED TEXT	19 WORDS	100%	MATCHING TEXT	19 WORDS

referenced Web site. If you set target="_blank" on the coding, the link will open a new window where

referenced Web site. If you set target="_blank" on the coding, the link will open a new window where

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

404/472	SUBMITTED TEXT	19 WORDS	100%	MATCHING TEXT	19 WORDS

referenced Web site. If you set target="_blank" on the coding, the link will open a new window where

referenced Web site. If you set target="_blank" on the coding, the link will open a new window where

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

405/472	SUBMITTED TEXT	50 WORDS	100%	MATCHING TEXT	50 WORDS

So, the proper coding is written as follows: >a href="feedback.htm" target="_blank" <Feedback>/a< The HTML anchor is defined by >a<, which is used to define both anchors and hyperlinks. The href attribute is set with >a< element that defines the link as marked with underline and generally highlighted with blue

So, the proper coding is written as follows: >a href="feedback.htm" target="_blank" <Feedback>/a< The HTML anchor is defined by >a<, which is used to define both anchors and hyperlinks. The href attribute is set with >a< element that defines the link as marked with underline and generally highlighted with blue

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

406/472	SUBMITTED TEXT	50 WORDS	100%	MATCHING TEXT	50 WORDS

So, the proper coding is written as follows: >a href="feedback.htm" target="_blank" <Feedback>/a< The HTML anchor is defined by >a<, which is used to define both anchors and hyperlinks. The href attribute is set with >a< element that defines the link as marked with underline and generally highlighted with blue

So, the proper coding is written as follows: >a href="feedback.htm" target="_blank" <Feedback>/a< The HTML anchor is defined by >a<, which is used to define both anchors and hyperlinks. The href attribute is set with >a< element that defines the link as marked with underline and generally highlighted with blue

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

407/472	SUBMITTED TEXT	45 WORDS	100%	MATCHING TEXT	45 WORDS

Feedback Hyperlinks point to resources that appear on the web page. These resources can be an HTML document, an image, a movie or a sound file, etc. The following HTML code shows how an image is connected with link: >html< >body< >p< > a

Feedback Hyperlinks point to resources that appear on the Web page. These resources can be an HTML document, an image, a movie or a sound file, etc. The following HTML code shows how an image is connected with link: >html< >body< >p< >a

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

408/472	SUBMITTED TEXT	45 WORDS	100%	MATCHING TEXT	45 WORDS

Feedback Hyperlinks point to resources that appear on the web page. These resources can be an HTML document, an image, a movie or a sound file, etc. The following HTML code shows how an image is connected with link: >html< >body< >p< > a

Feedback Hyperlinks point to resources that appear on the Web page. These resources can be an HTML document, an image, a movie or a sound file, etc. The following HTML code shows how an image is connected with link: >html< >body< >p< >a

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

409/472	SUBMITTED TEXT	9 WORDS	100%	MATCHING TEXT	9 WORDS

src="button_def.gif" width ="65" height="38"< >/a< >/p< >/body< >/html<

src="button_def.gif" width ="65" height="38"< >/a< >/p< >/body< >/html<

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

410/472	SUBMITTED TEXT	9 WORDS	100%	MATCHING TEXT	9 WORDS

src="button_def.gif" width ="65" height="38"< >/a< >/p< >/body< >/html<

src="button_def.gif" width ="65" height="38"< >/a< >/p< >/body< >/html<

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

411/472	SUBMITTED TEXT	18 WORDS	91%	MATCHING TEXT	18 WORDS

Same Page Linking on same page is basically created when the Web document is too long and

Same Page Linking on same page is basically created, if the Web document is too long and

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

412/472	SUBMITTED TEXT	18 WORDS	91%	MATCHING TEXT	18 WORDS

Same Page Linking on same page is basically created when the Web document is too long and

Same Page Linking on same page is basically created, if the Web document is too long and

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

413/472	SUBMITTED TEXT	78 WORDS	96%	MATCHING TEXT	78 WORDS

user navigates the pages quickly, for example chapter wise navigation on the page or in an e-book. Linking on same Web page is written as follows: >html< >body< >p< >a href="C4"<You can navigate on Chapter 4 from here.<>/ a< >/p< >h2<Chapter 1>/h2< >p<This chapter explains MS Word.>/p< >h2<Chapter 2>/h2< >p<This chapter explains MS Excel.>/p< >h2<Chapter 3>/h2< >p<This chapter explains MS PowerPoint.>/p< >h2<>a name="C4"<Chapter 4>/a<>/h2< >p<This chapter explains a detailed description about MS Access. >/p< >/body< >/html< The

user navigates the pages quickly, for example, chapter wise navigation on the Web page or e-book. Linking on same Web page is written as follows: >html< >body< >p< >a href="C4"<You can navigate on Chapter 4 from here.<>/a< >/p< >h2<Chapter 1>/h2< >p<This chapter explains MS Word.>/p< >h2<Chapter 2>/h2< >p<This chapter explains MS Excel.>/p< >h2<Chapter 3>/h2< >p<This chapter explains MS PowerPoint.>/p< >h2<>a name="C4"<Chapter 4>/a<>/h2< >p<This chapter explains a detailed description about MS Access. >/p< >/body< >/html< The

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

414/472	SUBMITTED TEXT	78 WORDS	96%	MATCHING TEXT	78 WORDS

user navigates the pages quickly, for example chapter wise navigation on the page or in an e-book. Linking on same Web page is written as follows: >html< >body< >p< >a href="C4"<You can navigate on Chapter 4 from here.<>/ a< >/p< >h2<Chapter 1>/h2< >p<This chapter explains MS Word.>/p< >h2<Chapter 2>/h2< >p<This chapter explains MS Excel.>/p< >h2<Chapter 3>/h2< >p<This chapter explains MS PowerPoint.>/p< >h2<>a name="C4"<Chapter 4>/a<>/h2< >p<This chapter explains a detailed description about MS Access. >/p< >/body< >/html< The

user navigates the pages quickly, for example, chapter wise navigation on the Web page or e-book. Linking on same Web page is written as follows: >html< >body< >p< >a href="C4"<You can navigate on Chapter 4 from here.<>/a< >/p< >h2<Chapter 1>/h2< >p<This chapter explains MS Word.>/p< >h2<Chapter 2>/h2< >p<This chapter explains MS Excel.>/p< >h2<Chapter 3>/h2< >p<This chapter explains MS PowerPoint.>/p< >h2<>a name="C4"<Chapter 4>/a<>/h2< >p<This chapter explains a detailed description about MS Access. >/p< >/body< >/html< The

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

415/472	SUBMITTED TEXT	26 WORDS	100%	MATCHING TEXT	26 WORDS

result, if you click on 'You can navigate on Chapter 4 from here.' marked hyperlink, you will get the Chapter 4 page quickly and directly.

result, if you click on 'You can navigate on Chapter 4 from here'. marked hyperlink, you will get the Chapter 4 page quickly and directly.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

416/472	SUBMITTED TEXT	26 WORDS	100%	MATCHING TEXT	26 WORDS

result, if you click on 'You can navigate on Chapter 4 from here.' marked hyperlink, you will get the Chapter 4 page quickly and directly.

result, if you click on 'You can navigate on Chapter 4 from here'. marked hyperlink, you will get the Chapter 4 page quickly and directly.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

417/472	SUBMITTED TEXT	35 WORDS	98%	MATCHING TEXT	35 WORDS

shows how links are useful for major Pay Per Click (PPC) search engines. These search engines provide various links that make Web page more powerful.

shows how links are useful for major Pay Per Click or (PPC) search engines. These search engines provide various links that make Web page more powerful.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

418/472	SUBMITTED TEXT	35 WORDS	98%	MATCHING TEXT	35 WORDS

shows how links are useful for major Pay Per Click (PPC) search engines. These search engines provide various links that make Web page more powerful.

shows how links are useful for major Pay Per Click or (PPC) search engines. These search engines provide various links that make Web page more powerful.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

419/472	SUBMITTED TEXT	41 WORDS	90%	MATCHING TEXT	41 WORDS

You can navigate on Chapter 4 from here. Chapter 1 This chapter explains MS Word. Chapter 2 This chapter explains MS Excel. Chapter 3 This chapter explains MS PowerPoint. Chapter 4 This chapter explains a detailed description about MS Access.

You can navigate on Chapter 4 from here. 130 Self-Instructional Material Internet Markup Languages NOTES Chapter 1 This chapter explains MS Word. Chapter 2 This chapter explains MS Excel. Chapter 3 This chapter explains MS PowerPoint. Chapter 4 This chapter explains a detailed description about MS Access.

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420/472	SUBMITTED TEXT	41 WORDS	90%	MATCHING TEXT	41 WORDS

You can navigate on Chapter 4 from here. Chapter 1 This chapter explains MS Word. Chapter 2 This chapter explains MS Excel. Chapter 3 This chapter explains MS PowerPoint. Chapter 4 This chapter explains a detailed description about MS Access.

You can navigate on Chapter 4 from here. 130 Self-Instructional Material Internet Markup Languages NOTES Chapter 1 This chapter explains MS Word. Chapter 2 This chapter explains MS Excel. Chapter 3 This chapter explains MS PowerPoint. Chapter 4 This chapter explains a detailed description about MS Access.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

421/472	SUBMITTED TEXT	48 WORDS	95%	MATCHING TEXT	48 WORDS

In each search engine index, titled links create the popularity of your Website by PPC or CPC mechanisms. Users browse the sites that give the quality and volume of the pages. You can view the referring traffic of the Web pages. Commercial organizations make powerful linking and

In each search engine index, titled links create the popularity of your Web site by PPC or CPC mechanisms. Users browse the sites that give the quality and volume of the pages. You can view the referring traffic of the Web pages. Commercial organizations make powerful linking and

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

422/472	SUBMITTED TEXT	48 WORDS	95%	MATCHING TEXT	48 WORDS

In each search engine index, titled links create the popularity of your Website by PPC or CPC mechanisms. Users browse the sites that give the quality and volume of the pages. You can view the referring traffic of the Web pages. Commercial organizations make powerful linking and

In each search engine index, titled links create the popularity of your Web site by PPC or CPC mechanisms. Users browse the sites that give the quality and volume of the pages. You can view the referring traffic of the Web pages. Commercial organizations make powerful linking and

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

423/472	SUBMITTED TEXT	18 WORDS	87%	MATCHING TEXT	18 WORDS

their business. Note: The broken link also known as dangling link or dead link takes place

their business growth. Note: The broken link also known as a dangling link or a dead link that takes place

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

424/472	SUBMITTED TEXT	18 WORDS	87%	MATCHING TEXT	18 WORDS

their business. Note: The broken link also known as dangling link or dead link takes place

their business growth. Note: The broken link also known as a dangling link or a dead link that takes place

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

425/472	SUBMITTED TEXT	23 WORDS	73%	MATCHING TEXT	23 WORDS

the Web server responded but the specific page is not found. The frequently link is known as 404 error representing broken link.

the Web server responds but when the specific page is not found. The most common broken link is known as a 404 error representing a broken link. 4.7.1

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

426/472	SUBMITTED TEXT	23 WORDS	73%	MATCHING TEXT	23 WORDS

the Web server responded but the specific page is not found. The frequently link is known as 404 error representing broken link.

the Web server responds but when the specific page is not found. The most common broken link is known as a 404 error representing a broken link. 4.7.1

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

427/472	SUBMITTED TEXT	13 WORDS	83%	MATCHING TEXT	13 WORDS

The >caption< tag is used to add a caption of the table.

The >caption< tag is used to add a caption row to the table.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

428/472	SUBMITTED TEXT	13 WORDS	83%	MATCHING TEXT	13 WORDS

The >caption< tag is used to add a caption of the table.

The >caption< tag is used to add a caption row to the table.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

429/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

more than one HTML document in the same browser window

more than one HTML document in the same browser window.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

430/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

more than one HTML document in the same browser window

more than one HTML document in the same browser window.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

431/472	SUBMITTED TEXT	16 WORDS	86%	MATCHING TEXT	16 WORDS

each HTML document is called a frame and each frame is independent of the others.

Each HTML document is known as a frame and each frame is independent of the others.

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

432/472	SUBMITTED TEXT	16 WORDS	86%	MATCHING TEXT	16 WORDS

each HTML document is called a frame and each frame is independent of the others.

Each HTML document is known as a frame and each frame is independent of the others.

W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20Interg ...

433/472	SUBMITTED TEXT	21 WORDS	75%	MATCHING TEXT	21 WORDS

the corresponding web pages as a reference. A user can navigate the pages to search or get information through links

the corresponding Web pages as a reference. If user navigates the pages to search or get the information through links,

W https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/4/__PG_M.B.A%20Five%20years%20In ...

434/472	SUBMITTED TEXT	21 WORDS	75%	MATCHING TEXT	21 WORDS

the corresponding web pages as a reference. A user can navigate the pages to search or get information through links

the corresponding Web pages as a reference. If user navigates the pages to search or get the information through links,

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435/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

It is combined with suitable access protocol and data networking.? ?

It is combined with suitable access protocol and data networking.

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436/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

It is combined with suitable access protocol and data networking.? ?

It is combined with suitable access protocol and data networking.

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437/472	SUBMITTED TEXT	19 WORDS	100%	MATCHING TEXT	19 WORDS

same page is basically created, if the web document is too long and user navigates the pages quickly,

same page is basically created, if the Web document is too long and user navigates the pages quickly,

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438/472	SUBMITTED TEXT	19 WORDS	100%	MATCHING TEXT	19 WORDS

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439/472	SUBMITTED TEXT	12 WORDS	100%	MATCHING TEXT	12 WORDS

display more than one HTML document in the same browser window

display more than one HTML document in the same browser window.

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440/472	SUBMITTED TEXT	12 WORDS	100%	MATCHING TEXT	12 WORDS

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441/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

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442/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

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443/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

that the reader can directly follow or that is followed automatically. ?

that the reader can directly follow or that is followed automatically.

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444/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

that the reader can directly follow or that is followed automatically. ?

that the reader can directly follow or that is followed automatically.

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445/472	SUBMITTED TEXT	18 WORDS	90%	MATCHING TEXT	18 WORDS

formatting tag. 7. The >thead< tag is used to group the header content in an HTML table.

Formatting Tags Tag Description >thead< The >thead< tag is used to group the header content in an HTML table. >

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446/472	SUBMITTED TEXT	18 WORDS	90%	MATCHING TEXT	18 WORDS

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Formatting Tags Tag Description >thead< The >thead< tag is used to group the header content in an HTML table. >

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447/472	SUBMITTED TEXT	12 WORDS	100%	MATCHING TEXT	12 WORDS

Tags which are used to group similar kinds of elements are >

Tags which are used to group similar kinds of elements are

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448/472	SUBMITTED TEXT	12 WORDS	100%	MATCHING TEXT	12 WORDS

Tags which are used to group similar kinds of elements are >

Tags which are used to group similar kinds of elements are

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449/472	SUBMITTED TEXT	21 WORDS	77%	MATCHING TEXT	21 WORDS

user navigates the pages to search to get the information through links this is also called hyperlink in Web technology

user navigates the pages to search or get the information through links that is also called in Web technology

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450/472	SUBMITTED TEXT	21 WORDS	77%	MATCHING TEXT	21 WORDS

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451/472	SUBMITTED TEXT	14 WORDS	100%	MATCHING TEXT	14 WORDS

as citation in literature. It is combined with suitable access protocol and data: (

as citation in literature. It is combined with suitable access protocol and data

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452/472	SUBMITTED TEXT	14 WORDS	100%	MATCHING TEXT	14 WORDS

as citation in literature. It is combined with suitable access protocol and data: (

as citation in literature. It is combined with suitable access protocol and data

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453/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

Users browse the sites that give the quality and volume of the: (

Users browse the sites that give the quality and volume of the

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454/472	SUBMITTED TEXT	13 WORDS	100%	MATCHING TEXT	13 WORDS

Users browse the sites that give the quality and volume of the: (

Users browse the sites that give the quality and volume of the

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455/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

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456/472	SUBMITTED TEXT	11 WORDS	100%	MATCHING TEXT	11 WORDS

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457/472	SUBMITTED TEXT	12 WORDS	100%	MATCHING TEXT	12 WORDS

that the reader can directly follow, or that is followed automatically

that the reader can directly follow or that is followed automatically.

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458/472	SUBMITTED TEXT	12 WORDS	100%	MATCHING TEXT	12 WORDS

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459/472	SUBMITTED TEXT	30 WORDS	73%	MATCHING TEXT	30 WORDS

Answers to ‘Check Your Progress’ 6.17 Questions and Exercises 6.18 Further Reading 6.19 Learning Outcomes 6.0 INTRODUCTION In this unit, you will learn about the basics of

Answers to ‘Check Your Progress’ 1.9 Questions and Exercises 1.0 INTRODUCTION In this unit, you will learn about the basics of

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460/472	SUBMITTED TEXT	30 WORDS	73%	MATCHING TEXT	30 WORDS

Answers to ‘Check Your Progress’ 6.17 Questions and Exercises 6.18 Further Reading 6.19 Learning Outcomes 6.0 INTRODUCTION In this unit, you will learn about the basics of

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461/472	SUBMITTED TEXT	23 WORDS	100%	MATCHING TEXT	23 WORDS

programmatic access to objects within both the client application and other applications. It is primarily used in the form of client-side JavaScript

programmatic access to objects within both the client application and other applications. It is primarily used in the form of client-side JavaScript,

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462/472	SUBMITTED TEXT	23 WORDS	100%	MATCHING TEXT	23 WORDS

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463/472	SUBMITTED TEXT	26 WORDS	88%	MATCHING TEXT	26 WORDS

implemented as an integrated component of the web browser facilitating the development of improved user interfaces and dynamic websites. JavaScript is a dialect of the

implemented as an integrated component of the Web browser, allowing the development of enhanced user interfaces and dynamic Websites. JavaScript is a dialect of the

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464/472	SUBMITTED TEXT	26 WORDS	88%	MATCHING TEXT	26 WORDS

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465/472	SUBMITTED TEXT	30 WORDS	100%	MATCHING TEXT	30 WORDS

standard and is characterized as a dynamic, weakly typed, prototype-based language with first- class functions. JavaScript was influenced by many languages and was designed to look like Java, but

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466/472	SUBMITTED TEXT	30 WORDS	100%	MATCHING TEXT	30 WORDS

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467/472	SUBMITTED TEXT	21 WORDS	90%	MATCHING TEXT	21 WORDS

NOTES 6.1 UNIT OBJECTIVES After going through this unit, you will be able to: ? Discuss the

NOTES 2.1 UNIT OBJECTIVES After going through this unit, you will be able to: • Explain the

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468/472	SUBMITTED TEXT	21 WORDS	90%	MATCHING TEXT	21 WORDS

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469/472	SUBMITTED TEXT	31 WORDS	54%	MATCHING TEXT	31 WORDS

The client's browser runs the script, and then displays the data, together with anyvisible output from the script. Client-side scripts could also include commands for the browser to follow in

The user's Web browser executes the script and then displays the document including any visible output from the script. Besides, client-side scripts may also include instructions for the browser to proceed in

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470/472	SUBMITTED TEXT	31 WORDS	54%	MATCHING TEXT	31 WORDS

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471/472	SUBMITTED TEXT	16 WORDS	90%	MATCHING TEXT	16 WORDS

by Web browsers (primarily HTML), which is then sent to the user's computer. The user

by Web browsers, usually HTML, which is then sent to the user's computer. The user

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472/472	SUBMITTED TEXT	16 WORDS	90%	MATCHING TEXT	16 WORDS

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