UNIT 3

OVERVIEW OF COMPUTER AND WEB TECHNOLOGY

STRUCTURE

3.1 INTRODUCTION

In the last 25 years, dramatic advances have been made in computer technology. From 1952-1977 processing speed as measured in multiplications per second increased by a factor of 1500. Storage capacity per reel of tape has increased from 2.7 million characters to 106 million characters and the physical size of a million characters of memory has been reduced from 400 cubic feet to less than one cubic foot. Because the capabilities of small computers have increased and their cost has been reduced, their use will increase rapidly. Some applications should logically be done on a large central machine. Other applications are more suited to a small computer. A combination of the two provides a highly flexible system. The continuing rapid changes in computer technology make it necessary to plan carefully to avoid incompatible machines, incompatible data bases, and systems that will not adapt to changing needs.

3.2 OBJECTIVES

After reading this unit you will be able to understand the following:

- Components of a computer
- Hardware& Software
- Input Devices Output Devices
- Computer languages
- The World Wide Web
- HTML
- Multimedia

3.3 SUBJECT

3.3.1 HISTORY

- The history of computers starts out about 2000 years ago in Babylonia (Mesopotamia), at the birth of the abacus, a wooden rack holding two horizontal wires with beads strung on them.
- Blaise Pascal is usually credited for building the first digital computer in 1642. It added numbers entered with dials and was made to help his father, a tax collector.
- This first mechanical calculator, called the Pascaline, had several disadvantages. Although it did offer a substantial improvement over manual calculations.
- A step towards automated computing was the development of punched cards, which were first successfully used with computers in 1890 by Herman Hollerith and James Powers, who worked for the US. Census Bureau. They developed devices that could read the information that had been punched into the cards automatically, without human help. Because of this, reading errors were reduced dramatically, work flow increased, and, most importantly, stacks of punched cards could be used as easily accessible memory of almost unlimited size. Furthermore, different problems could be stored on

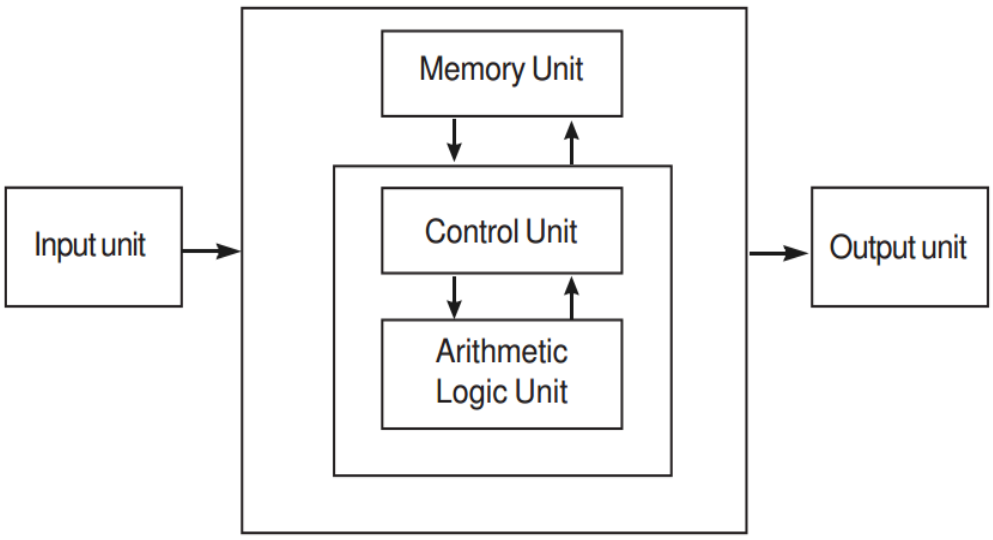
different stacks of cards and accessed when needed. These advantages were seen by commercial companies and soon led to the development of improved punch-card using computers created by International Business Machines (IBM), Remington, Burroughs, and other corporations.

- In 1942, John P. Eckert, John W. Mauchly, and their associates at the Moore school of Electrical Engineering of University of Pennsylvania decided to build a high - speed electronic computer to do the job. This machine became known as ENIAC (Electrical Numerical Integrator And Calculator).
- Early in the 50s two important engineering discoveries changed the image of the electronic - computer field, from one of fast but unreliable hardware to an image of relatively high reliability and even more capability. These discoveries were the magnetic core memory and the Transistor - Circuit Element.
- Many companies, such as Apple Computer and Radio Shack, introduced very successful PCs in the 1970's, encouraged in part by a fad in computer (video) games.
- In the 1980's some friction occurred in the crowded PC field, with Apple and IBM keeping strong. In the manufacturing of semiconductor chips, the Intel and Motorola Corporations were very competitive into the 1980s, although Japanese firms were making strong economic advances, especially in the area of memory chips.
- By the late 1980s, some personal computers were run by microprocessors that, handling 32 bits of data at a time, could process about 4,000,000 instructions per second.[1]

3.3.2 COMPONENTS OF A COMPUTER

Hardware verses software

Computer is a device that transforms data into meaningful information. Computer can also be defined in terms of functions it can perform. A computer can i) accept data, ii) store data, iii) process data as desired, and iv) retrieve the stored data as and when required and v) print the result in desired format.



[1] http://www.seattlecentral.edu/~ymoh/history_of_computer/history_of_computer.htm

Organisation of a Computer

The computer performs basically five major operations of functions irrespective of their size and make. These are 1) it accepts data or instruction by way of input, 2) it stores data, 3) it can process data as required by the user, 4) it gives results in the form of output, and 5). It controls all operations inside a computer. We discuss below each of these operations:

1. **Input:** this is the process of entering data and programs into the computer system.
2. **Control Unit (CU):** The process of input, output, processing and storage is performed under the supervision of a unit called 'Control Unit'. It decides when to start receiving data, when to stop it, where to store data, etc. It takes care of step -by-step processing of all operations inside the computer.
3. **Memory Unit:** Computer is used to store data and instructions.
4. **Arithmetic Logic Unit (ALU):** The major operations performed by the ALU are addition, subtraction, multiplication, division, logic and comparison.
5. **Output:** This is the process of producing results from the data for getting useful information. The ALU and the CU of a computer system are jointly known as the central processing unit (CPU). You may call CPU as the brain of any computer system.

A computer consist of hardware and software. The computer hardware includes the electronic components that we see when we open up the computer case. The computer hardware, by itself, can't really do much of anything. A computer needs something that gives that hardware set of instructions that tell it what to do. This is what the software is used for. Computer software can be stored as programs on a hard drive or even stored as programs inside of some special hardware chips on the system itself.

3.3.2.1 HARDWARE

3.3.2.1.1 INTERNAL COMPONENTS

The internal hardware provides three main functions.

Processing

First, it provides processing functionality. The main processing unit in computer is the Central Processing Unit (CPU). Its job is to process data according to a set of instructions. It takes the input and does something with it.

Short Term Data Storage

Second functionality is short term data storage. This is done using Random Access Memory or RAM. RAM is the place where the CPU stores the data it's currently working on. In addition, the instructions that the CPU is currently using are also stored in RAM. RAM is not persistent. That means that if we shut down the computer, data that was stored in RAM will be erased. RAM is used for short-term storage because of speed.

Long Term Data Storage

For long-term storage we use a variety of storage mediums. The most important one is the Hard Disk Drive or HDD. It can store bunch of data and it can retrieve it relatively quickly, but not as nearly as fast as RAM. That's why we don't use a Hard Drive instead of RAM. Data saved on long-term storage is persistent. That means that if we shut down the computer, the data saved on the Hard Drive will be intact.

There are other types of long-term storage medium as well. One of the older ones which we don't use a lot anymore is Floppy Disc Drive or FDD. Back in the old days computers didn't have a HDD, they only had an FDD. We don't use FDD anymore because they are slow and can't store a lot of data. The advantage of FDD is that the medium is removable. Another option for long-term storage are optical drives. These include CD as well as DVD drives. With CD or DVD drive we can store huge amounts of information on an optical disc. These optical storage devices come in two different varieties. We have the Read Only version, for example CD-ROM, which means Compact Disk - Read Only Memory. We can read information from that medium, but we cannot save new information. The same is with the DVD-ROM drives. However, we have a writable versions as well, like CD-R, or CD-RW. These allow us to both read information from the CD as well write information to it. It is the same with the DVD and Blu-ray drives.

One more type of long-term storage medium is a Flash Drive. Unlike RAM, memory chips used in Flash Drives are persistent. This is great because flash memory is fast and it can store a lot of data.

3.3.2.1.2 INPUT DEVICES

There are some key components that let us bring some information from the outside and put it inside of the computer. There are three main sources of input.

Keyboard

The first one is the keyboard. Keyboard allows us to send information to the internal computer hardware by pressing a key. When we press a key on the keyboard, electronic signals are sent through the wire (or ether) into the internal PC hardware where that signal is picked up and sent to the CPU (Central Processing Unit). Before the Personal Computers emerged, data were sent to the CPU using punch cards which ran through the card reader.

Mouse

The second important input device is the mouse. Mouse works different than keyboard. Keyboard has a chip that checks which key has been pressed and sends an appropriate code for the particular key to the computer hardware. Mouse has little sensors along with the roller ball. When we move the mouse, the sensors keep track of which direction the ball is rolling and moves the cursor on the screen accordingly. Optical or laser mouse works a little differently but the principle is the same.

Touchscreen

The third input device is the touchscreen. When we have a touchscreen we don't have to use the keyboard or the mouse. Touchscreen applies an overlay on top of the PC monitor. This overlay consist of two layers between which is an empty space. When we press on a particular place on the screen, the first layer gets bent in and touches the second layer, which then sends an electrical signal to the computer hardware consisting of X and Y coordinates of the screen. Software then does what it is programmed to do when we press on particular point on the screen.

3.3.2.1.3 Output Devices

To get information out of the computer we need to have output devices connected to it.

Monitor

The most important output device is a Monitor. Information being processed by the CPU can be displayed on the screen so we can see what we are working with. Monitors were not used as soon as the Computer emerged. Before monitors, we used Punch-cards to input data to the computer and the results of the processing would be printed on the paper instead of the screen.

Two basic types of monitors are used with microcomputers, which are as follows:

1. CRT

2. LCD

Cathode Ray Tube (CRT): CRT or Cathode Ray Tube Monitor is the typical monitor that you see on a desktop computer. It looks a lot like a television screen, and works the same way. This type uses a large vacuum tube, called cathode ray tube (CRT).

Liquid Crystal Displays (LCD): This type of monitors are also known as flat panel monitor. Most of these employ liquid crystal displays (LCDs) to render images. These days LCD monitor are very popular.

When we talk about the capabilities of various monitors, one critical statistic is the resolution of the monitor. Most monitors have a resolution of at least 800 x 600 pixels. High-end monitors can have resolutions of 1024 x 768 pixels or even 1280 x 1024 pixels. Thus monitors are available either in low resolution or in high resolution.

Audio

The second type of output is audio. Again, today we take audio for granted, but in the beginning computers could not produce audible signals.

Printer

The third device that we use to output data from the computer is a Printer. With printers we can print documents or whatever we see on the computer monitor. Printer takes information from the PC and using a variety of different technologies prints the formatted information onto a piece of paper. Some of the most commonly used printers are:

Laser Printer: A laser printer produces high quality print that one normally finds in publishing. It is extremely fast and quiet. Moreover, the operation of a laser printer is easy with automatic paper loading and no smudging or messing up of ink ribbons. The fastest laser printer can print up to 200 pages per minute in monochrome (black and white) and up to 100 pages per minute in colour.

Ink-Jet Printer: An ink-jet printer creates an image directly on paper by spraying ink through as many as 64 tiny nozzles. Although the image it produces is not generally quite as sharp as the output of a laser printer, the quality of ink-jet images is still high.In general, ink-jet printer offers an excellent middle ground between dot matrix and laser printer. Like laser printer, an ink-jet printer is quiet and convenient, but not particularly fast. Typically, an ink-jet printer is more expensive than a dot-matrix printer, but costs only half as much as a laser printer.

Dot Matrix Printer: The dot matrix printer was very popular at one point of time. It is a very versatile and inexpensive output device. In dot matrix printer the print head physically "hits" the paper through the ribbon and produces text (or images) by combinations of dots; hence the name dot matrix printer. Its speed is measured in characters per second (CPS). Although it is less expensive, it is louder, slower and produces lower print quality.

Line Printer: A line printer is generally used with large computer systems to produce text based data processing reports. Line printers are high-speed printers with speeds ranging anywhere from 100 to about 3800 lines per minute. In the past, print quality on line printers was not high. Developments in technology are improving the print quality on line printers. These are in the cost range of lacs of Rupees.

Plotter

A plotter is a special kind of output device that, like a printer, produces images on paper, but does so in a different way. Plotters are designed to produce large drawings or images, such as construction plans for buildings or blueprints for mechanical objects. A plotter can be connected to the port normally used by a printer. An array of different coloured pens in a clip rack and a robotic arm is part of plotter. The instructions that a plotter receives from a computer consist of a colour, and beginning and ending coordinates for a line. With that information, the plotter picks up the appropriate pen through its arm, positions it at the beginning coordinates drops the pen down to the surface of the paper and draws to the ending coordinates. Plotters draw curves by creating a sequence of very short straight lines. Plotters usually come in two designs: Plotters usually come in two designs:

1. Flat Bed: Plotters of small size to be kept on table with restriction of paper size.

2. Drum: These plotters are of big size using rolls of paper of unlimited length.

Speaker
Speakers are another type of output device, which allow us to listen to voice like music, and conversation with people.

3.3.2.2 SOFTWARE

As you are aware, computer cannot do anything on its own. It is the user who instructs computer; what to do, how to do and when to do. In order to perform

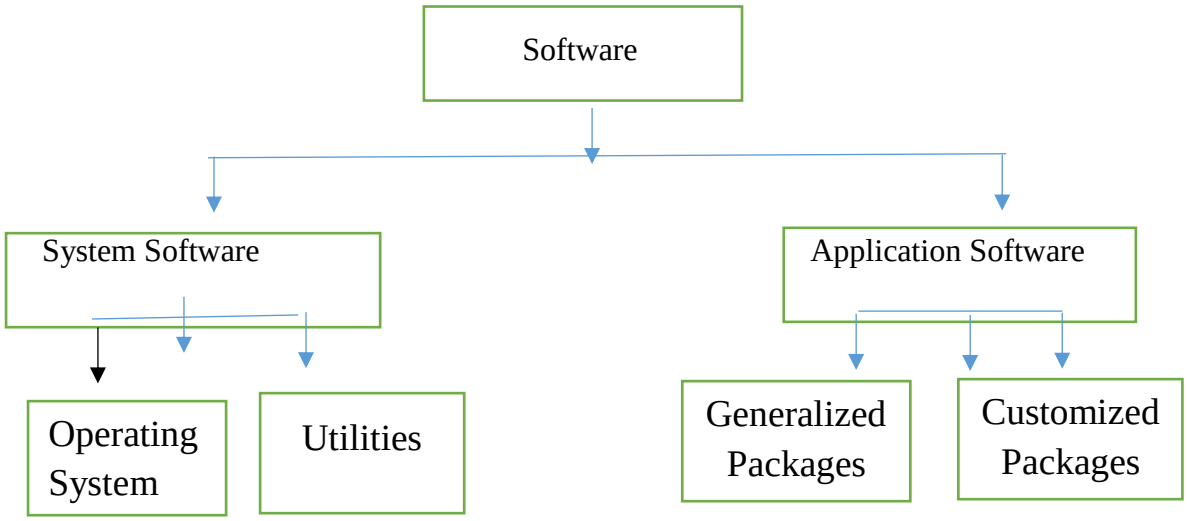


Figure 2.

any task, you have to give a set of instructions in a particular sequence to the computer. These sets of instructions are called Programs. Software refers to a set of programs that makes the hardware perform a particular set of tasks in particular order. Software can be classified mainly into following categories and sub-categories are shown in above Figure 1.

System Software: When we switch on the computer the programs stored in ROM are executed which activates different units of your computer and makes it ready for our work on it. This set of programs can be called system software. System software are sets of programs, responsible for running the computer, controlling various operations of computer systems and management of computer resources. Operating System (OS) falls under this category. An operating system is a system software that provides an interface for a user to communicate with the computer, manages hardware devices (disk drives, keyboard, monitor, etc), manages and maintains disk file systems and supports application programs. Some popular Operating systems are UNIX, Windows and Linux. Although operating system provides all the features users need to use and maintain their systems, inevitably, they still do not meet everyone’s expectations. This has led to another type of system software called "Utilities". These are programs that bridge the gap between the functionality of an OS and the needs of users. Utility programs are a broad category

of software such as compress (zip)/uncompressed (unzip) files software, anti-virus software, split and join files software, etc.

Application Software: Application software is a set of programs, which are written to perform specific tasks, for example: An application package for managing library known as library information system is used to manage information of library such as: keeping book details, account holder details, book issue details, book return details etc. Another application package for managing student details is called student's information system, manages student's roll no, name, parents name, address, class, section, processing of examination results etc. Application software can be broadly classified into two types:

(a) Generalized packages
(b) Customized packages

Generalized Packages: These are user friendly software written to cater to user's very general needs such as preparing documents, drawing pictures, database to manage data/information, preparing presentations, play games etc. It is a group of programs that provide general purpose tools to solve specific problems. Some of the generalized packages are listed below:

- **Word Processing Software(for preparing documents):** Word Perfect, MS-Word, OpenOffice.org Writer
- **Spreadsheets (Data Analysis):** Lotus Smart suites, MS Excel, OpenOffice.org Calc, Apple Numbers
- **Presentations :** Presentation Graphics, MS-PowerPoint, OpenOffice.org Impress
- **Database Management System:** MS-Access, OpenOffice.org Base, MS-SQL Server, ORACLE
- **Graphics Tools:** Paint shop pro, Adobe Photoshop

Customized packages: These are the applications that are customized (or developed) to meet the specific requirements of an organization/institution. For example: Student information details, Payroll packages, inventory control etc. These packages are developed using high-level computer language.

3.3.2.3 COMPUTER LANGUAGES

Languages are a means of communication. Normally people interact with each other through a language. On the same pattern, communication with computers is carried out through a language. This language is understood both by user and the machine. Just as every language like English, Hindi has its grammatical rules; every computer language is bound by rules known as SYNTAX of that language. The user is bound by that syntax while communicating with the computer system. Computer languages are broadly classified as:

1. **Low Level Language:** The term low level means closeness to the way in which machine understand. The low level languages are:

a. Machine Language: This is the language (in the form of 0's and 1's, called binary numbers) understood directly by the computer. It is machine dependent. It is difficult to learn and even more difficult to write programs.

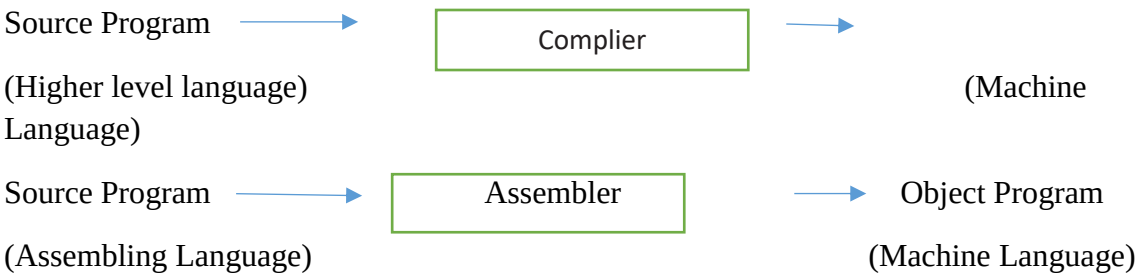
b. Assembly Language: This is the language where the machine codes comprising of 0's and 1's are substituted by symbolic codes (called mnemonics) to improve their understanding. It is the first step to improve programming structure. Assembly language programming is simpler and less time consuming than machine level programming, it is easier to locate and correct errors in assembly language than in machine language programs. It is also machine dependent. Programmers must have knowledge of the machine on which the program will run.

2. High Level Language: The low level language requires extensive knowledge of the hardware since it is machine dependent. To overcome the limitation, high level language has been evolved which uses normal English like, easy to understand statements to solve any problem. Higher level languages are computer independent and programming becomes quite easy and simple. Various high level languages are given below:

- **BASIC (Beginners All Purpose Symbolic Instruction Code):** It is widely used, easy to learn general purpose language. Mainly used in microcomputers in earlier days.
- **COBOL (Common Business Oriented language):** A standardized language used for commercial applications.
- **FORTRAN (Formula Translation):** Developed for solving mathematical and scientific problems. One of the most popular languages among scientific community.
- **C:** Structured Programming Language used for all purpose such as scientific application, commercial application, developing games etc.
- **C++:** Popular object oriented programming language, used for general purpose.

3.3.2.4 COMPLIER AND ASSEMBLER

High Level language is machine independent and assembly language though it is machine dependent yet mnemonics that are being used to represent instructions are not directly understandable by machine. Hence to make the machine understand the instructions provided by both the languages, Compiler and Assembler are required to convert these instructions into machine language. The software (set of programs) that reads a program written in high level language and translates it into an equivalent program in machine language is called as Compiler. The program written by the programmer in high level language is called source program and the program generated by the compiler after translation is called as object program. The software (set of programs) that reads a program written in assembly language and translates it into an equivalent program in machine language is called as Assembler.



3.3.3 WEB TECHNOLOGY

Web Technologies are playing the leading role in the World Wide Web includes many latest evolutions in it like Web Services, Web 2.0, Table less Design, HTML, XHTML, XML, CSS 2.0 etc. Web technology aims to enhance creativity, secure information sharing, collaboration and functionality of the web. Web Technologies have been developing since last 15-20 years and are still… Web 2.0, Web 3.0 are the main revolutionary Technologies of it.

The web is an immensely scalable information space filled with interconnected resources. The architecture for web has been developed and standardised by the World Wide Web Consortium (W3C). A Web resource is any type of named information object- such as a word processing document, digital picture, a Web page, an e-mail account or an application- that accessible through Web. All resources on the on the Web are connected via the internet and any one access Web resource using Standard Internet Protocol.

3.3.3.1 THE WORLD WIDE WEB (WWW)

The wold wide web[2] is the most popular and promising method of organising and accessing information on the internet main reason for its popularity is use of a concept called hypertext. Hypertext is a new way of information storage and retrieval that enables authors to structure information in novel ways. A properly designed hypertext document can help users locate desired type of information rapidly from vast amount of information on the internet. Hypertext document enables this by using a series of links. Different system show a link on screen in different ways such as a labelled button, highlighted text, different colour text than normal text, or author defined graphic symbols. A link is a special type of item in a hypertext document connecting the document to another document that provides more information about the linked item. The latter document can be anywhere on the internet (in the same document in which the linked item is, on the same computer in which the former document is, or on another computer at the other end of the world). For example, the following hypertext document-

"X has been involved in the R & D of distributed system for almost two decades. At present X is with the **Centre for Development of Advanced Computing (C-DAC)**, Pune, India. Before joining C-DAC, X was with the **Multimedia Systems Research Laboratory (MSRL) 0f Panasonic** in the Tokyo, Japan." – has two links shown on the screen as highlighted (bold and underlined) text. The first link (C-DAC) connect the current document to another document giving detailed information about c-DAC, and is located on a computer system at C-DAC in Pune, India. The second link in the above example connects this document to another document giving detailed information about MSRL of Panasonic, and is located on a computer system at MSRL of Panasonic in Tokyo, Japan.

Hypertext documents on the Internet are known as Web Pages. Web Pages designer create Web Pages by using a social language called Hyper Text Mark-up Language (HTML in short). HTML is a subset of a more generalized language called Standard Generalized Mark-up Language (SGML in short) that is a powerful language for linking documents for easier electronic access manipulation.

[2] WWW or W3 in short

3.3.3.2 HISTORY AND ORIGIN OF INTERNET AND WEB

The World Wide Web allows computer users to locate and view multimedia-based documents (i.e., documents with text, graphics, animations, audios or videos) on almost any subject. Even though the Internet was developed more than three decades ago, the introduction of the World Wide Web is a relatively recent event. In 1990, Tim Berners-Lee of CERN (the European Laboratory for Particle Physics) developed the World Wide Web and several communication protocols that form the backbone of the Web.

In the late 1960s, a graduate student at MIT research at MIT's Project Mac[3]was funded by ARPA the Advanced Research Projects Agency of the Department of Defence. ARPA sponsored a conference at which ARPA rolled out the blueprints for networking the main computer systems of about a dozen ARPA-funded universities and research institutions. Shortly after this conference, ARPA proceeded to implement the ARPA net, the grandparent of today's Internet.

One of the primary goals for ARPA net was to allow multiple users to send and receive information simultaneously over the same communications paths (such as phone lines). The network operated with a technique called packet-switching, in which digital data was sent in small packages called packets. The protocols for communicating over the ARPA net became known as TCP—the Transmission Control Protocol. TCP ensured that messages were properly routed from sender to receiver and that those messages arrived intact.

Soon, wide variety of networking hardware and software appeared. One challenge was to get these different networks to communicate. ARPA accomplished this with the development of IP—the Internetworking Protocol, truly creating a "network of networks," the current architecture of the Internet. The combined set of protocols is now commonly called TCP/IP.

Initially, Internet use was limited to universities and research institutions; then the military began using the Internet. Eventually, the government decided to allow access to the Internet for commercial purposes.

3.3.3.2.1 THE FORMATION OF THE WORLD WIDE WEB CONSORTIUM

In October 1994, Tim Berners-Lee founded an organization—called the World Wide Web Consortium (W3C) — devoted to developing non-proprietary, interoperable technologies for the World Wide Web. One of the W3C's primary goals is to make the Web universally accessible, regardless of disability, language or culture.

The W3C is also a standardization organization. Web technologies standardized by the W3C are called Recommendations. A recommendation is not an actual software product, but a document that specifies a technology's role, syntax, rules, etc. Before becoming a W3C a document passes through three phases:

[3]now the Laboratory for Computer Science—the home of the World Wide Web Consortium

I Working Draft-which, as its name implies, specifies an evolving draft,

II Candidate Recommendation- a stable version of the document that industry may begin implementing and

III Proposed Recommendation- a Candidate Recommendation that is considered mature (i.e., has been implemented and tested over a period of time) and is ready to be considered for W3C Recommendation status.

The W3C is comprised of three hosts—the Massachusetts Institute of Technology (MIT), Institute National de Recherché enInformatique et Automatique (INRIA) and Keio University of Japan—and over 400 *members*, including Deitel& Associates, Inc. Members provide the primary financing for the W3C and help provide the strategic direction of the Consortium.

The W3C homepage (**www.w3.org**) provides extensive resources on Internet and Web technologies. The W3C homepage (**www.w3.org**) provides extensive resources on Internet and Web technologies.

3.3.3.2.2 THE WEB STANDARDS PROJECT

The **Web Standards Project** (WaSP) is a group of professional web developers dedicated to disseminating and encouraging the use of the web standards recommended by the World Wide Web Consortium, along with other groups and standards bodies. Founded in 1998, The Web Standards Project campaigns for standards that reduce the cost and complexity of development while increasing the accessibility and long-term viability of any document published on the Web.

3.3.3.2.3 THE RISE OF WEB STANDARDS

In 2000, Microsoft released Internet Explorer 5 Macintosh Edition. This was a very important milestone, it being the default browser installed with the Mac OS[4] at the time, and having a reasonable level of support for the W3C recommendations too.

The WaSP persuaded Netscape to postpone the release of the 5.0 version of Netscape Navigator until it was much more compliant (this work formed the basis of what is now Firefox, a very popular browser).

3.3.3.2.4 WEB CONTENT AND BEGINNINGS OF WEB CONTENT

Web content is the textual, visual or aural content that is encountered as part of the user experience on websites. It may include, among other things: text, images, sounds, videos and animations. While the Internet began with a U.S. Government research project in the late 1950s, the web in its present form did not appear on the Internet until after Tim Berners-Lee and his colleagues at the European laboratory (CERN) proposed the concept of linking documents with hypertext. But it was not until Mosaic, the forerunner of the famous Netscape Navigator, appeared that the Internet become more than a file serving system. The use of hypertext, hyperlinks and a page-based model of sharing information, introduced with Mosaic

[4] Macintosh Operating system

and later Netscape, helped to define web content, and the formation of websites. Largely, today we categorize websites as being a particular type of website according to the content a website contains.

- **The page concept**

Web content is dominated by the "page" concept. Having its beginnings in academic settings, and in a setting dominated by type-written pages, the idea of the web was to link directly from one academic paper to another academic paper. This was a completely revolutionary idea in the late 1980s and early 1990s when the best a link could be made was to cite a reference in the midst of a type written paper and name that reference either at the bottom of the page or on the last page of the academic paper.

- **HTML web content**

Even though we may embed various protocols within web pages, the "web page" composed of "html" (or some variation) content is still the dominant way whereby we share content. And while there are many web pages with localized proprietary structure (most usually, business websites), many millions of websites abound that are structured according to a common core idea.

- A **blog** (a blend of the term "**web log**") is a type of website or part of a website. Blogs are usually maintained by an individual with regular entries of commentary, descriptions of events, or other material such as graphics or video. Most blogs are interactive, allowing visitors to leave comments and even message each other via widgets on the blogs and it is this interactivity that distinguishes them from other static websites. A typical blog combines text, images, and links to other blogs, Web pages, and other media related to its topic. The ability of readers to leave comments in an interactive format is an important part of many blogs. Most blogs are primarily textual, although some focus on art (Art blog), photographs (photo blog), videos (Video blogging), music (MP3 blog), and audio (podcasting). Microblogging is another type of blogging, featuring very short posts.
- A **web search engine** is designed to search for information on the World Wide Web. The search results are generally presented in a list of results and are often called hits. The information may consist of web pages, images, information and other types of files. Some search engines also mine data available in databases or open directories. Unlike Web directories, which are maintained by human editors, search engines operate algorithmically or are a mixture of algorithmic and human input. Today, there are more than two dozen major search engines are available on the WWW. Some popular ones are:
  - HotBot (www.hotbot.com)
  - Yahoo (www.Yahoo.com)
  - Lycos (www.lycos.com)
  - Infoseek (www.infoseek.com)
  - Google (www.google.com)
  - Inference Find (www.infind.com)
  - Ixquick (www.ixquick.com)

- An **Internet forum**, or **message board**, is an online discussion site where people can hold conversations in the form of posted messages. They differ from chat room since that

messages are not shown in real-time, to see new messages the forum page must be reloaded. Also, depending on the access level of a user and/or the forum set-up, a posted message might need to be approved by a moderator before it becomes visible. Forums have their own language; e.g. A single conversation is called a 'thread'. A forum is hierarchical or tree-like in structure: forum – sub forum - topic - thread - reply.

- **Electronic commerce**, commonly known as e-commerce or e-business consists of the buying and selling of products or services over electronic systems such as the Internet and other computer networks. The amount of trade conducted electronically has grown extraordinarily with widespread Internet usage. The use of commerce is conducted in this way, spurring and drawing on innovations in electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems.

3.3.3.2.5 TYPES OF WEBSITE CONTENT

(i) Static
(ii) Dynamic

(i) Static Web Site

A static web page (sometimes called a flat page) is a web page that is delivered to the user exactly as stored, in contrast to dynamic web pages which are generated by a web application. Static Web pages are very simple in layout and informative in context.

Application areas of Static Website:

- Need of Static web pages arise in the following cases
- Changes to web content is infrequent
- List of products / services offered is limited
- Simple e-mail based ordering system should suffice
- No advanced online ordering facility is required
- Features like order tracking, verifying availability of stock, online credit card transactions, are not needed
- Web site not required to be connected to back-end system.

(ii) Dynamic Web Sites

A dynamic web pageis a kind of web page that has been prepared with fresh information (content and/or layout), for each individual viewing. It is not static because it changes with the time (ex. A news content), the user (ex. preferences in a login session), the user interaction (ex. web page game), the context (parametric customization), or any combination of the foregoing.

Application areas of Dynamic Website: Dynamic web page is required when following necessities arise:

- Need to change main pages more frequently to encourage clients to return to site.
- Long list of products / services offered that are also subject to up gradation
- Introducing sales promotion schemes from time to time

- Need for more sophisticated ordering system with a wide variety of functions
- Tracking and offering personalized services to clients.
- Facility to connect Web site to the existing back-end system.

The fundamental difference between a static Website and a dynamic Website is a static website is no more than an information sheet spelling out the products and services while a dynamic website has wider functions like engaging and gradually leading the client to online ordering.

3.3.3.3 HTML

HTML, which stands for **Hypertext Mark-up Language**, is the predominant mark-up language for web pages. It is written in the form of HTML elements consisting of "tags" surrounded by angle brackets within the web page content. It allows images and objects to be embedded and can be used to create interactive forms. It provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. It can embed scripts in languages such as JavaScript which affect the behaviour of HTML web pages. HTML can also be used to include Cascading Style Sheets (CSS) to define the appearance and layout of text and other material. The W3C, maintainer of both HTML and CSS standards, encourages the use of CSS over explicit presentational mark-up.

Dynamic HTML, or **DHTML**, is an umbrella term for a collection of technologies used together to create interactive and animated web sites by using a combination of a static mark-up language(such as HTML), a client-side scripting language (such as JavaScript), a presentation definition language (such as CSS), and the Document Object Model. There are four parts to DHTML:

- Document Object Model (DOM)
- Scripts
- Cascading Style Sheets (CSS)
- XHTML

Features of DHTML: There are four primary features of DHTML:

1. Changing the tags and properties

2. Real-time positioning

3. Dynamic fonts (Netscape Communicator)

4. Data binding (Internet Explorer)

XHTML (Extensible Hypertext Mark-up Language) is a family of XML mark-up languages that mirror or extend versions of the widely used Hypertext Mark-up Language (HTML), the language in which web pages are written.

Active server page

Microsoft® Active Server Pages (ASP) is a server-side scripting technology that can be used to create dynamic and interactive Web applications. An ASP page is an HTML page that contains server-side scripts that are processed by the Web server before being sent to the user's

browser. One can combine ASP with Extensible Mark-up Language (XML), Component Object Model (COM), and Hypertext Mark-up Language (HTML) to create powerful interactive Web sites.

Java script

Java script is a scripting language developed by Netscape to enable Web authors to design interactive sites. Although it shares many of the features and structures of the full Java language, it was developed independently. JavaScript can interact with HTML source code, enabling Web authors to spice up their sites with dynamic content. JavaScript is endorsed by a number of software companies and is an open language that anyone can use without purchasing a license. It is supported by recent browsers from Netscape and Microsoft, though Internet Explorer supports only a subset, which Microsoft calls Jscript.

3.3.3.4 FEATURES AND APPLICATION

There are literally hundreds of difficult technologies available to the webmaster. Making proper use of these technologies allows the creation of maintainable, efficient and useful web sites. For example, using SSI (server side includes) or CSS (cascading style sheets) a webmaster can change every page on his web site by editing one file. A few of the more common technologies are listed below:

ASP

Active Server Pages are used to perform server-side scripting. Although there is a UNIX and Linux version of ASP, it is primarily intended for use on Microsoft web server based systems. ASP is useful for tasks such as maintaining a database, creating dynamic pages and respond to user queries (and many other things as well).

CGI

Common Gateway Interface is one of the older standards on the internet for moving data between a web page and a web server. CGI is by far and away the most commonly used method of handling things like guestbook, email forms, message boards and so on. The CGI connects Web servers to external applications. GI can do two things. It can gather information sent from a web browser to a web server, and make the information available to an external program. CGI can send the output of a program to a Web browser that request it.

CSS

You use Cascading Style Sheets to format your web pages anyway that you want. CSS is complicated, but the complication pays off by being able to create web pages that look much better than otherwise.

HTACCESS

The .htaccess file allows you to set parameters for your website and folders (directories). The most common use is to protect directories by defining usernames and passwords.

Java

Java is a client-side (meaning it is executed by the browser not the server) language. It is efficient and very powerful. The primary advantage of Java over ActiveX is, Java has a sane security model (called the Sandbox Model), while the ActiveX model is so imbecilic as to defy imagination.

JavaScript

This is a scripting language which is interpreted and executed by the browser. It is very useful for getting tasks done on the client, such as moving pictures around the screen, creating very dynamic navigation systems and even games.

Office
the Microsoft Office suite includes a number of tools, including Word, Excel, Access and Power point. Each of these tools has the ability to save in HTML format and has special commands for the internet.

Perl

It is a great scripting language which makes use of the CGI standard to allow work to be done on the web server. PERL is very easy to learn (as programming languages go) and straightforward to use.

PHP

This language is, like ASP, used to get work done on the server. PHP is similar in concept to ASP and can be used in similar circumstances.

SSI
If your site is hosted on a typical Apache server, then you probably can use something called Server Side Includes. This is a way to get the web server to perform tasks before displaying a web page.

VBScript

Visual Basic Scripting was Microsoft's answer to JavaScript. VBScript is a good tool for any site which is intended to be only displayed by the Internet Explorer browser.

3.3.3.5 MULTIMEDIA

Multimedia refers to content that uses a combination of different content forms. This contrasts with media that use only rudimentary computer displays such as text-only or traditional forms of printed or hand-produced material. Multimedia includes a combination of text, audio, still images, animation, video, or interactivity content forms. Web pages often contains multimedia elements in many different formats. It can be almost anything you can hear or see. Examples: Pictures, music, sound, videos, records, films, animations, and more.

The first web browsers had support for text only, limited to a single font in a single color. Later came browsers with support for colors and fonts, and even support for pictures. The support for sounds, animations, and videos is handled differently by various browsers. Different types

and formats are supported, and some formats requires extra helper programs (plug-ins) to work. This will become history. HTML5 multimedia promises an easier future for multimedia.

Multimedia elements (like sounds or videos) are stored in media files. The most common way to discover the type of a file, is to look at the file extension. When a browser sees the file extension .htm or .html, it will treat the file as an HTML file. The .xml extension indicates an XML file, and the .css extension indicates a style sheet file. Pictures are recognized by extensions like .gif, .png and .jpg.

Multimedia files also have their own formats and different extensions like: .swf, .wav, .mp3, .mp4, .mpg, .wmv, and .avi.

Multimedia finds its application in various areas including, but not limited to, advertisements, art, education, entertainment, engineering, medicine, mathematics, business, scientific research and spatial temporal applications. Multimedia is heavily used in the entertainment industry, especially to develop special effects in movies and animations (VFX, 3D animation, etc.). In Education, multimedia is used to produce computer-based training courses (popularly called CBTs) and reference books like encyclopaedia and almanacs

3.3.4NEW HORIZON IN THE FIELD OF INFORMATION TECHNOLOGY BY YEAR 2020[5]

FancisCairncross in her book, the death of distance has visualise the Nature of Information Technology By 2020[6] as under: How will the death of distance shake the future? Some of the most important development to watch, are as follows:

1. **The death of distance-** distance will no longer decide the cost of communicating electronically. Indeed, once investment has been made in communication network. In buying a computer or telephone, or in setting up a web site, the additional cost of sending or receiving an extra piece of information will be virtually zero.
2. **The fate of location-** companies will be free to locate many screen based activities wherever they can find the best bargain of skills and productivity. Developing countries will increasingly perform on line services including monitoring security screens, inputting data from forms, running help-lines, and writing software code – and sell them to the rich industrial countries that generally produce such service domestically.
3. **Improved connections-**Most people on earth will eventually have access to networks that are all interactive and broadband. The Internet will continue to exist in its present form, but will also carry many other services, including telephone and television.
4. **Increased mobility-** Every form of communication will be available for mobile or remote use.
5. **More customized networks-** The huge capacity of networks will enable individuals to order "content for one", that is, individual consumers will receive (or send) exactly what they want to receive (or send), when and where they want it.
6. **A deluge of information-** Because peoples capacity to absorb information will not increase, they will need filters to shift, process, and edit it.

[5]Gupta and Agarwal; Cyber Laws, Premier publishing company, I st edition; page 422
[6] At page xi to xv

7. **Increased value of brand-** Companies will want ways to push their information ahead of their competitors, one of the most effective will be branding. What's hot-whether a product, a personality, a sporting event, or the latest financial data – will attract the greatest rewards?
8. **More minnows, more giants-**Many of the cost of starting a new business will fall and companies will more easily buy in services, so small companies will start up more radially, offering services that, in the past, only giants had the scale and scope to provide if they can back creativity with competence and speed, they will compete effectively with larger firms. At the same time, communication amplifies the strength of brands and the power of networks. In industries where networks matter, concentration will increase.
9. **More competition-** More companies and customers will have access to accurate price information, in addition, some entry barriers will fall. The result will be greater competition in many markets, resulting in "profitless prosperity": it will be easier to find buyers, but harder to make fat margins.
10. **Increased value of niches-** The power of computer to search, identify and classify people according to similar needs and tastes will create sustainable markets for many niche products. One of the most valuable improvements will be in the ability of people to locate things that have hitherto been hard to find: from friends with similar tastes to specialised services.
11. **Communities of practice-** The horizontal bonds among people performing the same job or speaking the same language in different parts of the world will strengthen. Common interests, experiences and pursuits, rather than proximity, will bind these communities together.
12. **The Loose-Knit Corporation-** Culture and communications networks, rather than rigid management structures, willold companies together. Vertically integrated companies that do everything from buying the raw materials to repairing their own products will disappear. Internet based technologies will reduce the costs of dealing with arm's-length suppliers and partners. Alliances will bond companies together at many levels.
13. **Openness as a Strategy-** Loyalty, trues and open communications will reshape the nature of supplier and customer contracts. Suppliers will draw directly on their customers' databases, working as closely and seamlessly as an in-house supplier does now. Customers will be able to manage and track their orders through the production process.
14. **Manufacturers as service providers-** Companies will taller their products more precisely to a customer's tastes and needs. Some will retain lasting links with their products; car companies, for instance, will continue electronically to track, monitor, and learn about their vehicles throughout the products life cycle. New opportunities to build links with customers will emerge as a result.
15. **The inversion of home and office-** The line between home and work will blur. People will increasingly work from home and shop from work. The office will become a place for the social aspects of work such as networking, brainstorming, lunching and gossiping. More people will work on the move; from their cars, from hotel rooms, from airport departure lounges. Home design will change: new homes will routinely have home offices.

16. **The proliferation of ideas-** New ideas and information will travel faster to the remotest corners of the world. Developing countries will acquire more rapidly access to the industrial world's knowledge and ideas. That will help many developing countries to grow more quickly and even to narrow the gap with the rich world.
17. **The decline of National Authority-** Governments will find national legislation and censorship inadequate for regulating the global flow of information. As content sweeps across national borders, it will be harder to enforce laws banning child pornography, libel and other criminal or subversive material and those protecting copyright and other intellectual property.
18. **Loss of privacy-** Protecting privacy will be difficult, as it was in the villages of past centuries. Governments and companies will easily monitor people's movements, machines will recognise physical attributes such as a voice or fingerprint. Civil libertarians will worry, but others will rationalise the loss as a fair exchange for the reduction of crime, including fraud and illegal immigration. In the electronic village, there will be little true privacy and little unsolved crime.
19. **A global premium for skills-** Pay differentials will continue to widen, as companies fight for the scarce talents of well educated workers managerial and professionals jobs will be less vulnerable to competition from automation than jobs requiring relatively little skill. In addition, the internet enhances the value of creative use of information. On-line recruitment will make the job market more global and efficient. As a result, highly skilled people will earn broadly similar amounts, wherever they live in the world.
20. **Rebirth of cities-** As individuals spend less time in the office and more time working from home or on the road, cities will change from concentration of office employment to centres of entertainment and culture. They will become places where people congregate to visit museums and galleries, attend performance of all kinds, participate in civic events and dine in good restaurants. Some poor countries will use low-cost communications to stem the fight from the countryside by providing rural areas with better medical services, jobs, education and entertainment.
21. **The rise of English-** The global role of English as a second language will continue. It became the global communications standard; the default language of the electronic world.
22. **Communities of culture-** At the same time, electronic communications will reinforce les widespread languages and cultures, not replace them with Anglo-Sexon and Hollywood. The falling cost of creating and distributing many entertainment products will also reinforce local culture and help scattered peoples and families to preserve their cultural heritage.
23. **A new trust-** Since it will be easier to check whether people and companies deliver what they have promised, many services will become more reliable and people will be more likely to trust each other to keep their word. However, those who fall to deliver will quickly lost that trust, which will be increasingly hard to regain.
24. **People as ultimate scarce resource-** The key challenge for companies will be to hire and retain good people, motivation them while at the same time extracting value from them. A company will constantly need to convince its best employees that working for it enhance their value as well as its own.
25. **Global peace-** Democracy will continue to spread- People who live under dictatorial regimes will be more aware of their government's failures. Democrats have always been more reluctant to fight than dictatorship. In addition countries will communicate

more freely with human beings on other parts of the globe. As a result, while wars will still be fought, the effect may be to foster world peace.

3.4 SUMMARY

Computer is a device that transforms data into meaningful information. The computer performs basically five major operations of functions irrespective of their size and make. These are 1) it accepts data or instruction by way of input, 2) it stores data, 3) it can process data as required by the user, 4) it gives results in the form of output, and 5).

The history of computers starts out about 2000 years ago in Babylonia (Mesopotamia), at the birth of the abacus, a wooden rack holding two horizontal wires with beads strung on them. This first mechanical calculator, called the Pascaline, Early in the 50s two important engineering discoveries changed the image of the electronic - computer field These discoveries were the magnetic core memory and the Transistor - Circuit Element. By the late 1980s, some personal computers were run by microprocessors that, handling 32 bits of data at a time, could process about 4,000,000 instructions per second.

A computer consist of hardware and software. A computer needs something that gives that hardware set of instructions that tell it what to do. This is what the software is used for. The internal hardware provides three main functions. First, it provides processing functionality. The main processing unit in computer is the Central Processing Unit (CPU). Second functionality is short term data storage. This is done using Random Access Memory or RAM. For long-term storage we use a variety of storage mediums. The most important one is the Hard Disk Drive or HDD.

There are three main sources of input- Keyboard, Mouse, Touchscreen. To get information out of the computer we need to have output devices connected to it..For example-Monitor, Audio, Printer,Plotter.

Computer cannot do anything on its own. To make the machine understand the instructions provided by both the languages, Compiler and Assembler are required to convert these instructions into machine language.

Web Technologies are playing the leading role in the World Wide Web includes many latest evolutions in it like Web Services, Web 2.0, Table less Design, HTML, XHTML, XML, CSS 2.0 etc. The web is an immensely scalable information space filled with interconnected resources. The architecture for web has been developed and standardised by the World Wide Web Consortium (W3C).
The wold wide web is the most popular and promising method of organising and accessing information on the internet main reason for its popularity is use of a concept called hypertext. Hypertext is a new way of information storage and retrieval that enables authors to structure information in novel ways.
A link is a special type of item in a hypertext document connecting the document to another document that provides more information about the linked item. The latter document can be anywhere on the internet (in the same document in which the linked item is, on the same

computer in which the former document is, or on another computer at the other end of the world).

Hypertext documents on the Internet are known as Web Pages. The World Wide Web allows computer users to locate and view multimedia-based documents (i.e., documents with text, graphics, animations, audios or videos) on almost any subject.

In the late 1960s, a graduate student at MIT research at MIT's Project Mac was funded by ARPA the Advanced Research Projects Agency of the Department of Defence. ARPA sponsored a conference at which ARPA rolled out the blueprints for networking the main computer systems of about a dozen ARPA-funded universities and research institutions. Shortly after this conference, ARPA proceeded to implement the ARPAnet, the grandparent of today's Internet.

Initially, Internet use was limited to universities and research institutions; then the military began using the Internet. Eventually, the government decided to allow access to the Internet for commercial purposes.

Web content is the textual, visual or aural content that is encountered as part of the user experience on websites. It may include, among other things: text, images, sounds, videos and animations. Web content is dominated by the "page" concept. A **blog** (a blend of the term "**web log**") is a type of website or part of a website. Most blogs are interactive, allowing visitors to leave comments and even message each other via widgets on the blogs and it is this interactivity that distinguishes them from other static websites.

A **web search engine** is designed to search for information on the World Wide Web. The search results are generally presented in a list of results and are often called hits. Today, there are more than two dozen major search engines are available on the WWW.

An **Internet forum**, or **message board**, is an online discussion site where people can hold conversations in the form of posted messages. They differ from chat room since that messages are not shown in real-time, to see new messages the forum page must be reloaded. Forums have their own language; e.g. A single conversation is called a 'thread'. A forum is hierarchical or tree-like in structure: forum – sub forum - topic - thread - reply.

Electronic commerce, commonly known as e-commerce or e-business consists of the buying and selling of products or services over electronic systems such as the Internet and other computer networks.

HTML, which stands for **Hypertext Mark-up Language**, is the predominant mark-up language for web pages. It is written in the form of HTML elements consisting of "tags" surrounded by angle brackets within the web page content. It allows images and objects to be embedded and can be used to create interactive forms. It provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. It can embed scripts in languages such as JavaScript which affect the behaviour of HTML web pages. HTML can also be used to include Cascading Style Sheets (CSS) to define the appearance and layout of text and other material. The W3C,

maintainer of both HTML and CSS standards, encourages the use of CSS over explicit presentational mark-up.

Microsoft® Active Server Pages (ASP) is a server-side scripting technology that can be used to create dynamic and interactive Web applications. An ASP page is an HTML page that contains server-side scripts that are processed by the Web server before being sent to the user's browser. There are literally hundreds of difficult technologies available to the webmaster. Making proper use of these technologies allows the creation of maintainable, efficient and useful web sites. **Multimedia** refers to content that uses a combination of different content forms. This contrasts with media that use only rudimentary computer displays such as text-only or traditional forms of printed or hand-produced material. Multimedia includes a combination of text, audio, still images, animation, video, or interactivity content forms. Web pages often contains multimedia elements in many different formats. It can be almost anything you can hear or see. Examples: Pictures, music, sound, videos, records, films, animations, and more.

Multimedia finds its application in various areas including, but not limited to, advertisements, art, education, entertainment, engineering, medicine, mathematics, business, scientific research and spatial temporal applications.

3.5 GLOSSARY

1. NETSCAPE – Netscape communication is an American computer service company, best known for Netscape Navigator, its web browser.
2. BIT – Bit is a short for Binary Digit, meaning how much information is processed per clock cycle. A 64-bit computer processes 64 lots of information at one time. Each lot of information processed is made up of different combination of 1's and 0's.

3.11 SAQS

1. Choose the correct answer:

(a) The task of performing arithmetic and logical operations is called:

(i) ALU (ii) editing (iii) storage (iv) Output

(b) The ALU and CU jointly are known as

(i) RAM (ii) ROM (iii) CPU (iv) None of above

(c) The process of producing results from the data for getting useful information is called:

(i) output (ii) input (iii) processing (iv) storage

2. Write True or False for the following:

(i) Mouse is an output device. (a) True (b) False

(ii) OCR stands for Optical Content Reader. (a) True (b) False

(iii) LCD Monitor is used in notebook computer. (a) True (b) False

(iv) Speed of DOT Matrix Printer is measured in Characters Per Second. (a) True (b) False

(v) Plotters are used to produce high quality drawings and images, such as construction plans for buildings or blueprints for mechanical objects. (a) True (b) False

(vi) Operating System (OS) is an Application Software.(a) True (b) False

3. Fill in the blanks:

(i) HTML stands for……..
(ii) ALU stands for……..
(iii) RAM stands for……

3.7 REFERENCES

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3.8 SUGGESTED READINGS

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4. Gupta & Agarwal, Cyber Law; Ist edition, Premiere Publishing Company

3.9 TERMINAL QUESTIONS AND MODEL QUESTIONS

1. What is a computer? Explain the functions of various units.
2. What is an input device? Briefly describe various important input devices.

3. Write short notes on:

(a) Laser Printer

(b) High level language

(c) Compiler

(d) Plotter

4. What is the Common Gateway Interface (CGI)?

5. Write an essay on web technology.

6. What do you understand by multimedia? Write its application.

3.10 ANSWER

SAQS

1. (a) i (b) iii (c) i

2. (i) False (ii) False (ii) True (iv) True (v) True (vi) False

3. (i) Hypertext Markup Language (ii) Arithmetic Logic Unit

(iii) Random Access Memory