

**COMPUTER  
FUNDAMENTALS  
(DBC&11)  
(BCOM- COM. APP.)**



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## Lesson 1

# UNDERSTANDING COMPUTER

## 1.0 Aims and Objectives

The aim of the lesson is to definition computer, discuss different types/categories of computers and explain the importance of computers in today's environment.

## Contents

- 1.1 Introduction
- 1.2 The Computer System
- 1.3 Computer History
- 1.4 Types of Computers
  - 1.4.1 Classification by their power
    - 1.4.1.1 Micro computer system
    - 1.4.1.2 Midrange computer system
    - 1.4.1.3 Mainframe computer system
  - 1.4.2 Classification by their users
    - 1.4.2.1 Computers for individual user
    - 1.4.2.2 Computers for organization
- 1.5 Computers in Society and their importance
- 1.6 Summary
- 1.7 Key Words
- 1.8 Self Assessment Questions
- 1.9 References

## 1.1 Introduction

In basic terms a computer is an electronic device that processes data, converting it into information that is useful to people. Today's computer systems available in a variety of sizes, shapes and computing capabilities. All computers are, a system of input, processing, output, storage and control components. There are two basic types of computers; analog and digital. The computers commonly used today are all digital computers.

## 1.2 The Computer System

A system is a group of integrated parts that have the common purpose of achieving same object. Since a computer is made up of integrated components it is called as a system.

The computer system consists of central processing unit, primary storage, secondary storage, input devices, output devices and communication devices(See Fig 1.1)

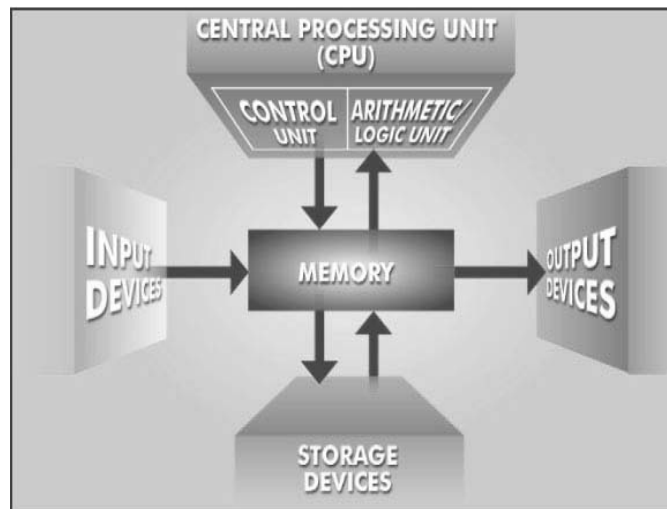


Fig 1.1

The central processing unit manipulates data into a useful form and controls the other parts of the computer system. Primary storage temporarily stores data and program instruction during processing. Secondary storage devices store data and programs. Input devices such as keyboard or mouse. Convert data and instruction into electronic form for input into the computer.

#### **Output Devices**

Output devices are instruments of interpretation and communication between humans and computers such as printers and video display terminals, convert electronic data produced by the computer system into a form that can be used by people.

#### **Communication**

Communication devices provide connection between the computer and communication networks.

### **1.3 Computer History**

The modern age of computers span almost 60 years, which can be divided into five generation. Each generation is marked by a significant advancement in technology.

#### **First generation(1951-57)**

During this generation computers were built with vacuum tubes – electronic tubes (made of glass) The first generation computers were huge, slow, expensive and often undependable. In 1946 two Americans Presper Eckert and John Manchly built the ENIAC electronic computer. The ENIAC used thousands of vacuum tubes, which took up a lot of space and produced a great deal of heat and had to be handled by gigantic air conditioners.

#### **Second Generation (1958-63)**

This generation begins with the first computers built with transistors which are small devices that transfer electronic signals across a register. Transistors are much smaller, use less power and create less heat than vacuum tubes. The new computers are faster, smaller and more reliable than the first generation computers.

### Third Generation (1964-69)

During 1960, computer manufactures began replacing transistors with integrated circuits. An integrated circuit is a complete electronic circuit on a small chip made of silicon. These computers were more reliable and compact than computers made with transistors. Placing such a large number of transistors on a single chip vastly increases the power of a single computer and lowered its cost considerably since the invention of integrated circuits. The number of transistors that can be placed on a single chip has doubled every two-year, shrinking both the size and cost of computers even further and further enhancing its power.

### Fourth Generation (1970-90)

There are many key advancements that were made during this generation. The most significant of which was the use of the microprocessor a specialized chip developed for computer memory and logic. Key innovations include personal computers, the graphical user interface and the growth of massive computer network.

### Fifth Generation (1991-2000 & beyond)

The rapidly expanding internet, world wide web, and interacts have created an information super highway that has enabled both computer professionals and home computes users to communicate with other across the globe. Today we are heard of Intel and its Pentium processors and their computers. These computers have million upon millions of transistors on one chip and will perform over a billion calculations in a single second.

## 1.4 Types of Computers

Computers can be categorized

- 1) By their power and
- 2) By the people who can used them simultaneously

Depending on their size and processing power, computers are categorized as micro computers, mid range computers and mainframes.

### 1.4.1 Classification by their power

#### 1.4.1.1 Micro Computer System

Micro computers are the most important category of computer systems for individual user and business people. It is also called as personal computer or PC. Micro computers are available in a variety of sizes and shapes for different purposes. (See Fig 1.2)



Fig 1.2

Most of the microcomputers are desktop computers designed to fit on any desk, or laptops on the road. Some micro computers are powerful workstation computers that support applications with heavy mathematical computing and graphics display like CAD etc., Some microcomputers are used as network servers. They are specifically designed for use with the Internet and corporate intranets by employees

#### **1.4.1.2 Midrange Computer System**

Midrange computers are multi-user systems that can manage networks of PCs and terminals. They became popular as minicomputers for scientific research, engineering analysis and industrial process monitoring and control (CAD/CAM). They are less powerful, less expensive and smaller than a mainframe and capable of supporting the computing needs of smaller organization.

#### **1.4.1.3 Mainframe Computer System**

Mainframe computers are large, fast and powerful computer system and extremely rapid processing power. They also have large primary storage capacities and can support more network users and peripheral devices. They are designed to handle the information processing needs of a large organization with high volumes of transaction processing or with complex computational problems. They are mostly used for computer intensive applications such as analyzing seismic data from oil field exploration or simulating flight condition in designing aircraft. They are also widely used as super servers for the large client/server networks and high-volume internet websites of large companies.

### **1.4.2 Classification by their users**

#### **1.4.2.1 Computers for Individual Users**

Computers designed for, used by a single individual / user are Categorized into

- Desktop computers
- Workstations
- Notebook computers
- Tablet computers
- Handheld computers
- Personal Digital Assistant

#### **Desktop Computer**

A desktop computer is a personal computer made for use on a desk in an office or home and is distinguished from portable computers. Desktops are currently the most affordable computers used by business, schools and households. They are used for performing office tasks, organizing digital photos, video, editing and internet access.(See Fig 1.3)



Fig 1.3

**Work Stations**

Work stations are powerful computers and are used by engineers, scientists and other professionals who process a lot of data. Work stations use sophisticated display screens featuring high-resolution color graphics and powerful networking.

**Note Book Computers/Laptop Computers**

These computers are designed to be easy to carry around and move from place to place. They are in many ways identical to desktop computer but expensive.

**Tablet Computers**

A tablet PC is a note book or slate shaped mobile computer. Its touch screen or digitizing tablet technology allows the user to operate the computer with a stylus or digital pen instead of a keyboard or mouse.(See Fig 1.4)



Fig 1.4

**Handheld Computers**

A portable computer that is small enough to be held in one's hand. The most popular hand held computers are those that are specifically designed to provide PIM ( Personal Information Manager) functions, such as a calendar and address book. (See Fig 1.5)



Fig 1.5

**Personal Digital Assistants(PDAs)**

PDAs are much smaller than the sub notebooks. They combine pen input, writing recognition, personal organizer



Fig 1.6

#### 1.4.2.2 Computers for organization

These computers are specifically designed to handle the needs of many users at the same time. They are

- Network Servers
- Mainframes
- Mini Computers
- Super Computers

##### **Network Servers**

Network servers control and manage network resources such as files, printers, users and groups etc., Servers are classified according to the service they provide to the network. File servers are used to store files, print servers control one or more printers, network servers control network traffic and access.

##### **Mainframes**

Mainframe computers are very large in size. They can process one million program instructions per second and can store enormous of information and perform many tasks at the same time; can communicate many users at the same time, and are very expensive.

##### **Mini Computers**

Mini computers also known as mid-range computers are much smaller than mainframe computers and less expensive. They possess most of the features found on mainframe computers but on a limited scale. Medium and small business use these computers.

##### **Super Computers**

Super computers have a very large storage capacity and have massively parallel processing power; as well as a very fast input/output capability. Most super computers are used by government agencies.

Super computers are a special category of extremely powerful computer systems designed for scientific, engineering and business applications requiring extremely high speed for numeric computation. They are used for applications like global weather forecasting, military defense system, computational cosmology and astronomy and large-scale data mining, etc., Super computers are parallel processing and can perform billions and even trillions of calculations per second, many times faster than the largest mainframe.

### 1.5 Computers in the Society and their importance

Computer technology is becoming so powerful and integrated into our daily life. It is one of the most power forces in society. Today computers are important to us because information is so essential to human lives.

- Personal computers help families educate their children, manage their finances, obtain any information from anywhere, keep in touch with distant relatives and friend and family
- Making on-line purchases
- Computer play a crucial role in every government agency to collect census and taxes and provide e-seva services to people.
- At schools, and colleges, personal computers help students get in contact with their teachers, perform research, and make presentation.

- At work, personal computer skills are almost essential for career success. Computers help millions of people do their jobs more effectively.
- Computers enable small business to operate more efficiently.
- Computers play virtual role in industries from management to product design, manufacturing and customer relation management.
- Computers are involved in nearly every aspect of the health industry.
- Play a crucial role in making diagnoses, managing schedules and even performing complex surgery.
- Helps children suffering from cerebral palsy, by providing icon based education and communication software.
- Computers assist visually impaired persons.
- Computers communicate with children suffering from Downs syndrome through speech.
- In more ways than most people can imagine, computer play key roles in our lives.

## 1.6 Summary

The lesson covers the introduction of computers. Computers are classified according to the power and the people using it. Five generations of computers have evolved since the first generation of computers began in the early 1950's.

## 1.7 Key Words

Analog Computer

Digital Computer

Generations of computer

Mini Computer

PDA

Mainframe

Network Server

Computer System

Super Computer

## 1.8 Self – Assessment Questions

1. List the four parts of the Computer System.
2. What are the four categories of Computer Hardware?
3. What is the use of Key Board?
4. List out major characteristics of Main Frame System.
5. Explain the classification of computers.

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## Lesson 2

# INSIDE THE SYSTEM

## 2.0 Aims and Objectives

The aim of the lesson is to introduce the part of computer and their functionality.

## Contents

- 2.1 Introduction
- 2.2 Hardware capabilities
- 2.3 Introducing the system unit
  - 2.3.1 Outside the Box
    - 2.3.1.1 Power switch
    - 2.3.1.2 Connectors
  - 2.3.2 Inside the system Unit
    - 2.3.2.1 Mother board
    - 2.3.2.2 Power supply
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    - 2.3.2.4 System clock
    - 2.3.2.5 Microprocessor
    - 2.3.2.6 Memory
  - 2.3.3 Representation of Data
- 2.4 Summary
- 2.5 Keywords
- 2.6 Self Assessment Question
- 2.7 References

## 2.1 Introduction

A computer includes both hardware and software. The term hardware refers to the physical components of the computer, the one you can see and touch. The term software refers to the programming that tells the computer what to do. A computers hardware consists of interconnected electronic devices that you can use to control the computers operations, input and output.

## 2.2 Hardware Capabilities

Computers perform four basic functions. Inputting and representing data, processing the data displaying the results using output devices, and storing the results for future purpose. Computer store and process information in the form of binary digits called bits.

### Bit

A bit is a binary digit representing the smallest unit of data in a computer system. A bit is either 1 or 0 ( a single digit binary number). A string of eight bits that the computer stores as a unit is called a byte. Each byte can be used to store a decimal number, a symbol, a character, or part of a picture.

## 2.3 Introducing the system Unit

A computers hardware devices fall into

1. Processor
2. Memory
3. Input and Output
4. Storage

System unit components are power switch, connectors, serial port and parallel port (See Fig 2.1).

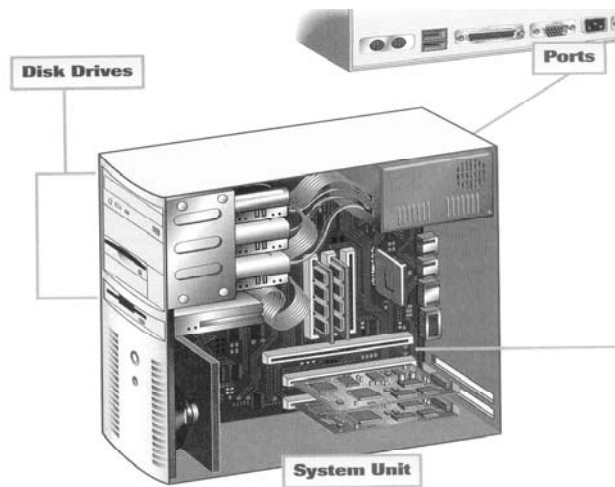


Fig 2.1

### 2.3.1 Outside the Box

#### 2.3.1.1 Power Switch

Usually the power switch is located in the rear of the computer.

#### 2.3.1.2 Connectors

The connectors on the outside of the system connect peripherals, such as a keyboard or a mouse or a printer. A connector is a physical receptacle that is designed for a specific type of plug. The plug is a turn connected to a cable and cable is connected to a peripheral device. (See Fig 2.2)

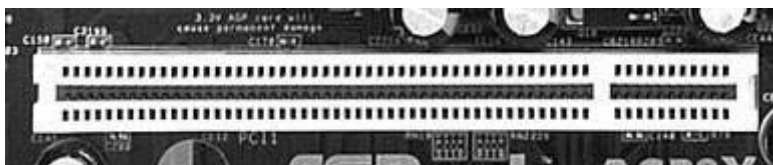


Fig 2.2

### Types of Connectors

#### Serial Port

A serial port creates an interface in which data flows in a series of pulses, one after-another. Serial ports conform to one of the two international standards.

1. RS-232 (for PCs)
2. RS-422 (for Mac)

### Parallel Port

Parallel port can transfer eight bits of information simultaneously. They are much faster than serial ports. They are used for printers, which require high-speed connections.

### PS/2 Port

PS/2 port also called as mouse port. Mouse port is a type of serial port but it is electronically differentiated from the serial ports. Most of the today's PCs connect mice using a PS/2 port.

### SCSI Port ( Small Computer System Interface)

SCSI port is a type of parallel interface that is used for all Macintosh computers and PCs. SCSI port enables users to connect upto eight SCSI compatible devices, such as printers, scanners and digital cameras.

### Universal Serial Bus Port

A USB can connect more than one device at a time upto 127 of them. In addition, it is possible to connect and disconnect devices without shutting down the computer. This capability is called hot swapping. It has built in plug and play (PnP) support with plug and play, the computer automatically detects the brand, model and characteristics of the device when you plug it in and configures the system accordingly.

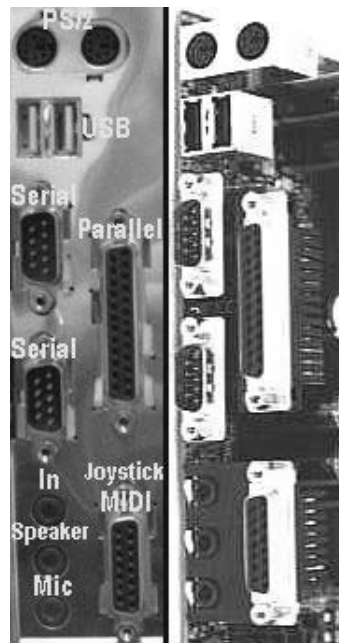


Fig 2.3

### 2.3.2 Inside the System Unit

Inside the system unit consists of mother board, power supply, cooling fan, speaker and drive bays.

#### 2.3.2.1 Motherboard

The motherboard is a large printed circuit board, a flat piece of plastic or fiber glass that contains thousands of electrical circuits. It provides both the physical and the electrical setting for the computer's most important components. Most of these components are integrated circuits. A chip consists of millions of transistors. A transistor is an electronic switching device (See Fig 2.4).

#### 2.3.2.2 Power Supply

A computers power supply transforms the alternating current (AC) available from standard wall outlets into the direct current (DC) needed for the computers operation. A 250 watt power supply is adequate for most desk tops.

#### 2.3.2.3 Cooling Fan

Fans are used to keep the system unit cool, otherwise the computer's components can be damaged, if heat accumulates within the system unit. Some systems include auxiliary fans. An auxiliary fan provides additional cooling for high-powered system (See Fig 2.4).

#### 2.3.2.4 System Clock

System clock controls events of the computer. Every event in a computer must be sequenced so that one step logically follows another. The control unit sets a beat to the chip. This beat is established by an internal clock and is measured in mega hertz. A megahertz is a measure of cycle speed, or the pacing of events in a computer. One megahertz equals one million cycles per second (See Fig 2.4).

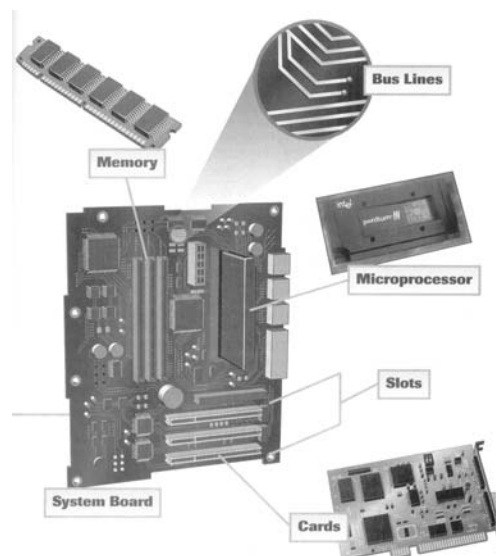


Fig 2.4

### 2.3.2.5 The Microprocessor

A microprocessor contains almost all of a computer's central processing unit (CPU) on a single chip. The CPU interprets the instructions given to it by software and carries out these instructions by processing data and controlling the rest of the computer's components. (See Fig 2.5)

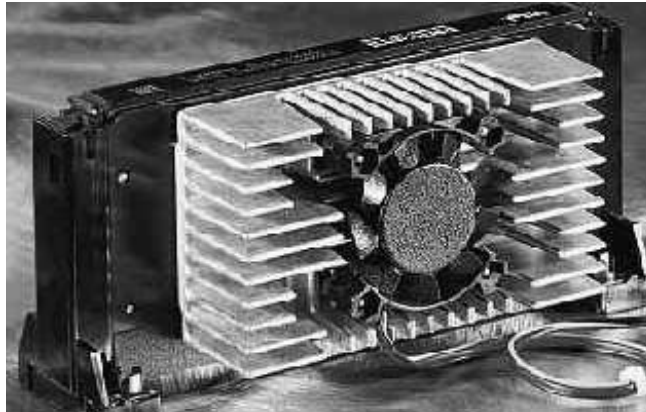


Fig 2.5

#### Instruction Set

Every processor can perform a fixed set of operations, such as getting a character from the computer's memory or comparing two numbers to see which is larger. Each of these operations has its own unique number, called an instruction. A processor's list of instructions is called an instruction set. Different processors have different instruction sets.

#### Control Unit

CPUs contain two subcomponents, the control unit and the Arithmetic Logic Unit (ALU). The control unit coordinates and controls all the other parts of the computer system. The control unit manages four basic operations.

#### Fetch

Getting the next program instruction from the computer memory.

#### Decode

Figuring out what the program is telling the computer to do.

#### Execute

Performing the requested action, such as adding two numbers or deciding whether one of them is larger.

#### Write-back

Writing the results to an internal register.

This four step process is called a machine cycle, and it consists two phases

1. The instruction cycle and
2. The execution cycle

#### Arithmetic Logic Unit (ALU)

The arithmetic logic unit can perform with arithmetic or logical operations. Arithmetic operations include addition, subtraction, multiplication and division. Logical operation means comparing two data items to see which one is larger or smaller.

## Registers

Registers are temporary storage location in the CPU.

## Data Bus width and Word Size or Word Length

The data bus acts as a highway between the CPU, primary storage, and other devices, determining how much data can be moved at one time.

## Word Length

The number of bits that the computer can process at one time. A 32 bit chip can process 32 bits or 4 bytes of data in a single machine cycle.

### 2.3.2.6 Memory

Another important motherboard component is the computer's memory; Every computer has several types of memory, but they fall into two categories

1. Volatile memory and
2. Non – Volatile memory

In volatile memory the memories contents are erased when the power is off.

#### Random access memory (RAM):

Internal primary storage is called RAM, because it can directly access any randomly chosen location in the same amount of time. Primary memory is divided into locations called byte. Each location contains a set of eight switches or devices, each of which can store one bit of information.(See Fig 2.6)

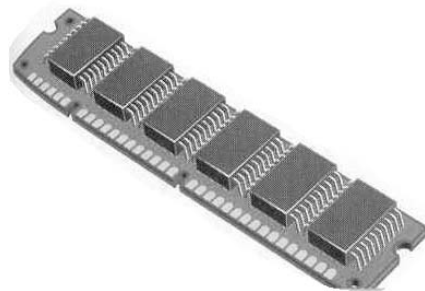


Fig 2.6

#### Cache Memory

Cache memory is much faster than RAM. The processor can use the cache to store frequently accessed program instructions and data. Two types of cache memory are available.

1. Primary Cache - included in the microprocessor chip
2. Secondary Cache - included on a separate circuit board

#### Chipset

The chipset is a collection of chips that are designed to work together. They provide the switching circuitry that the micro processor needs in order to move data to and from the rest of the computer.

### Input/Output (I/O) Buses

An I/O bus extends the computer's internal data pathways to communicate with input and output device. Today's PCs use the Personal Computer Interface (PCI) bus, which supports the Plug and Play(PnP) system. With PnP, the computer detects a new card and configure the system automatically.

### 2.3.3 Representation of Data

Computers can process incoming data, but only after the words, photos, music and other information have been translated into a language they can understand. The language computers understand is called digital data or binary code; which simply means that all incoming data must be translated into the 1s and 0s of binary code. Binary codes make up machine language, the only language computers understand. ASCII and EBCDIC are used to represent numbers, letters and other characters in binary form.

#### ASCII(American Standard Code for Information Interchange)

ASCII is the stand binary code adopted for data communications systems and is used by most microcomputers (See Fig 2.7 )

A	81	Q	97
B	82	R	98
C	83	S	99
D	84	T	100
E	85	U	101
F	86	V	102
G	87	W	103
H	88	X	104
I	89	Y	105
J	90	Z	106
K	91	[	107
L	92	\	108

Fig 2.7

#### EBCDIC(Extended Binary Coded Decimal Interchange)

EBCDIC is used primarily on IBM mainframe computers.

#### Unicode

A third binary code is called Unicode better than either ASCII or EBCDIC for representing the letters and characters in languages other than English. Unicode uses 16 bits. By using 16 bits, Unicode can represent more characters than ASCII and EBCDIC and it can encode most language.

## 2.4 Summary

Computers hardware components includes input, output devices, central processing unit and primary , secondary storage devices. The computer system unit consists of motherboard, power supply, cooling fan, speakers and drive. Computers understand only binary language. ASCII and EBCDIC codes are used to represent letters.

## 2.5 Key Words

ALU

Motherboard

Microprocessor

Memory

Register

Parallel Port

Serial Port

ASCII Code

EBCDIC Code

## 2.6 Self – Assessment Questions

1. Describe the purpose of expansion slots in a PC.
2. Explain the functions of arithmetic unit.
3. What is CPU describe it?
4. How are keyboard and monitor are connected to CPU.

## 2.7 References

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## Lesson 3

# INPUT – OUTPUT DEVICES

## 3.0 Aims and Objectives

The aim of the lesson is to explain the difference between keyboard and direct-entry input devices and describe output devices.

## Contents

- 3.1 Introduction
- 3.2 Input Devices
  - 3.2.1 Key Board
  - 3.2.2 Direct Entry
    - 3.2.2.1 Pointing Devices
    - 3.2.2.2 Scanners
    - 3.2.2.3 Voice-Input Devices
- 3.3 Output Devices
  - 3.3.1 Monitors
  - 3.3.2 Printers
  - 3.3.3 Plotters
  - 3.3.4 Voice-Out Devices
- 3.4 Summary
- 3.5 Key words
- 3.6 Self-Assessment Questions
- 3.7 References

## 3.1 Introduction

Human beings interact with computers through input and out devices. Input devices gather data and convert them into electronic form for use by the computer, where as output devices display data after they have been processed.

## 3.2 Input Devices

An input device is a machine that feeds data into the computer. Keyboard is the principal method of data entry for entering text and numerical data into a computer. Input devices other than the keyboard are called alternate input devices. Mouse, tract balls light pen and touch screens are all alternate input devices. Two kinds of input are keyboard and direct entry.

### 3.2.1 Keyboard

Keyboard is an input device consisting of a set of typewriter like keys that enable the user to enter data into a computer. Computer keyboards are similar to electronic-type writer keyboards (See Fig 3.1). The keys on computer keyboards are classified as follows

- Alphanumeric keys - letters and numbers
- Punctuation keys - comma, semi colon etc.
- Special keys - Function keys, control keys, caps lock key etc.



Fig 3.1

### 3.2.2 Direct Entry

Direct entry devices can be categorized as pointing devices, scanners and voice – input devices

#### 3.2.2.1 Pointing Devices

Pointing devices allow users to directly use their hand/hands to input data. Most common is the mouse. Three devices similar to the mouse are track balls, touch screens and pointing sticks.

#### Mouse

A computer mouse is a handheld device that controls the movement of the cursor or pointer on a display screen (See Fig3.2). The mouse also can be used to draw images on the screen. The standard mouse has a ball on the bottom and it is attached with a cord to the system unit.



Fig 3.2

#### Trackball

Trackball is another pointing device(See Fig 3.3). Trackball are popular pointing devices for portable computers. The user controls the pointer by rotating a ball with his thumb.



Fig 3.3

**Touch screen**

Touch screen is a type of display screen which allows users to touch the screen with finger/pointer to control operations. Touch screens are often used in information kiosks in retail stores/departmental stores, restaurants and shopping malls (See Fig 3.4) and ATMs(Automated teller machine). Touch screens are easy to use, especially when people need information quickly.

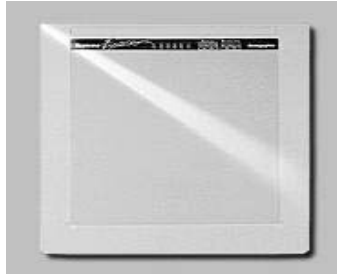


Fig 3.4

**Joy Stick**

Joystick is a lever that moves all directions and controls the movement of a pointer. Joysticks control game action by varying pressure, speed and direction. The joystick (See Fig 3.5) is the most popular input device for computer games.



Fig 3.5

**Digitizers**

Digitizers convert images to digital data using stylus and digitizing tablet. It can be used to trace or copy a drawing or photograph. The item to be copied is placed on a flat digitizing tablet. A specific stylus connected to a computer is then used to trace the item.

**3.2.2.2 Scanners or Scanning devices**

Direct entry scanning devices record images of text, drawing or special symbols. Scanners convert images to digital data. Widely used scanning devices include OCR, MICR and OMR devices.

**Optical Character Recognition (OCR)**

Devices translate specifically designed marks, characters and codes into digital form. The most widely used optical code is the bar code. The codes can include time, data and location data and identification data. It is also called mark sensing. OMR is often used to score multiple-choice tests such as the Bank Tests and Government Texts.

**Magnetic Ink Character Recognition (MICR)**

Translates characters written in magnetic ink into digital codes for processing. It is used primarily in check processing for the banking industry.

**Digital Scanners**

Translate images, such as pictures or documents into digital form for processing.(See Fig 3.6)

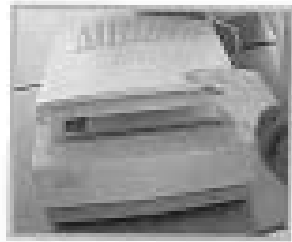


Fig 3.6

**3.2.2.3 Voice Input Devices**

Convert spoken words into digital form for processing by the computer. This input device, when combined with a sound card and appropriate software forms a voice recognition system. Most voice recognition system must be “trained” to the particular user’s voice. This is done by matching the users spoken words to patterns previously stored in the computer.

**3.3 Output Devices**

Output devices convert machine –readable information into human readable form. An output device is a machine capable of representing information from a computer. Output devices are Monitors, Printers, Plotters and Voice-output device.

**3.3.1 Monitors**

The most frequently used output device is the monitor. Two important characteristics of monitors are size and clarity. In general, two types of monitors are used with PCs(See Fig 3.7) 1. Cathode ray tube and 2. Flat –panel display.



Fig 3.7

**Cathode ray tube** The most common type of monitor for the office and the home is cathode ray tube .It works much like a television picture tube.

**Flat-panel Display** was used primarily with portable computers, now they are popular desktop computers.

All monitors can be categorized the way they display colors.

- 1.Monochrome monitors actually display two colors, one for the background and other for the foreground.
- 2.Gray scale monitors display varying shades of gray against a white or off-white background.
- 3.Color monitors can display between 16 to 16 million colors.

### 3.3.2 Printers

Printers produce a printed hard copy of information output Popular printers are 1. Dot matrix printers 2. Ink-jet printers and 3. Laser printers.

#### Dot Matrix Printers

Dot Matrix printers create characters by striking pins against an ink ribbon (See Fig 3.8) Each pin makes a dot and combination of dots form characters and illustrations. They are inexpensive, but produce low quality output. The speed of dot matrix printers is measured in characters per second. The fastest ones can print 500 characters per second.



Fig 3.8

#### Ink-jet Printers

Ink-jet printers create an image directly on the paper by spraying ink .(See Fig 3.9) Ink-jet printers are the most widely printers. They are reliable and inexpensive for both color and black printing.



Fig 3.9

### Laser Printers

Laser printers are expensive, but produce higher quality print and are fast and convenient to use (See Fig). Laser printers are available in both color and black and white. The laser printer uses a laser beam to produce images with excellent letter and graphics quality. A CPU and memory are built into the printer to interpret the data that it receives from the computer and to control the laser.

### Latest Technology

#### Multi-functional printers.

Multifunctional printer combines a printer, scanner, copier and sometimes also a fax-machine into the same machine. This is very convenient as it frees up valuable space on your desk and also saves money as the all-in-one machine costs less than three or four separate machines cost. An MFP can work both as a computer peripheral (using a computer port, like ethernet /Wi-Fi-LAN, USB, FireWire, etc.) and autonomously, with no need for the computer connection; for example, to copy, fax and so on.



Fig 3.10

### 3.3.3 Plotters

Plotters are special purpose output devices for producing bar charts, maps for architectural or engineering purposes (See Fig 3.11). They use multi-colored pens to draw high-quality graphic documents. They are four types of plotters, pen, ink-jet, electrostatic and direct imaging.

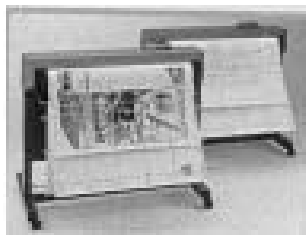


Fig 3.11

#### Pen Plotters

Pen plotters create a drawing by moving a pen or pencil over drafting paper. They are reliable, inexpensive and most popular.

#### Ink-jet Plotters

Ink-jet plotters are fast, quiet and produce high quality output. Ink-jet plotters create line drawings and solid-color output by spraying droplets of ink onto paper.

**Electrostatic plotters**

Electrostatic plotters use electrostatic charges to create images made up of tiny dots on specially treated paper. Electrostatic plotters produce high-resolution images and are much faster than other plotters.

**Direct Imaging Plotters**

Direct Imaging Plotters use electrically heated pins to create two color output on special heat sensitive paper. These plotters require expensive paper but they are reliable and good for high-volume work.

**3.3.4 Voice-output Device**

Voice-output device converts digital output data into intelligible speech. Voice-output devices make sounds that resemble human speech but actually are pre recorded vocalized words.

**3.4 Summary**

Human beings interact with computer system largely through input and output devices. Two kinds of input are keyboard and direct entry. Direct entry devices can be categorized as pointing, scanning and voice-input. Output devices include monitors, printers, plotters and voice-output.

**3.5 Key words**

Input Devices

Key board

Mouse

Track ball

Joystick

Touch screen

OCR

Printer

Scanner

**3.6 Self – Assessment Questions**

1. Describe two benefits of Mouse.
2. What is the use of plotters?
3. What are the output devices?
4. Describe various methods providing computer output.
5. Name some pointing devices.

**3.7 References**

1. Teach yourself Computer Basics in 24hours - Sams
2. Peter Norton - "New Inside the PC" – Tata MC Graw Hill
3. Peter Norton - "Introduction to Computers"– Tata MC Graw Hill

## Lesson 4

# STORAGE DEVICES

### 4.0 Aims and Objectives:

The aim of this lesson is to explain various storage devices and their hierarchy.

### Contents

- 4.1 Introduction
- 4.2 Types of Storage devices
  - 4.2.1 Read Write Vs Read Only Devices
  - 4.2.2 Sequential Vs Random Access Storage
- 4.3 Storage Technology
  - 4.3.1 Magnetic Storage Media
    - 4.3.1.1 Floppy Disk
    - 4.3.1.2 Hard Disk
  - 4.3.2 Optical Storage Media
    - 4.3.2.1 CD
    - 4.3.2.2 DVD
- 4.4 Summary
- 4.5 Key words
- 4.6 Self Assessment Questions
- 4.7 References

### 4.1 Introduction

Most of the information used by a computer application is stored on secondary storage devices located outside of the primary storage area. Secondary storage is non volatile and is used for relatively long-term storage of data. The physical materials on which data is stored are called storage media. The hardware components that write data to and read data from, storage media are called storage devices.

### 4.2 Types of Storage Devices

Storage media are categorized by the type of operations they can perform read-only or read/write and the type of data access they provide(Sequential or random-access) and their location in the storage hierarchy (on line or off line)

#### 4.2.1 Read/Write Vs Read only Devices

Most storage devices are read/write media. They enable the computer to perform writing(output) operations as well as reading operation.

Some storage devices are read-only, they cannot perform writing operations. CD-ROM drives are read-only devices and CD-R drives are read/write devices.



### 4.2.2 Sequential Vs Random Access Storage

Storage devices are categorized according to the method used to access the information they contain. In a sequential storage device, such as a tape back up unit, the computer has to go through a fixed sequence of stored items to get to the one that's needed. Sequential storage devices are slow but inexpensive.

A random-access storage device can go directly to the requested data without having to go through a sequence. Random access storage devices are faster but more expensive.

#### Storage Hierarchy

Storage hierarchy differentiates storage devices according to the availability of the data they contain. The three levels are

- 1) Online storage also called primary storage. The computers hard disk is a personal computers online storage system.
- 2) Near online storage also called secondary storage. Examples of near-online storage devices for personal computers are floppy disks and CD-ROMs
- 3) Off line storage also called territory storage or archival storage. Offline storage devices are magnetic tape. They are used for infrequently-accessed data that needs to be kept for archival purposes.

## 4.3 Storage Technology

Widely used storage technology are : magnetic storage and optical storage.

### 4.3.1 Magnetic Storage Media

Magnetic storage media use disks or tapes that are coated with tiny, magnetically-sensitive materials. The most widely used secondary-storage medium today is magnetic disk. There are two kinds of magnetic disks: Floppy Disk and Hard Disk

#### 4.3.1.1 Floppy Disk

Floppy Disk are removable storage media. Data is recorded on track and sectors. Floppy disks often called diskettes or simply disks are a portable or removable storage media. They are used to store and to transport word processing, spreadsheet, and others. Data is stored as electromagnetic charges on a metal oxide film coating the Mylar plastic. They are inexpensive, removable storage media. They are primarily used to save and transport documents(See Fig 4.1).

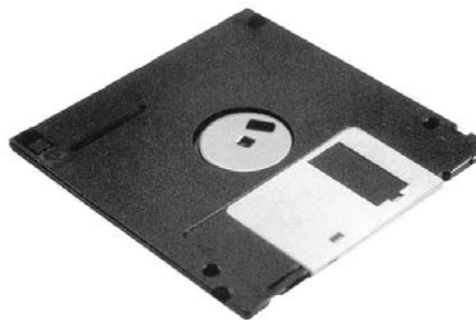


Fig 4.1

#### 4.3.1.2 Hard Disk

Hard disks are faster and provide much greater storage. They are used to store programs and large amounts of data (See Fig 4.2). Hard disks are of three types:

1. Internal hard disk
2. Hard Disk Cartridge and
3. Hard Disk Pack

An internal hard disk is located inside the system unit. It is used to store programs and large data files. It is also known as a fixed disk.

Hard disk cartridges are removable and the amount of storage available is limited only by the number of cartridges. They are used primarily to complement an internal hard disk.

Hard Disk Packs consist of several platters and have a capacity that greatly exceeds both internal and hard disk cartridges. They are removable storage devices used to store massive amounts of information by mini computer and mainframe computer system.



Fig 4.2

#### 4.3.2 Optical Storage Media

##### Optical Disk

Optical disks also called compact disks or laser optical disks use laser technology to store data at densities many times greater than those of magnetic disks. They are available for both PCs and large computers. Optical disks can store massive quantities of data including text, pictures and full motion order in a highly compact form.

The two most common are CD and DVD

DVD-R stands for DVR recordable. They are used to create permanent archives for large amounts of data. DVD-RAM and DVD-RW recently introduced in the market. They are two different types of reusable disks. They used to develop very large scale multi media projects.

##### 4.3.2.1 Compact Disk

Compact disk or CD, is the most widely used today (See Fig 4.3). One important characteristic of CD drives is their speed. CD drives can store 650 megabytes of data on one side of a CD. There are three basic types of CDs, CD-Rom, CD-R and CD-RW

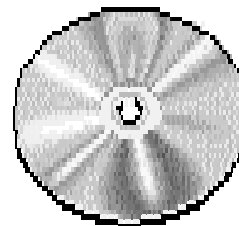


Fig 4.3

**CD-ROM**

CD-ROM stands for compact disc read only memory. Read only means it cannot be written on or erased by the user. They are used to distribute large databases, references and application

Fig 4.4

packages.(See Fig 4.4)



Fig 4.4

**CD-R**

CD-R also known as CD-WORM(Write once, read many). CD-R can be written to once, but they can be need many times without deterioration. They are used to archive data.

**CD-RW**

CD-RW stands for compact disc rewritable or known erasable optical disks. They are often used to create and edit large multimedia presentation.

**4.3.2.2 Digital Versatile Disc(DVD)**

Digital Versatile Disc stands for digital versatile disc or digital video disks. DVDs are used to store movies and multimedia application with large amounts of video and graphics. There are three basic types of DVDs.

**DVD-ROM**

DVD-ROM stands for digital versatile disc and read only memory. They are used to distribute full length feature film with theater-quality video and sound.

**4.4 Summary**

A storage device is a hardware device designed to store information. There are two types of storage devices used in computers; a 'primary storage' device and a 'secondary storage' device. Widely used storage technology are magnetic storage and optical storage. Magnetic storage devices are floppy disk and magnetic disks. Optical storage devices are CD-ROM, DVD etc.

**4.5 Key words**

RAM

ROM

Magnetic Storage Media

Floppy Disk

Hard Disk

Optical Disk

CD ROM

DVD

#### **4.6 Self – Assessment Questions**

1. Name three types of storage devices?
2. List four types of Magnetic storage media commonly used in PCs.
3. Describe optical storage devices.
4. Where does the computer store the information.
5. What is the difference between CD ROM and Hard Disk?
6. Name and differentiate the two categories of storage devices.

#### **4.7 References**

1. "Teachyourself Computer Basics in 24hours" - Sams
2. Peter Norton - "New Inside the PC" - Tata MC Graw Hill
3. Peter Norton - "Introduction to Computers"- Tata MC Graw Hill

## Lesson 5

# SOFTWARE

## 5.0 Aims and Objectives

The aim of this lesson is to explain the concept of software, distinguish between different types of software and differentiate application software from system software.

## Contents

- 5.1 Introduction
- 5.2 Categories of software
- 5.3 System Software
- 5.4 System Management programs
  - 5.4.1 Operating system
    - 5.4.1.1 Capabilities of Operating System
    - 5.4.1.2 Popular Operating Systems
  - 5.4.2 Network operating systems
  - 5.4.3 System utilities
- 5.5 System Development programs
  - 5.5.1 Compilers
  - 5.5.2 Interpreters
  - 5.5.3 Assemblers
  - 5.5.4 Simulators
  - 5.5.5 Programming Languages
- 5.6 Application Software
- 5.7 Summary
- 5.8 Key words
- 5.9 Self Assessment Question
- 5.10 References

## 5.1 Introduction

Software is the detailed instructions that control the operations of a computer system. Without software the power of hardware is waste. The major types of software are system software and application software. Each serves a separate purpose.

## 5.2 Categories of Software

- System software manages the computer resources and mediates between application software and computer hardware. System software is a set of generalized program that manages the computer resources, such as the central processor, communication link and peripheral devices
- Application programmers and some end users to develop specific business applications use application software. Application software describes the programs that are written for or by

users to apply the computer to a specific task. These programs tell the hardware how to do a particular task such as word processing, games, database management

Overview of the major types and functions of application software and system software available to user (See Fig 5.1)

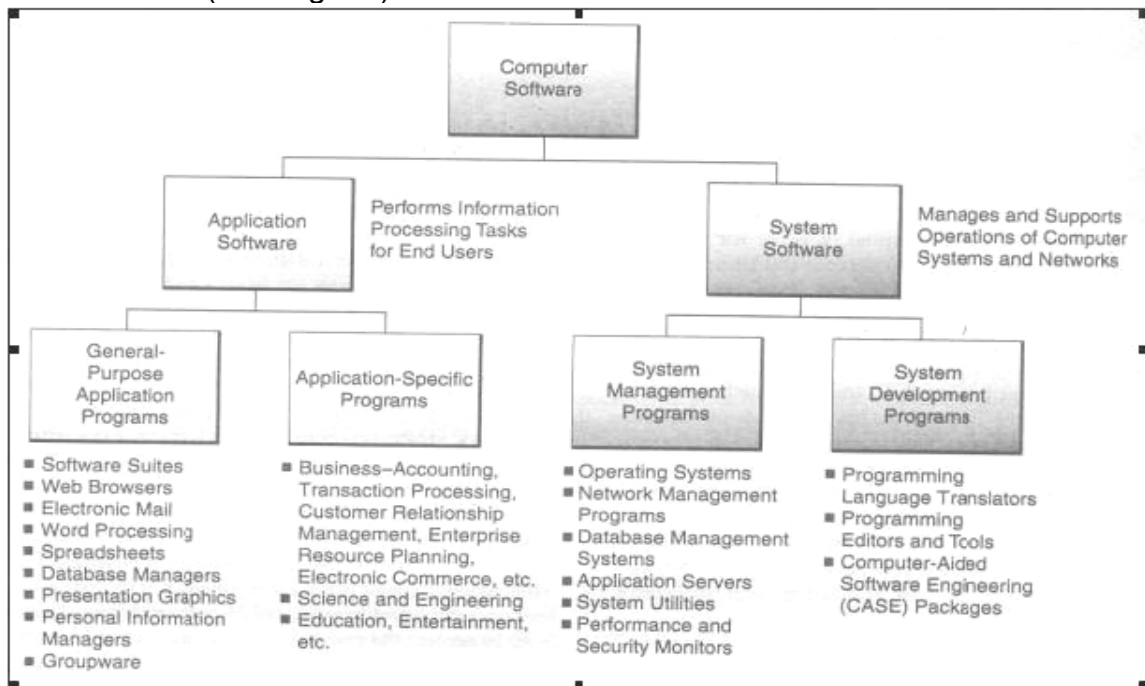


Fig 5.1

Source: Management Information Systems - James A. O'Brien

## 5.3 System Software

The system software can be grouped into the major categories.

1. System Management Programs
2. System Development Programs

System management programs can manage the hardware, software, network and data resources of the computer system during its execution. Examples of system management programs are operating system, network management programs and database management system.

System development programs can help users develop information system programs and procedures and prepare the user programs for computer processing. Examples of system development programs are programming language translators, programming tools and computer-aided software engineering package(See Fig 5.1)

## 5.4 System Management Programs

### 5.4.1 Operating System

The system software that manages and controls the computers activities is called the operating system. An operating system performs three functions.

- It allocates and assigns system resources
- It schedules the use of computer resources and jobs and
- It monitors computer system activities

#### **5.4.1.1 Capabilities of Operating System**

##### **Multiprogramming**

The most important operating system capability for sharing computer resource is multi-programming. Multiprogramming is a method of executing two or more programs concurrently using the same computer. The CPU executes only one program but it can serve the input/output needs of others at the same time. Examples of multi-programming operating system are

##### **Multitasking**

Multitasking is the multi-programming capability of single-user operating system such as those for PC's. examples of multitasking operating system are Unix and Windows 2000.

##### **Multithreading**

Multithreading is the ability of an operating system to execute different parts of the same program simultaneously. Examples are Linux, Unix and Windows 2000.

##### **Virtual Storage**

Virtual storage splits up programs into small portions so that the main memory can be used more efficiently. Example is IBM OS390.

##### **Time Sharing**

Time sharing is an operating system capability that enables many users to share computer processing resources simultaneously by allocating each user a specific computing time.

##### **Multiprocessing**

Multiprocessing is an operating capability that links together two or more CPUs to work in parallel in a single computer system.

##### **Graphical User Interface(GUI)**

A GUI operating system contains graphics and icons and is commonly navigated by using a computer mouse. Example of GUI operating system are Windows 98 and Windows CE.

#### **5.4.1.2 Popular Operating Systems**

Popular operating system today are

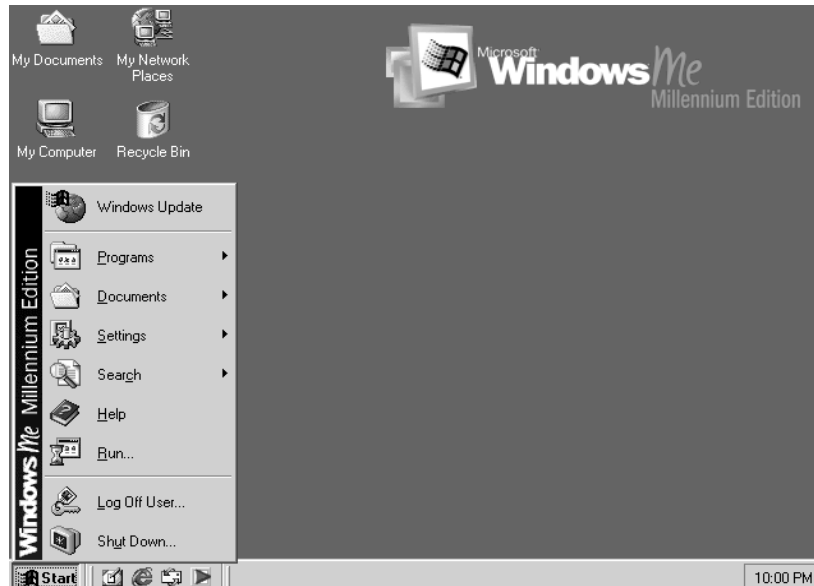
1. Microsoft Disk Operating System (MS-DOS) and  
Microsoft Windows Operating System (Windows)
2. UNIX
3. Linux
4. Mac OS X

##### **MS-DOS**

MS-DOS was the most widely used micro computer operating system. It is a single user, single tasking operating system. Microsoft was replacing its DOS with the Windows 95 operating system

### Windows Operating System

Features are graphical user interface multitasking, networking multimedia and other capabilities. Microsoft introduced enhanced versions like Windows NT,98, Windows Me (Millennium Edition) Windows XP and Windows 2000.(See Fig 5.2)



### Unix

Unix is offering many features like multi tasking multi user, network – managing operating system. Unix is used for all types of Computers like mainframes, midrange computers and Micro Computers.

### Linux

Linux is a low-cost, powerful and reliable operating system for network servers and Web servers in both the small and large networks.

### Macintosh Operating System

It is the operating system for the Mac and other Macintosh Micro computers. The features of Macintosh operating system are graphical user interface, multitasking and multimedia capabilities.

#### 5.4.2 Network Operating System

Unlike the operating systems such as DOS and Windows ,designed for single user to control one computer , Network operating systems co-ordinate the activities of multiple computers across the Network. Network operating system acts as director to keep the network running smoothly. Network operating systems provides the mechanism to integrate all the components of the network. It will also allows multiple users to simultaneously share resources irrespective of physical location. Some of Network operating systems are Apple Share, Novell Netware, Windows NT etc.

#### 5.4.3 System Utilities

Utilities or utility programs are designed to manage computers, resources and files. System utility programs provide a necessary addition to an operating systems basic system management tools.



Some are included in operating system software. Others are to be purchased separately and installed on computer. The following utilities are very essential to the system: File management, File finders, Backup utilities, Antivirus software, File compression utilities and Disk scanning utilities.

## 5.5 System Development Programs

### 5.5.1 Compiler

It is program translator that translates the instruction of a higher level language to machine language. It scans the entire program first and then translates it into machine code. The program written by the programmer in higher level language is called source program. After this program is converted to machine languages by the compiler is called object program.

A compiler can translate only those source programs, which have been written in that language.

### 5.5.2 Interpreter

An interpreter is another type of program translator used for translating higher-level language into machine language. It takes one statement of higher-level languages, translate it into machine language and immediately execute it. Translation and execution are carried out for each statement. It differs from compiler, which translate the entire source program into machine code. The advantage of interpreter compared to compiler is its fast response to changes in source program. Interpreter are easy to write and do not require large memory in computer.

### 5.5.3 Assemblers

Assemblers translates operation codes into machine code. They produce the object programs on disk. They will also indicate invalid source language instructions.

### 5.5.4 Simulators

Simulation has been one of the most useful and productive application of computer science. Simulators are programs developed to apply the process of simulation.

### 5.5.5 Programming Languages

Programming Languages are divided into

1. First Generation of Computer Language
2. Assembly Language
3. Third Generation Languages
4. Fourth Generation Languages

#### First Generation of Computer Language

The first generation of computer languages consisted of machine language, which requires the programmer to write all programs instructions in the 0s and 1s of binary code. Programming in machine language was very slow and tedious.

#### Assembly Language

Assembly Language is the next level of programming language. And it is considered to be "Second Generation" language. It is developed around 1950s and it is designed for a specific machine and specific microprocessors. The use of assembler languages requires language translator programs

called assembler that allow a computer to convert the instructions of such language into machine language.

### **Third Generation Languages**

Third Generation Languages also called as High level languages. Third generation languages specify instructions as brief statements that are more like natural language. Important third generation languages are FORTRAN, COBOL, C, BASIC and Pascal. A high level language is easier to learn and to program than an assembler language.

#### **FORTRAN(Formula Translator)**

FORTRAN was developed in 1956 for scientific and mathematical applications. It is exclusively useful in processing numeric data. It is used to express mathematical formulas. It can handle mathematical and logical expressions. Its statements are small and simple. Different types of business applications can be written in FORTRAN.

#### **COBOL(Common Business Oriented Language)**

It was developed in the early 1960s and designed for processing large files. It is machine independent. Its statements are like simple English and easily understandable. It can handle input/output operations.

#### **BASIC(Beginners All purpose Symbolic Instruction Code)**

BASIC was developed in 1964 and used primarily in education to teach programming. Basic is very easy to use. It is an interactive language. Current evolution of Basic is Visual Basic.

#### **PASCAL**

PASCAL was developed in the late 1960's and it is used in scientific and graphic applications. It is a structured programming language. It has extensive capabilities for graphic applications.

#### **C and C++**

C is a powerful programming language with tight control and efficient use of execution. It is portable across different microprocessors. C++ is an object-oriented version of the C programming language, and it is used for developing application software.

### **Fourth Generation Languages**

Most fourth generation languages are non-procedural languages to encourage users and programmers to specify the results they want.

Fourth generation language consists of a variety of software tools and they tend to be non-procedural than conventional programming languages. Non-procedural languages need only specify what has to be accomplished. Some of these non-procedural languages are natural languages.

There are seven categories of fourth generation languages query languages, report generation, graphic languages, application generation, very high-level programming languages, application software packages and PC tools.

## Query Languages

Query Languages are high level languages for retrieving data stored in database or files. The query may be expressed in the form of a sentence or near English command. SQL is a query language.

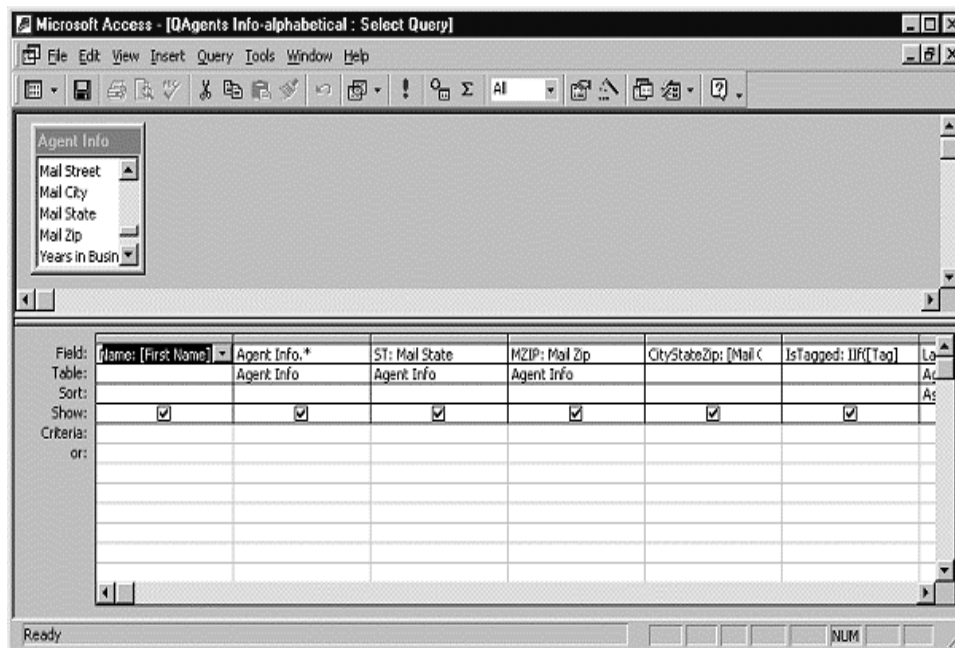


Fig 5.3

## Report Generations

Report Generations are software that creates customized reports. They extract data from files or databases and create reports in many formats. The report may be a printout or screen display.

## Graphic Languages

Graphic Language is a computer language that displays data from files or databases in graphic format.

## Application Generator

Application Generator is a software that can generate entire information system application. Programmers use application generators to help them create parts of other programs. FOCUS NOMAD are the software having application generator facility.

## Very High-level Programming Language

These are designed to generate program code with less instruction. It is used as a professional programmer productivity tool.

## 5.6. Application software

Application Software consists of programs that tell a computer how to produce information. Application software is primarily concerned with accomplishing the tasks of end users.

Some of the more commonly used packages are Word processing, Electronic spreadsheet, Database, Presentation graphics, Educations software etc.

Word processing allows users to easily create, change and produce attractive documents. Spreadsheets allow users to create tables and financial schedules. Graphical forms used to communicate or make a presentation of data to others such as clients and supervisor. Education and reference software is used to educate and entertain.

Application Software is designed to help people perform a certain type of work. The computer manufacturer or supplier may provide applications program. Most applications programs can work in conjunction with the appropriate systems programs.

## 5.7 Summary

Software refers to the set computer programs, procedures that govern the operation of computer system. Software is classified into System software and Application software. System software that consists of master set of programs that manage the basic operations of computer. System software coordinates all hardware components and application software programs. Application software such as word processing, spreadsheet, database management and graphic programs provides convenient tools for in creasing peoples productivity.

## 5.8 Keywords

System software

Application software

Operating system

Windows

Compiler

Interpreter

Assembler

Programing languages

## 5.9 Self Assessment Questions

1. Describe at least four different functions performed by an operating system.
2. How are interpreters different from compilers?
3. Describe the various types of Application Software.
4. Describe the common functions of System Software.
5. Name two versions of DOS that were popular during 1980s.
6. What is the palm OS?
7. Name some network operating systems.

## 5.10 References

1. [Http://www.jayettele12.ilous/99/intro2comp/intro.html](http://www.jayettele12.ilous/99/intro2comp/intro.html)
2. [Http://www.grasrootsdesign.com/intro/software.php](http://www.grasrootsdesign.com/intro/software.php)
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4. Peter Norton - "New Inside the PC" - Tata MC Graw Hill
5. Peter Norton - "Introduction to Computers" - Tata MC Graw Hill

## Lesson 6

# PC OPERATING SYSTEMS

### 6.0 Aims and Objectives

The aim of the lesson is to explain popular PC operating systems. Features and uses of operating systems are also highlighted in this lesson.

### Contents

- 6.1 Introduction
- 6.2 Functions of Operating System
- 6.3 Types of operating system
- 6.4 Services of an operating system
- 6.5 PC operating system
  - 6.5.1 MS-DOS
  - 6.5.2 Windows 95
  - 6.5.3 Windows 98
  - 6.5.4 Windows Me
  - 6.5.5 Windows 2000
  - 6.5.6 Windows XP
  - 6.5.7 Macintosh Operating System
  - 6.5.8 Unix Operating System
  - 6.5.9 Linux
  - 6.5.10 OS/2
  - 6.5.11 Windows CE
  - 6.5.12 Palm OS
- 6.6 Summary
- 6.7 Key words
- 6.8 Self-assessment Questions
- 6.9 References

### 6.1 Introduction

An operating system (OS) is a software program, and it is the computer's master control program, controlling the hardware and interacting with the user and application software. The operating system manages all the other programs that run on the PC, and it provides services such as file management, memory management and printing.

### 6.2 Functions of operating system

An operating system performs the following functions.

- Displays the on-screen elements with which users interact.

- Loads programs into the computer's memory so that the user can use them.
- Coordinates how programs work with the computers hardware and software.
- Manages the way information is stored and retrieved from disks.

### 6.3 Types of operating system

Operating system can be categorized into four major types.

1. Real - time operating system
2. Single user/single tasking operating system
3. Single user/Multi tasking system
4. Multi user/Multi tasking system

#### 1. Real – Time operating system

Real time operating is a very fast i.e. it responds to certain inputs extremely quickly. Real-time applications are needed to run medical diagnostics equipment, machinery, scientific instruments and industrial system.

#### 2. Single user / Single Tasking operating system

An operating system that allows a single user to perform just only one task at a time is called as single user / single tasking operating system.

#### 3. Single user / Multitasking operating system

An operating system that allows a single user to perform two or more functions at a time is called as single user multi-tasking operating system.

#### 4. Multi – user/ Multitasking operating systems

An multi user/multitasking operating system is an operating system that allows multiple users to use programs that are simultaneously running on a single network server.

### 6.4 Services of an operating system

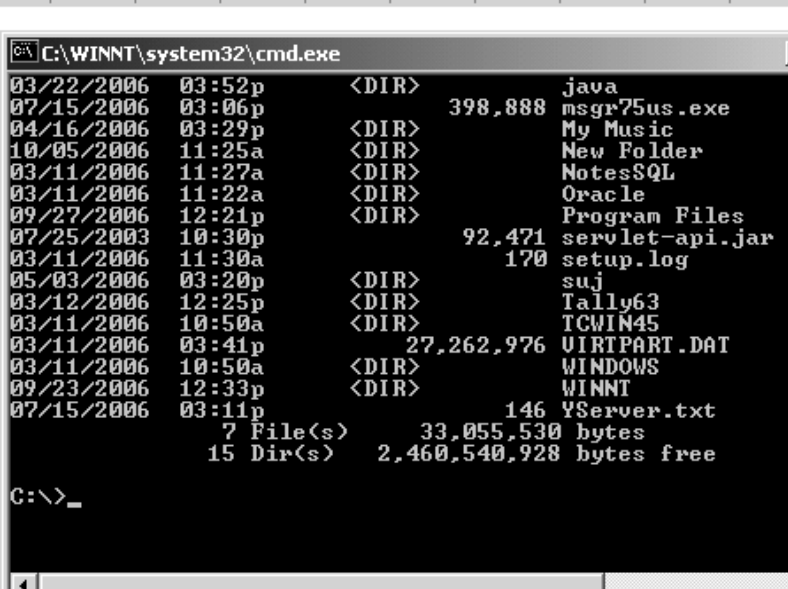
- The operating system provides a consistent interface between application programs and the user.
- It is the interface between those programs and other computer resources such as memory, printer and other resources.
- Saves the contents of files to the disk.
- Reads the contents of a file from disk into memory.
- Sends a document to the printer and activates the printer.
- Provides resources for copying or moving data from one document to another or from one program to another.
- Allocates RAM (Random Access Memory) among the running programs.

## 6.5 PC Operating Systems

PC software is based on specific operating systems and computer hardware. A software package written for one PC operating system cannot run on another. See Fig 6.1 shows the leading PC operating systems.

### 6.5.1 MS-DOS (Microsoft Disk Operating System)

MS-DOS was the most widely used micro computer operating system. DOS originally came into wide use in the 1980's with IBM PC – which came to be known as the first personal computer. DOS is a single user, single tasking operating system and it is given a graphical user interface and limited multitasking capabilities by combining it with MS-Windows. Microsoft began replacing its DOS/Windows combination in 1995 with the Windows operating system(See Figure 6.1)



```

C:\WINNT\system32>cmd.exe
03/22/2006 03:52p <DIR> java
07/15/2006 03:06p 398,888 msgr75us.exe
04/16/2006 03:29p <DIR> My Music
10/05/2006 11:25a <DIR> New Folder
03/11/2006 11:27a <DIR> NotesSQL
03/11/2006 11:22a <DIR> Oracle
09/27/2006 12:21p <DIR> Program Files
07/25/2003 10:30p 92,471 servlet-api.jar
03/11/2006 11:30a 170 setup.log
05/03/2006 03:20p <DIR> suj
03/12/2006 12:25p <DIR> Tally63
03/11/2006 10:50a <DIR> TCWIN45
03/11/2006 03:41p 27,262,976 UIRTPART.DAT
03/11/2006 10:50a <DIR> WINDOWS
09/23/2006 12:33p <DIR> WINNT
07/15/2006 03:11p 146 YServer.txt
7 File(s) 33,055,530 bytes
15 Dir(s) 2,460,540,928 bytes free

G:\>_
  
```

### 6.5.2 Windows 95

Windows 95 is a 32 bit operating system for personal computing. It has a redesigned graphical interface with multitasking, multithreading and network support. It has enhanced supports for action games, laptop computing and provides on-line help.(See fig 6.2)



Fig 6.2

### 6.5.3 Windows 98

Microsoft introduced an enhanced windows 98 version during 1998. It is the upgrade to Microsoft Windows 95. it has significant updates, fixes and support for new peripherals.

## Features

### Protection

Windows 98 includes additional protection for important files on your computer such as backing up your registry automatically.

**Improved support** Improved support for new devices such as AGP, DirectX, DVD, USB, MMX.

**FAT32** - Windows 98 has the capability of converting your drive to FAT32 without losing any information.

**Interface** :Users of Windows 95 and NT will enjoy the same easy interface.

**PnP** :Improved PnP support, to detect devices even better than Windows 95.

**Internet Explorer 4.0** : Included Internet Explorer 4.0.

**Customizable Taskbar** : Windows adds many nice new features to the taskbar which 95 and NT do not have.

**Includes Plus!** : Includes features only found in Microsoft Plus! free.

**Active Desktop**: Includes Active Desktop which allows for users to customize their desktop with the look of the Internet(See Fig 6.4).



Fig 6.3



#### 6.5.4. Windows Me(Millennium Edition)

Windows Me is a hybrid 16-bit/32-bit graphical operating system. Windows Me offers many improved features like multimedia capabilities, built-in support for digital video editing, and enhanced internet features. Windows Me introduced the System Restore logging and reversion system, which was meant to simplify trouble shooting and solving problems (See Fig 6.4).

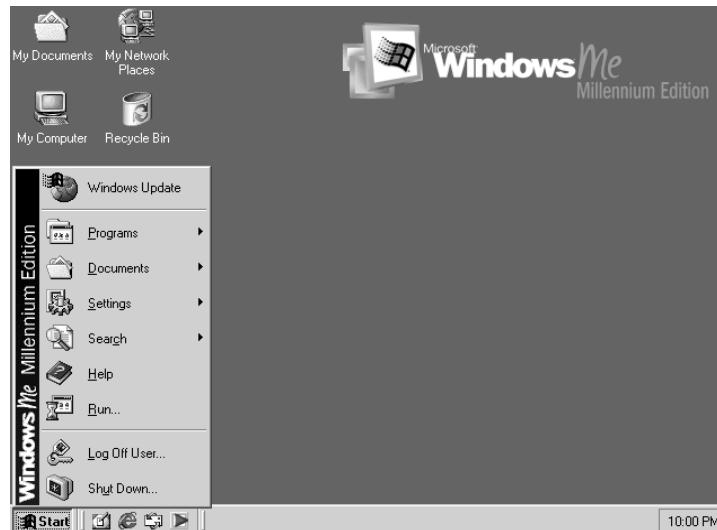


Fig 6.4

### Features

#### Universal Plug and Play

Windows Me was Microsoft's first operating system to introduce support for Universal Plug and Play, often shortened to UPnP.

#### Windows Image Acquisition

Windows Me also introduced the Windows Image Acquisition API for a standardized and officially supported method of allowing Windows applications to transparently and more easily communicate with image acquisition devices, such as digital cameras and scanners. Before Windows Me and the introduction of WIA, non-standard third party solutions were often common here, leading to incompatibility problems.

#### Automatic Updates

The Automatic Update utility automatically downloads and installs critical updates from the Windows Update Web site with little user interaction. It is set up to check Windows Update once every 24 hours by default.

#### 6.5.5 Windows 2000(Professional)

Released in 2000, it offers user friendly interface and features like file system, networking. Microsoft developed four version of Windows 2000. Windows 2000 professional for the desktop and three versions for network servers.

### 6.5.6 Windows XP

Windows XP, released in 2001 and features like. Digital media support, advanced networking and communication and advanced mobile computing. It has an improved user interface that makes using a computer easier and simplifies working with photo, video and music files. Windows XP is upgradeable from Windows 98/Me/2000 but will not support upgrades from Windows95, NT3.X or lower. The XP product line is tailored for different markets. Windows XP professional for business and power users and Windows XP Home Edition for general consumers. Windows XP has built in support for support for some major Indian languages that include Gujarati, Hindi, Kannada, Konkani, Marathi, Punjabi, Sanskrit, Tamil, Telugu and Urdu.



Fig 6.5

### 6.5.7 Macintosh Operating System

It works only on Macintosh systems. The Mac Os X is the latest operating system from Apple and it has a new graphical user interface and advanced multitasking and multimedia capabilities with tools(Internet services)

### 6.5.8 Unix for the Desktop

UNIX works on a wide range including super computers, mainframes, notebook PCs and mid range computers and microcomputers. UNIX is a interactive multitasking, multi-user, network managing operating system. UNIX has been popular for high-powered workstation. It is also a popular choice for web and other network servers. It is portable to different models of computer hardware. .(See fig 6.6)

```

Select C:\WINNT\system32\telnet.exe
lrwxrwxrwx 1 root root 35 Sep 24 1988
/5.0.5Eb/pmd/pmd
drwxr-xr-x 4 root sys 512 May 16 1998
-rw-r--r-- 1 root sys 0 Sep 22 2003
-rwx----- 1 root sys 77 Aug 22 2003
drwxr-xr-x 2 bin bin 512 Sep 24 1988
-rwxr-xr-x 1 root sys 507 Aug 18 2001
drwxr-xr-x 2 bin bin 512 Sep 24 1988
-rwx----- 1 root sys 32 Mar 10 2006
-rw-r--r-- 1 root sys 100 Mar 17 2006
-rw-r--r-- 1 root sys 32 Mar 1 2002
drwxr-xr-x 4 root bin 240 Jul 13 2005
-rw-r--r-- 1 root sys 106 Jul 27 2002
d--x--x--x 5 bin bin 512 Sep 24 1988
-rw-r--r-- 1 root sys 10 Jul 18 2005
-rwxrwxrwx 1 root sys 66 Sep 25 2005
drwxrwxrwt 3 sys sys 34816 Oct 10 16:20
-rw-r--r-- 1 root sys 4265 Aug 9 2002
drwxr-xr-x 5 root sys 512 Sep 24 1988

```

Fig 6.6

### 6.5.9 Linux for the Desktop

Linux is a low-cost, powerful and reliable operating system. Linux was developed as free or low cost shareware or open-source software over the Internet in the 1990 by Linus Torvald.

Linux is a full 32 bit, multitasking operating system that supports multiple users and multiple processors. Linux can work on any computer and support any type of application. Anyone can get a free copy of Linux on the Internet, and commercial version of Linux, which are

nexpensive when compared to the cost of others. Linux launched Multilingual Linux distribution 'LiFY' in 2003. It supports Bengali, Gujarati, Hindi, Kannada, and Tamil.

### 6.5.10 OS/2

OS/2 is a robust 32- bit operating system for powerful IBM Compatible PCs with Intel microprocessors. It supports multitasking, networking and very memory intensive applications. It is a very powerful operating system, supporting networking and Internet support, multi threading advanced multimedia and supports multiple users in networks and pen computing applications.

### 6.5.11 Windows CE

It is portable and compact operating system designed to run on small handheld computers, personal digital assistants, or wireless communication devices. Microsoft Windows CE 1.0 was originally released in 1996 to compete in the Palm Device Assistant category. Windows CE has many of the same features as Windows 95. In addition to the look of Windows 95, Windows CE also includes similar applications such as Pocket Excel, Pocket Word and Pocket Power. (See Fig 6.7)



Fig 6.7

## Windows Vista

Windows Vista is the latest version of Microsoft Windows. It can be used on personal computers, including home and business desktop, note book computers and media centers. It has an updated graphical user interface and visual style dubbed Windows Aero, improved searching features, new multimedia creation tools such as windows DVD Maker and completely redesigned networking, audio print and display sub system.

### 6.5.12 Palm OS

Palm OS is a compact operating system developed by Palm Source, Inc for personal digital assistants(PDAs). It is uniquely designed to be easy to use for the needs of today's mobile world.

## 6.6 Summary

Some Common Pc operating systems are MSDOS, Macintosh OS, Windows, and UNIX etc., MSDOS, Unix are Command Based operating systems. Windows and Macintosh, Linux are GUI based operating systems. Windows CE and Palm OS are used for small handheld computers.

## 6.6 Keywords

MSDOS

Macintosh

Windows

Windows Me

Windows Vista

Windows CE

Linux

Palm OS

## 6.8 Self-assessment Questions

1. Why is Operating System required for a computer?
2. What do you understand by the term multiprogramming?
3. Give an example of real time system.
4. What are characteristics of Windows 2000 Operating System?
5. Explain services of Operating System.
6. Which Operating System is used for PDA's.

## 6.9 References

1. [Http://www.jayettele12.ilous/99/intro2comp/intro.html](http://www.jayettele12.ilous/99/intro2comp/intro.html)
2. [Http://www.grasrootsdesign.com/intro/software.php](http://www.grasrootsdesign.com/intro/software.php)
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4. Peter Norton "New Inside the PC" – Tata MC Graw Hill
5. Peter Norton " Introduction to Computers" – Tata MC Graw Hill

## Lesson 7

# APPLICATION SOFTWARE

## 7.0 Aims and Objectives

This lesson explains the concept of software, distinguishes between different types of software, differentiates application software from system software, defines a language, and differentiates between different types of languages.

## Contents

- 7.1 Introduction
- 7.2 Types of Application Software
- 7.3 General Purpose Application software
  - 7.3.1 Word processing
  - 7.3.2 Spread sheets
  - 7.3.3 Database Management System
  - 7.3.4 Presentation Graphics
  - 7.3.5 E-mail Software
  - 7.3.6 Web browsers
  - 7.3.7 Personal Information Manager Software
  - 7.3.8 Desktop publishing
  - 7.3.9 Integrates software packages
  - 7.3.10 Groupware
  - 7.3.11 Instant Messaging
- 7.4 Application Specific Software
- 7.5 Summary
- 7.6 Keywords
- 7.7 Self Assessment Questions
- 7.8 References

## 7.1 Introduction

Software is a set of detailed instructions that control the operations of a computer system. The major types of software are system software and application software. System software manages the computer resources and mediates between application software and computer hardware. Application software describes the programs that are written for or by users to apply the computer to a specific task. Application software is primarily concerned with accomplishing the tasks of end users. Many different languages can be used to develop application software. Application software includes word processors, spreadsheets, database management systems and presentation programs. (See Fig 7.1)

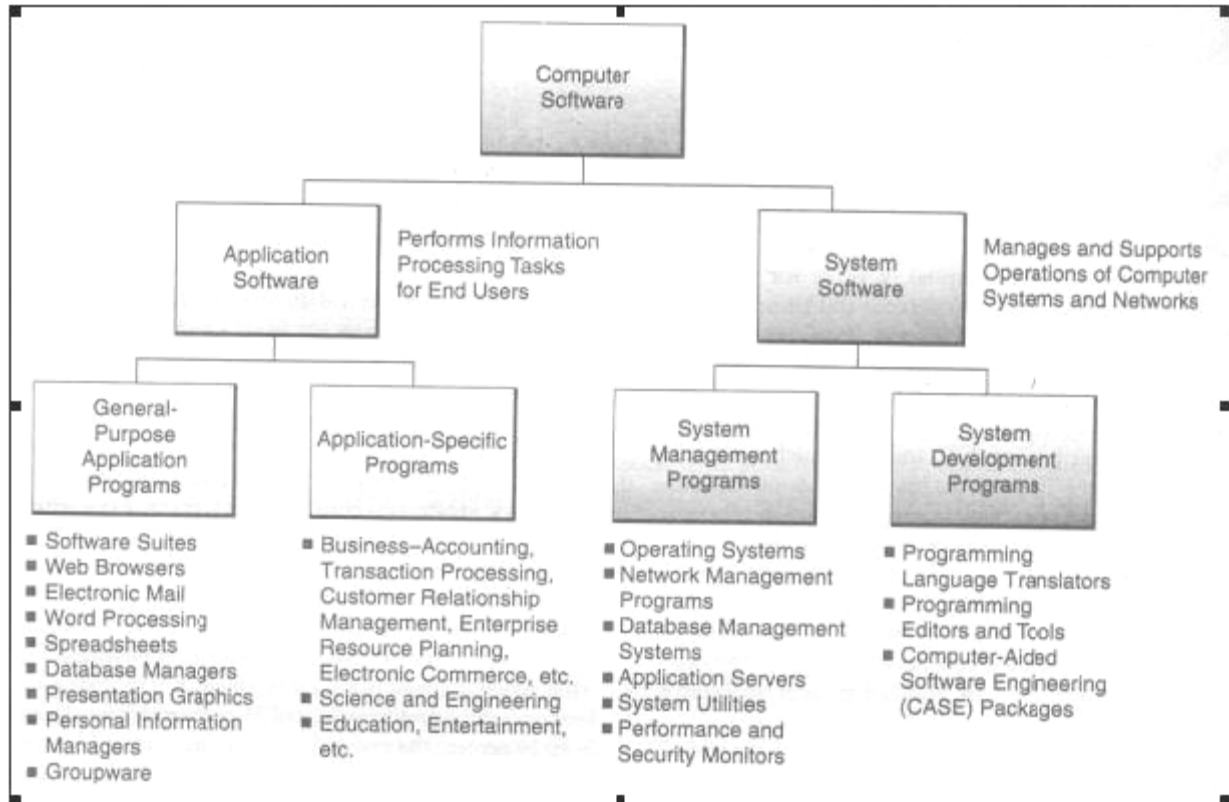


Fig 7.1

Source: Management Information Systems - James A. O'Brien

These are two basic types of application software.

1. Customized or proprietary software
2. Commercial Software

### Customized application software

Customized application software is developed to meet the specification of an organization/business. This software may be developed in-house by the company's own staff, or it may be contracted, or out sourced to a specialized vendor.

### Commercial Software

Application software is categorized according to its design and by the type of application or task it supports.

1. Large business systems (Packages)
2. Personal productivity tools/Office automation

Application in the business category are purchased or developed by the organization to support the organization wide operations of the company. Those in the office automation or personal productivity category are tools used to support the daily work activities of individuals and small groups. Business Information Systems are applications developed to perform organization wide operations. For example, payroll and tax accounting.

Productivity suites contain many of the most widely used applications and they often contain features that allow them to work together seamlessly. Productivity suites combine word processing, spread sheets, presentation graphics, and database software into one package. Many come with additional software components, such as desktop publishing software, a web browser, e-mail and personal information manager. Popular productivity suites are Microsoft's office, Lotus Smart Suite Corel work perfect office and Sun's star office.

## 7.2 Types Of Application Software

Application software includes a variety of programs that can further be subdivided into two categories:

1. General Purpose
2. Application specific

General purpose application programs are programs that perform information processing jobs for end users such as work processing programs, spread sheet programs, database management programs and graphics programs. Application specific software packages are available to support specific applications of end users in business and other fields such as software for science and engineering, research etc.

## 7.3 General Purpose Application Software

### 7.3.1 Word Processing

Word processing software is used to create and edit documents such as letters, memos and reports. Users can manipulate the text font, size and style. The software provides tools to create tables and simple diagrams. It can automatically correct for spelling and grammar. Word processing software can lead to significant productivity increases for business. The word processing software allows the user to make changes in the document electronically in memory, and this eliminates the need to retype an entire document. Top word processing packages like MS-Word, Word Perfect, Lotus, and Word Pro can provide a wide variety of printed documents with their desktop publishing capabilities. These packages can also convert all documents to HTML format for publication. (See Fig 7.2)

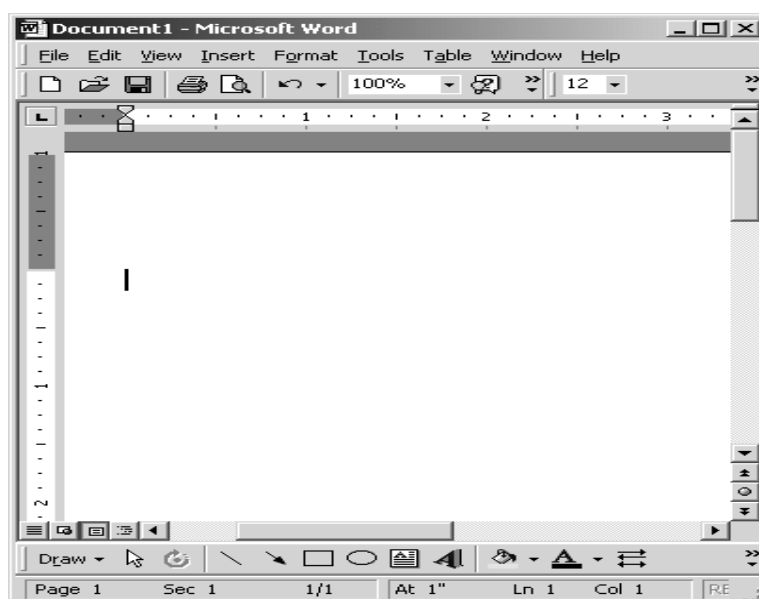


Fig 7.2

### 7.3.2 Spreadsheets

Electronic spreadsheet software provides computerized versions of traditional financial tools. An electronic spreadsheet is organized into a grid of column and rows. (See Fig 7.3 ). A user enters

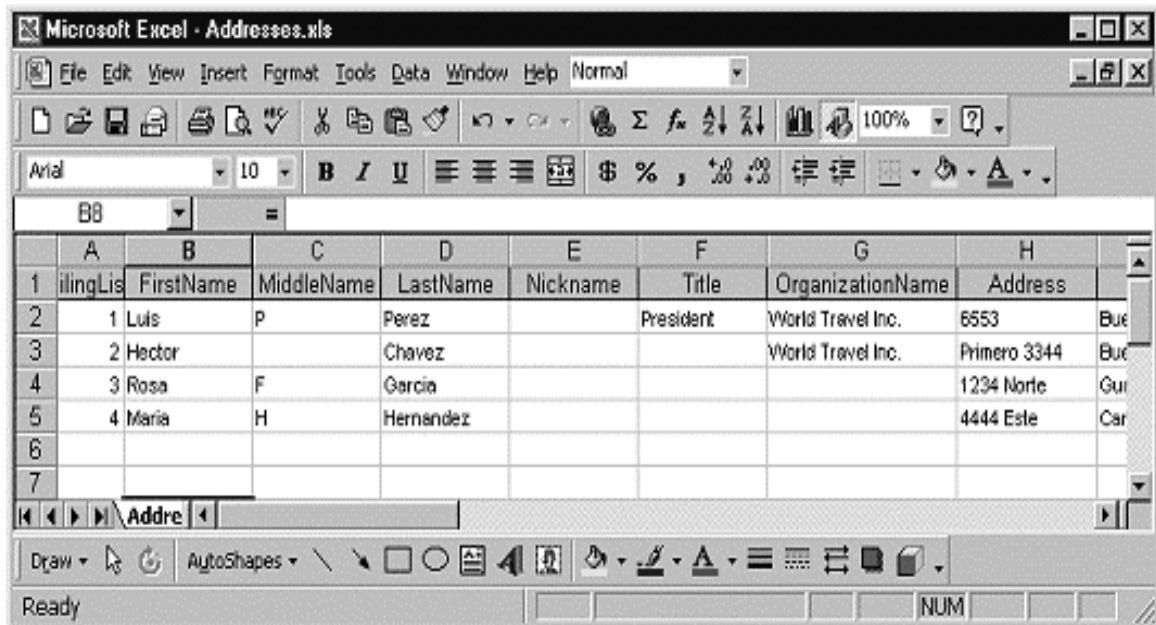


Fig 7.3

data at the intersection of a column and row. This intersection is called a cell. The most popular packages are Microsoft's Excel, Lotus 1-2-3, Corel's Quattro Pro and Star Office's Star calc. Many spreadsheet packages include graphic functions that can present data in the form of line graphs, bar graphs or pie charts.

Spreadsheet data can be text, but a spreadsheets primary use is to handle numeric data and mathematical formulas. The user can create his own formula or use one of the built-in-formulas that come with spreadsheet packages.

### 7.3.3 Database Management System

Data management software is more suitable for creating and manipulating lists and for combining information from different files. It has facilities for creating files and databases and for storing, modifying, manipulating data for reports and queries. Popular Data management software are Microsoft access, Lotus Approach, Sun's Starbase and Corels 'Paradox'.

Database management systems are at the heart of information system. Database software can access several files at one time. Databases allows user to select and display the data, sort the data, calculate and format the data. Database software allows you to query files and get answers. Businesses use DBMS to organize a collection of data, so that it is easily created, manipulated and retrieved by users(See Fig 7.4).



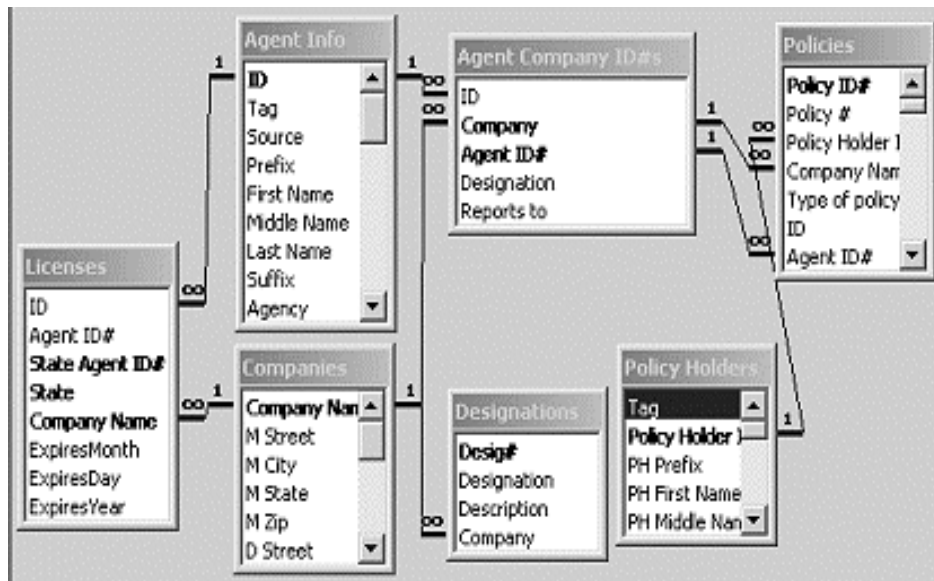


Fig 7.4

### 7.3.4 Presentation Graphics

Presentation graphics software allows users to create and present sophisticated multimedia presentations. This software can convert numeric data into charts and other types of graphics. This software generally contains the tools for making colorful electronic slides (See Fig 7.5) that can include text, sound animation and pictures. The user can then produce an electronic slide show to support his presentation. Popular presentation graphics packages are Microsoft PowerPoint, Lotus Freelance Graphics, and Sun's Star Impress and Aldus Persuasion.



Fig 7.5

### 7.3.5 E-mail Software

E-mail software is used for the computer to computer exchange of messages. It is also an important tool for communication and collaborative work. E-mail software typically includes an address book that stores frequently used e-mail addresses. Business use e-mail to communicate

and collaborate internally, as well as communicate with customers. (See Fig 7.6)



Fig 7.6

Millions of end users now depend on e-mail software to communicate with each other by sending and receiving electronic messages and file attachments via the internet or their organizations intranets or extranets. Free e-mail packages like Microsoft Hotmail and Netscape Web Mail are available to internet users from on line services and internet service providers.

### 7.3.6 Web Browsers

Web browsers are easy to use software tools for displaying web pages and for accessing the web and other Internet resources. The browser formats a page's content and provides the user simple navigation features such as a back button and an area to type a web address. Browsers can display or present graphics, audio, video information and text. The popular commercial web browsers are Microsoft's Internet Explorer and Netscape navigator. Their capabilities are E-mail, file transfer, on-line discussion groups, and bulletin boards, and other Internet services (See Fig 7.7). Web is a graphical user interface to the internet and provides users with a simple, consistent interface to a wide variety of information.

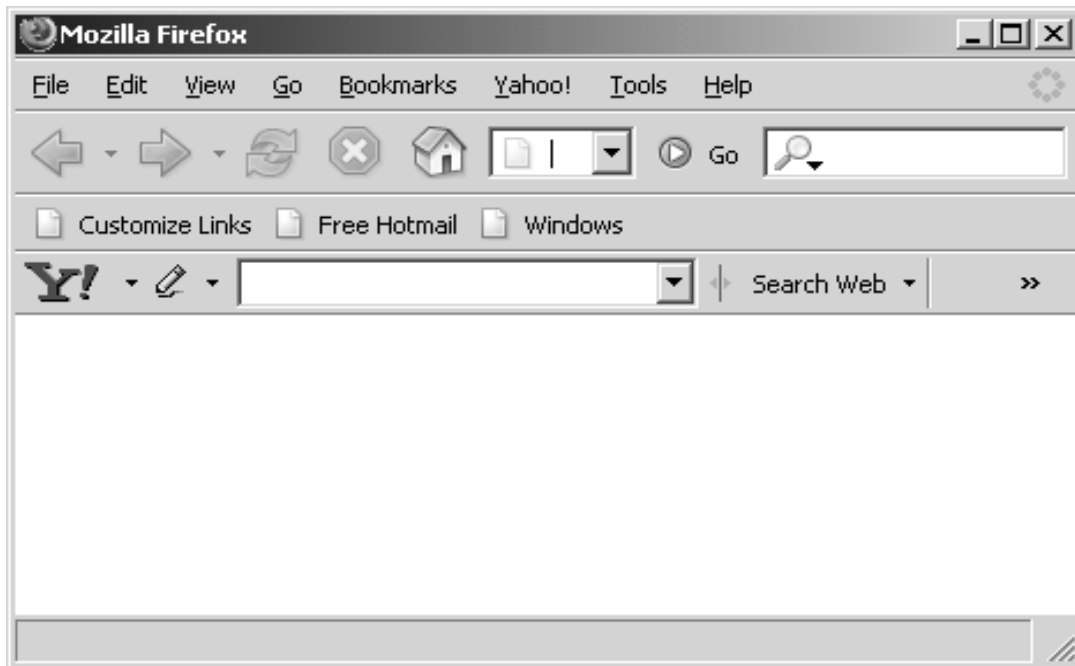


Fig 7.7

### 7.3.7 Personal Information Manager Software

Personal Information Manager Software is a popular software package for end user productivity and collaboration. It is a popular application for personal digital assistant devices. These are developed to help people organize their daily activities. PIMs such as Lotus organizer and Microsoft outlook help end users store, organize, and retrieve information about customer, clients, schedule and manage appointments and meetings. These PIMs provide functions such as an address book, calendar, and to-do list. Many PIMs can be run on a handheld computer and synchronized with information on a desktop system. These PIMs are sold as independent programs or are included in software suites. They are available and vary widely in their style, structure and features.

### 7.3.8 Desktop Publishing

Desktop publishing software is used to produce organization or end users own printed materials. Organizations/end users can design and print their own newsletters, brochures, manuals and books with several type styles, graphics, photos, and colors an each page. Word processing packages and desktop publishing packages like Adobe Page Maker and Quark X Press are used to do desktop publishing. DTP software has changed the print media and advertising industries.

### 7.3.9 Integrated Software Packages and Software Suites

Integrated software packages combine the functions of the most important PC software packages, such as word processing, spreadsheets, presentation graphics and data management. A software suite costs a lot less than the total cost of buying its individual packages separately. All programs/ software use a similar graphical user interface of icons, tools and status bars, menus and others, which gives them the same look and feel, and makes them easier to learn and use. The top four software suites are Ms-Office, Lotus SmartSuite, Corel world perfect office and Sun's Star Office.

### 7.3.10 Groupware

Groupware is collaboration software that helps workgroups and teams work together to accomplish group assignments. Groupware is a fast growing category of general purpose application software that combines a variety of software features and functions to facilitate collaboration. Groupware includes software for information sharing, electronic meetings, scheduling, and e-mail and a network to connect the members of the group.

Groupware products are Lotus Notes, Novell Group wise Microsoft Exchange, and Netscape communication support collaboration through e-mail, discussion groups and databases, scheduling, task management, data, audio and video conferencing. Groupware improves productivity of business Groupware allows users to co-ordinate and keep track of an ongoing project.

### 7.3.11 Instant Messaging

Instant messaging is an e-mail/computer conferencing technology that has become a standard method of electronic messaging for million of internet users world wide.

By using instant messaging, groups of business professionals or friends can send and receive electronic messages instantly and thus communicate and collaborate in real time. Messages popup instantly is an IM window on the computer screens of everyone who is part of your business workgroup friends circle. Instant messaging software can be downloaded. Popular instant messaging software are IM systems, including AOL's. Instant messenger and Yahoo manager, Gadu-Gadu, Qnext, Windows Live Messenger, ZX2C4 Instant Messenger, Skype, Google Talk, NET Messenger Service, Jabber, QQ, Excite/Pal iChat and ICO. Instant messaging typically boosts communication and allows easy collaboration. Communication via instant messaging can be less cost than communication via phone. Recently, many instant messaging services have begun to offer video conferencing features, voice Over IP (VoIP) and web conferencing services. (See Fig 7.8)



Fig 7.8

## 7.4 Application Specific Software

A software package is a prewritten pre-coded, commercially available set of programs that eliminates the need for individuals or organizations to write their own software programs for certain function. These packages are available for major business applications on mainframes, midrange computers and PC's. Some of the example of application software packages are ERP package, CAD, Library system, Tax accounting and Payroll.

**Accounting Software**

Accounting Software is computer software that records and process according business transactions like Account payable, Accounts Receivable etc. Ex. TALLY

**Education Software**

Educational software is designed for use in classrooms. This software is projected on whiteboard and simultaneously on a network of desktop computers in the classroom. NATO is a educational toolkit. It is a teaching package which consists of prepared power point presentations , background information documents, workshop questions, articles and games.

**CAD/CAM**

Computer Aided Design (CAD) programs used for designing product and structures. They help architects design building and engineers design cars, electronic devices, roadways, bridges. Some of CAD programs are Auto sketch, Corel CAD and Turbo CAD – CAD/CAM systems greatly enhances efficiency in many industries.

**Case Tools**

Case Tools provide automated graphics facilities for producing charts, E-R-diagrams, screens and report generators etc. it can facilitate creation of documentation and co-ordination of team development efforts. They will automate tedious portions of analysis and design. And also automate testing and controlling.

**7.6 Summary**

Programs that start up the computer and functions as the principal co-coordinator of all hardware components and application software programs. System software has many utility programs. Examples of utilities are data recovery, backup, virus protection and data compression. Application Software such as word processing, spread sheet database management or graphics provides confinement tools for increasing people's productivity operating system is system software that consists of master set of programs that manage the basic operations of computer.

**7.6 Keywords**

Word processing

Power point

Spread sheet

Presentation

Desktop publishing

Web browsers

**7.7 Self Assessment Questions**

1. Which software is used for word processing?
2. Name some packages used for desktop publishing.
3. What are the uses of spread sheets?
4. Explain the features of database management systems.

**7.8 References**

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## Lesson 8

# MULTIMEDIA AND ADVANCED COMPUTER APPLICATIONS

## 8.0 Aims and Objectives

The main objective of the lesson is to explain multimedia software and hardware, and to know about the applications of multimedia.

### Content

- 8.1 Introduction
- 8.2 Multimedia hardware
- 8.3 Multimedia Software
- 8.4 Multimedia applications
- 8.5 Advanced computer Applications
- 8.3 Summary
- 8.4 Keywords
- 8.5 Self Assessment Questions
- 8.6 References

## 8.1 Introduction

Multimedia is the integration of all sorts of media into one presentation. These media may include video, music, voice, graphics and text. Multimedia is widely used in business, education, home and for computer games. Business uses for product demonstration and web page design. An essential feature is user participation or interacting. In interactive multimedia, users can choose their own path through the presentation.

A multimedia presentation is organized as a series of related pages and they are linked or connected by button. Story boards are design tools to record the intended overall logic, flow and structure of multimedia presentation. Multimedia System has four basic Characteristics:

1. Multimedia systems must be Computer Controlled.
2. Multimedia systems are integrated
3. The information they handle must be represented digitally.
4. The interface to the final presentation of media is usually interactive.

## 8.2 Multimedia Hardware

Most of the today's PCs are equipped with the hardware needed for multimedia viewing, but multimedia production requires input devices for graphics, sound, photographs and video.

Paint programs are used to create bit-mapped pictures consisting of individual dots. Draw programs create vector graphics images composed of individually selectable objects. Bit-mapped graphics can be used for complex images. Vector graphics images can be sized without introducing

such distortions. Compression and decompression codes/schemes are needed for digitized audio and video files due to their very large size.

### Alternative Input and Output devices

Today many people use computers as stereos, televisions and game consoles. With the right input and output devices (See Fig 8.1) the computer can become a multimedia machine.

#### Music

Most of the computers have CD-ROM drive and speakers as standard equipments, allowing users to listen to music CDs. Musicians can connect their instruments and microphones to a computer and make it as a music studio.

#### Video

To handle digital video input, computers need special multimedia adapters that are either installed in the computer or connected to it through a cable. Users can connect the adapter to an antenna or cable Television system, allowing them to view television channels on the computer's monitor.

#### Game controllers

Various input devices such as joysticks, game pads and flight sticks can be added to a computer to turn it into a game console.

Many games that are available for popular television-based products such as play station are also available for personal computers.

The gaming experience can be enhanced further through the use of force feedback and virtual reality devices. In addition to its use in computer games, medical colleges use force feedback to teach proper surgical techniques, force feedback is also used in auto industry. It can allow the driver full control over environmental elements in the car such as the temperature, stereo, navigation system and phone.









Multimedia Device	Picture	Application
Speakers		Outputs sound, such as music
Digital camera		Takes pictures, which can be stored and edited on a computer
Camcorder		Captures video, which can be stored and edited on a computer
Scanner		Copies paper documents and pictures into a computer
TV		Displays computer output
Game pad		Controls computer games
Microphone		Enters voice commands or sound files on a computer
Joystick		Controls computer games

Fig 8.1

### Virtual Reality

Virtual reality is an artificial environment created within a computer. This can be used in the military, in computer games, in architecture and in medical training. A virtual reality system uses special input, output devices to create its illusion. User wear a head mounted display(HMD). The HMD houses some computer screens that cover the users eyes. The HMD rapidly displays alternating images to each eye, producing the illusion of three dimension. A common input device in virtual reality system is the data glove. A data glove is an input device that looks and is worn like a regular glove, but with wires that go from it to a computer(See Fig 8.2).



Fig 8.2

The data glove allows any hand movement the user makes to be copied by the computer in the virtual world. For example, when the doctor begins the virtual operation, the image of his/her hand in the HMD will mimic exactly what the doctor is actually doing. Another use of virtual reality is to treat people suffer from phobias. Some hospitals are using virtual reality as a pain control mechanism.

### Voice Recognition

Another new type of input device which is especially helpful to the disabled and is now becoming widely used is voice recognition. Voice recognition systems are combination of hardware such as a microphone, and software that convert spoken words into text that a computer can understand, such as a word processing document. When the user speaks into the microphone, the software converts the spoken words into text input. Users have to train the system to learn their voice, accent, and intonation. Voice recognition is particularly useful to people who have limited use of their hands, such as those who are paralyzed or suffering from multiple sclerosis.

### Text to speech

Text to speech systems convert computer text into speech. A text file is sent through special software that converts it into spoken words, which are output through speakers. Blind people use text to speech systems to listen to computer based document. People who cannot talk, like the famous cosmologist Stephen Hawking, use text-to-speech systems to choose the words and have their computer speak for them.

### Brain Wave Input

Brian wave input systems use electrical signals from the brain as an input method. By using bio feedback technique, users can learn how to control certain types of brain waves. A computer translates the brain wave activity into the same action on the computer.



### 8.3 Multimedia Software

Multimedia software includes applications that can play music as well as display images and movies. Microsoft's Windows Media Player is the best example. The advertising and entertainment industries are among the most active users of multimedia software. In addition to play back and viewing, some software package help users create music, images and movies.

### 8.4 Multimedia Applications

Multimedia is used for any computer application because graphics, sounds, animation and video can often do a more effective interaction than text alone. It is a prerequisite for computer games of all kinds. Today, it is also used in computer based education and computer based training. In business, multimedia is used as information kiosks for public information.

The processing, input, output and storage technologies can be used to create multimedia applications that integrate sound and full-motion video, or animation with graphics and text into a computer based application. Multimedia is becoming the base for new consumer products and services, such as electronic books and newspaper, electronic class room presentation, full-motion video conferencing, imaging, graphics design tools, and video and voice mail . PCs today available with built an multimedia capabilities, including high resolution color monitor, CD-ROM drives or DVD drives to store video, audio and graphic data, and stereo speaker for amplifying audio output. Some of Multimedia applications are World wide web, videoconferencing ,Interactive TV, Virtu

#### Graphics Suites

A graphic suite is a collection of individual graphics programs. Graphics suites combine image editing, illustration, page layout, Web design, and typography functionality in one package. They can be multiple programs bundled together and sold at a discount, or a single application combining all these functions. Buying a graphics suite is a good way to save money and streamline workflow. These suites are all available for both Macintosh and Windows. Popular Image editing software are Adobe Creative Suite 2, Macromedia Studio 8.

#### Virtual Reality

Virtual Reality creates computer generated simulated environments and it consists of interactive sensory equipment to simulate alternative realities to the physical world. Virtual Reality is a technology that allows to explore and manipulate computer-generated, 3-dimensional, multimedia environments in real time.

There are two main types of virtual reality environments. Desktop virtual reality environments are presented on an ordinary computer screen and are usually explored by keyboard, mouse, wand, joystick, or touch screen. Web-based "virtual tours" are an example of a commonly available desktop virtual reality format. Total immersion virtual reality environments are presented on multiple, room-size screens or through a stereoscopic, head-mounted display unit. Additional specialized equipment such as a Data Glove enables the participant to interact with the virtual environment through normal body movements. Sensors on the head unit and Data Glove track the viewer's movements during exploration and provide feedback that is used to revise the display enabling real-time, fluid interactivity. Examples of virtual reality environments are a virtual solar system that enables users to fly through space and observe objects from any angle, a virtual science experiment that simulates the growth of microorganisms under different conditions,

**Virtual reality modeling language**

Virtual reality modeling language is used to create real-time virtual reality applications on the web. Virtual reality began in the 70s, with technologists researching the production of animated computer images, complete with color, texture, and changing spatial conditions, identical to the experience in real life. Researchers now are able to use systems for users to experience a “simulated” three-dimensional reality. This experience is vital for flight simulators used by pilots for flight training, along with distance control of robots, and limb retraining for stroke victims. Participants done headgear, gloves, and full body suits, connected by electric wires to a computer system, which holds all the virtual reality information.

**VR Authoring programs**

VR Authoring programs use VRML and are used to create web based virtual reality applications.

**Artificial Intelligence**

Artificial Intelligence is a research field to develop computer systems that stimulate human thought processes and action. Two users are knowledge based systems and robotics. The goal of Artificial Intelligence is to develop computer that can think as well as see hear, walk, talk and feel. Artificial Intelligence can be used to develop vision systems, Robotics, Pattern reorganization systems, natural language processors and expert systems. Artificial Intelligence development is started with programs assisting chess players. Artificial Intelligence machines can do things formally possible only with human effort; natural language processing could reduce barriers to human/ computer communications.

**Knowledge based(Expert) Systems**

Knowledge based(Expert) Systems are programs that duplicate the knowledge humans have for performing specialized tasks.

**Expert Systems**

Expert Systems provide advice to users who would normally rely on human experts. Knowledge bases contain specific facts and rules to relate to these facts. Fuzzy logic is used to allow human like input and output. An Expert System is a computer based information system. In this system knowledge is represented as data. Expert systems can be used to solve complex problems. These systems were aimed at replicating the abilities of human experts. Expert System gives training, provides experience. It can also be used as tutor, consultant.

**Robotics**

Robotics are computer controlled machines that mimic the motor activity of humans.

Three types are

- Industrial robots – widely used in factors
- Perception systems – simulate human senses
- Mobile robots – Acts as transporters

All robots are preprogrammed. Robot is automatic device. In future it may as small as a tablet or capsule. Doctors use pencil size robots to perform complex operation. Robots may also act as a servant and companion as well.

**Project Management**

A project can be defined as one-time operation composed of several tasks that must be completed during a stated period of time. Project management is a program used to plan , schedule and control , resources like people , costs and equipment. The software provides schedules for a particular task. Examples of project management software are Harvard Project Manager, Microsoft Project for Windows , Project Scheduler 4 , Super Project and Time Line.

### **Project Mangers**

Project Managers are programs designed to assist in the placing, scheduling, and controlling of people, resources and costs of a project. The important tools are Gantt and PERT charts.

### **8.3 Summary**

Multimedia presents information in more than one medium including text graphics, animation, video and voice. Multimedia used in business, education to improve the way information is communicated. Computers also used in web authoring, graphics programs, virtual reality, artificial intelligence and project management.

### **8.4 Keywords**

Multimedia hardware

Multimedia software

Voice reorganization

Virtual reality

Game controllers

Expert system

Artificial intelligence

Project Management systems

### **8.5 Self – Assessment Questions**

1. What are the Multimedia features?
2. List out the Multimedia hardware.
3. List out the Multimedia software.
4. What are the Multimedia applications?
5. What is need of Expert systems?

### **8.6 References**

1. Teach yourself Computer Basics in 24hours - Sams
2. Peter Norton - "New Inside the PC" - Tata MC Graw Hill
3. Peter Norton - "Introduction to Computers" - Tata MC Graw Hill

## Lesson 9

# NETWORKS

## 9.0 Aims and Objectives

The aim of the lesson is to provide the knowledge of the advantages of networks and to explain the types of networks.

## Contents

- 9.1 Introduction
- 9.2 Advantages of Networking
- 9.3 Types of Network
  - 9.3.1 Local Area Network
  - 9.3.2 Wide Area Network
  - 9.3.3 Hybrid Network
- 9.4 Models of Network
  - 9.4.1 Server-Based Network
  - 9.4.2 Client/Server Network
  - 9.4.3 Peer to Peer Network
- 9.5 Network Topologies
- 9.6 Network Media
  - 9.6.1 Wire Base Media
  - 9.6.2 Wire Less Media
- 9.7 Network Software
- 9.8 Summary
- 9.9 Keywords
- 9.10 Self-Assessment Questions
- 9.11 References

## 9.1 Introduction

A computer network links two or more computers so that they can exchange data and share resources. A network is a set of technologies –including hardware, software and media. Networks allow many users to access shared data and programs simultaneously. Most of the networks are built around a central computer called a server, which provides storage and other resources that users can share.

## 9.2 Advantages of Networking

### Sharing Files

Networks allows to share information with other computers on the network. One can easily send the file from his computer to any computer.

### **Sharing Resources**

Using networks we can share resources like disk drive or printer. All the computers on the network can access those resources. One can also share CD ROM drives, modem on his network.

### **Sharing programs**

Instead of keeping separate copies programs on each personal computer, we can keep all the needed programs on shared disk. All the users on the network can use those programs.

### **Communication**

Networks provide better communication like e-mail and groupware applications

## **9.3 Types of Networks**

Computer networks fall into three categories

1. Local Area Networks(LANs)
2. Wide Area Networks (WANs)
3. Hybrid Network

### **9.3.1 Local Area Networks(LANs)**

Local Area Networks are used to link offices and buildings in closer proximity. LANs are used to connect PCs in an office to shared printers and other resources or to link computers. The network gateway connects the LAN to public network. LAN technology consists of cabling (twisted line, coaxial or fiber-optic cable) or wireless technology that links computer devices, network interface cards and software to connect LAN activities(See Fig 9.1) LANs can transfer data at 10 Mbps and speeds of 100 Mbps.

### **9.3.2 Wide Area Networks(WANs)**

Wide Area Network(WANs) span a broad geographical distance, ranging from several miles to continents and are private networks that are independently managed. WANs may consist of a combination of switched and dedicated lines, microwave and satellite communications. Typically a Wide Area Network (WAN) is two or more LANs connected together, generally across a wide geographical area.

### **9.3.3 Hybrid Network**

Between the LAN and WAN we can find hybrid networks such as

1. Campus Area Networks
2. Metropolitan Area Network
3. Intranets and Extranets

### **Campus Area Network(CANs)**

A campus area network can connect different campus offices and organizations. CAN follows the same principles as a local area network only on a larger and more diversified scale.

**Metropolitan Area Network(MANs)**

MAN is a large scale network that connects multiple corporate LANs together. MANs also can provide a shared connection to other networks using a WAN link.

**Intranet**

Intranets are private networks within an organization. They provide e-mail, mailing lists, newsgroups, and FTP services accessible only to those within the organization.

**Extranet**

Extranets are private networks connecting organizations. They are used to connect suppliers and producers.

**9.4 Models of Network**

Networks can be categorized by the roles the servers and PCs play in terms of hierarchical and security interaction.

**9.4.1 Server-Based Network**

Server based networks connect many nodes and one or more servers, which control user access to the network's resources. A node is a processing location that can be a PC or some other device. The central computer is known as a file server, network server, or application server. Files and programs used by more than one user are often stored on the server.

**9.4.2 Client/Server Network**

In a client/server network, nodes and the server share the storage and processing work. In a client/server network, end-user PCs or NI workstations are called the clients. They are connected by local area network and share application processing with network servers, which also manage the network (See Fig 9.1). A server is a powerful computer with a fast processor and a lot of memory. It is capable of handling simultaneous requests from clients.

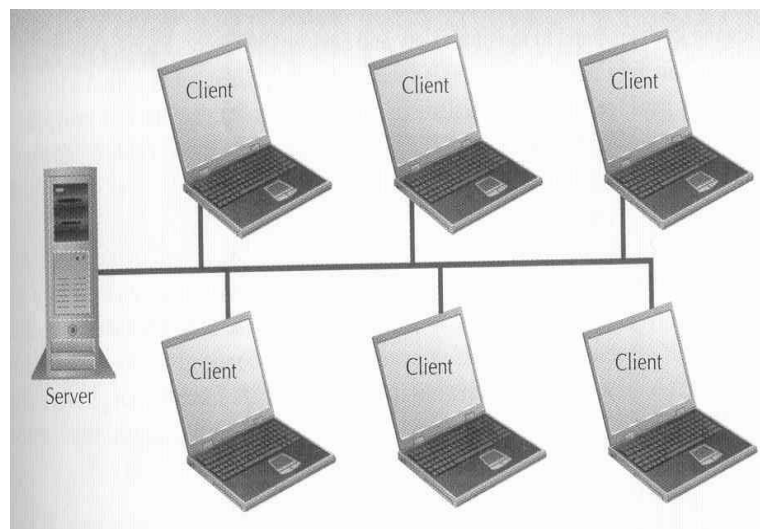


Fig 9.1

### 9.4.3 Peer-to-Peer

A Peer to Peer network is a small network and users can share all the files and resources on all the networks nodes. All computers are clients and servers. Any computer in the network is capable of sharing resources. But it is not powerful as dedicated servers (See Fig 9.2).

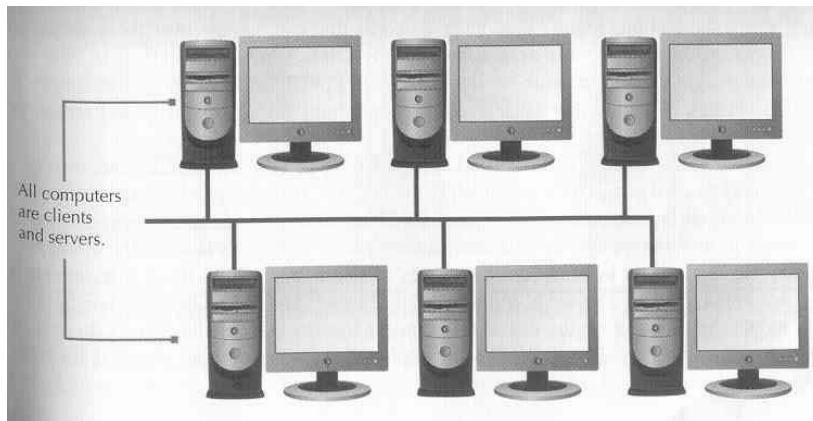


Fig 9.2

## 9.5 Network Topologies

An important feature of any LAN is its topology. Topology is the logical layout of the cables and devices that connects the nodes of the network. The three common network topologies are the star network, the bus network and the ring network.

### Star Network

The star network consists of a central host computer connected to a number of smaller computers or terminals. All communication must pass through a central computer (See Fig 9.3)

Fig 9.3

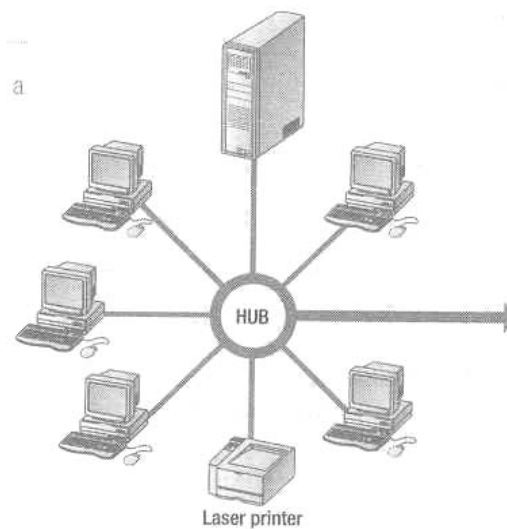


Fig 9.3

**Bus Network**

The bus network links a number of devices to a single channel and broadcasts all of the signals to the entire network (See Fig 9.4)

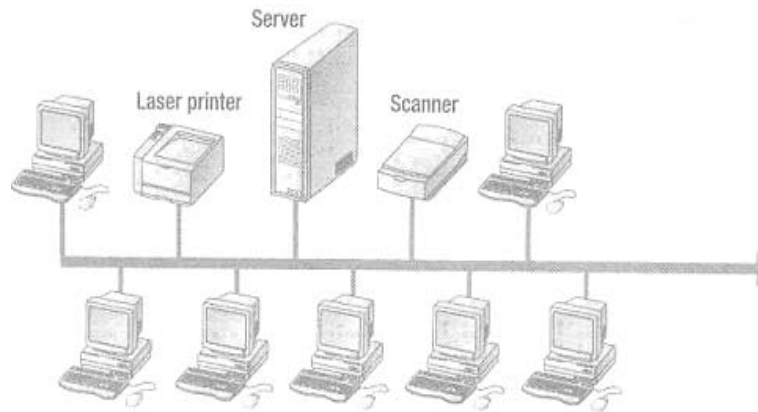


Fig 9.4

**Ring Network**

In a ring network each computer in the network can communicate directly with any other computer. Data is passed along the ring from one computer to another (See Fig 9.5).

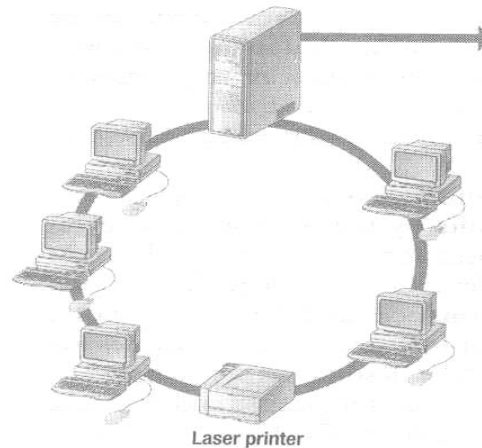


Fig 9.5

**9.6 Network Media**

In the context of networks, media refers to the wires, cables, and other means used to link a network's nodes together. There are many types of transmission media, the most popular are

1. Twisted pair wire
2. Coaxial Cable
3. Fiber Optic Cable
4. Wireless links



### 9.6.1 Wire Based Media/Cable Media

Wire based media physically link computers and other devices in a network. The most common forms are Twisted-pair, Coaxial and Fiber optic.

#### Twisted Pair Cable

Twisted Pair Cable is made of two or more parts of insulated copper wires twisted together (See Fig 9.6). The cable may be unshielded or shielded. These links are used in established communications networks throughout the world for both voice and data transmission.

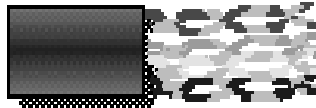


Fig 9.6

#### Coaxial Cable

Coaxial cable contains a solid inner copper conductor, surrounded by plastic insulation and an outer braided copper or foil shield. (See Fig 9.7) they allow high speed data transmission and are used in high service metropolitan cities, for cable TV system and for short distance Fig 9.7 connection of computers and peripheral devices.

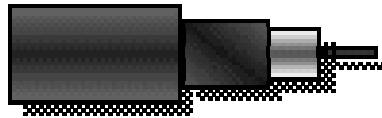


Fig 9.7

#### Fiber Optic Cable

Fiber optic cable is made of a light conducting glass or plastic core, surrounded by more glass called cladding and a tough outer sheath. Fiber optic cables provide substantial size and weight reduction as well as increased speed and greater carrying capacity.(See Fig 9.8)

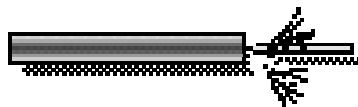


Fig 9.8

### 9.6.2 Wireless Media

Wireless media transmit and receive electromagnetic signals using methods such as infrared link of sight, high frequency radio and microwave systems.(See Fig 9.9)

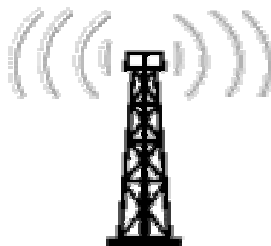


Fig 9.9

**Infrared link of sight**

Infrared line of sight uses high frequency light waves to transmit data on an unobstructed path between nodes on a network. The remote controls for most audio/visual equipment such as TV, Stereo and other electronic equipment use infrared light.

**High Frequency Radio**

Signals can transmit data at rates of up to 11 Mbps to network nodes from 122 up to approximately 40 kilometers. Most police departments use high frequency radio signals that enable police vehicles to communicate with each other.

**Microwave**

Microwave transmission is a high-frequency radio signal sent through the air using either terrestrial systems or satellite systems.

**Terrestrial**

Terrestrial Microwave uses antennas that require an unobstructed path or line of sight between nodes. These systems are used to connect buildings.

**Satellite Microwave**

Satellite Microwave uses a relay station that transfers signals between antennas located on earth and satellites orbiting the earth.

## 9.7 Network Software

Network Software handles two main tasks. One is network operating system other one is network management and monitoring system. Network Software allows computers and other devices to communicate with network.

**Network management software**

Network management software helps network administrator. This software helps network administrators ensure the security of their network. Some software monitors network performance and helps administrators reconfigure the network.

Recent development in network management is push technology. With this technology network management software automatically install new software and software upgrades from central server to all computer on a network. Packet sniffers and keystroke monitors are used to monitor network performance, data transfers and key strokes of users.

Network communications functions are handled by separate network operating system. Some communication functions are included in regular operating system. Business network administrators need separate network software.

**Network Operating Systems****Netware**

It was developed by Novell in 1980. It is most popular network operating system. Netware provide a shell around the operating system. Network Software allows sharing resources in the network.

**Windows NT**

Windows NT provides same interface as Windows 95 or 98, and is a multitasking, multiprocessing operating system. It has built in support for large networks. Windows NT is multi user system. It can support up to 32 processors.

**Unix**

Unix is multiprogramming and multi tasking operating system. Due to its versatility and popularity in a academia, Unix become the most widely used operating system on the early Internet.

**Linux**

Linux is both computer operating and network operating system Linux is ideal for users needing to maintain web server or network server from PC at low cost. It allows users to develop their own applications. Linux has ample power to run many windows based applications.

**9.8 Summary**

Networks are useful for sharing data and programs. The different types of network topologies are star , ring, and bus networks. According to area and distance covered by networks , they are classified into LAN, WAN,MAN, Internet.

**9.9 Keywords**

Local Area Network

Wide Area Network

Hybrid Network

Topology

Star Network

Bus Network

Ring Network

Intranet

Extranet

**9.10 Self Assessment Questions**

1. List three benefits of using a Network.
2. Explain Network Topologies.
3. Name two common Network medias.
4. What is the difference between Intranet and Internet?
5. What is a Local Area Network?
6. Give some examples of computer networks and applications.
7. Describe software used in networks.

**9.11 References**

1. [Http://www.computerhope.com/os/htm](http://www.computerhope.com/os/htm)
2. "Teach yourself Computer Basics in 24hours" - Sams
3. Peter Norton - "New Inside the PC" – Tata MC Graw Hill
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## Lesson 10

# CONNECTIVITY AND COMMUNICATION DEVICES

## 10.0 Aim and Objectives

The aim of this lesson is to know the connectivity options and models of transmission. It also explains the requirements of devices for communication.

## Contents

- 10.1 Introduction
- 10.2 Options of connectivity
- 10.3 Data Transmission
- 10.4 Models of Connectivity for Networks
- 10.5 Models of data transmission
- 10.6 Communication devices
- 10.7 Summary
- 10.8 Key Words
- 10.9 Self Assessment Questions
- 10.10 References

## 10.1 Introduction

The telecommunications revolution is changing the way we live and work, and how we communicate with each other. People in organization around the world are finding that telecommunications and networks are highly effective tools for communications, coordination and collaboration. Telecommunication refers to the transmission of all forms of information, including digital data, voice, fax, sound, and video, from one location to another over networks.

A network is a set of technologies including hardware, software and media that can be used to connect computers together, enabling them to communicate, exchange information and share sources in real time connectivity is the act of linking computers to other electronic devices through communication systems to share access to information and data.

## 10.2 Options of connectivity

Options of connectivity available to users are

1. Fax Machines
2. E-mail
3. Voice Messaging systems
4. Video conferencing systems
5. Shared resources
6. Online services

**Fax Machines** (Facsimile Transmission Machines)

Fax Machines are essential in all most all offices/business. Fax machines scan the image of a document and convert the image to signals that can be sent over a telephone to a receiving machine.(See Fig 10.1). A Fax may be sent by a dedicated fax machine, which scans paper documents, or by fax modem, a circuit board inside the computer. The message then travels over a communication link, usually a phone line, to a receiving computer or fax machine.



Fig 10.1

**E-mail (Electronic Mail)**

E-mail is a way of sending an electronic letter message between individuals or computers. E-mail can contain text, graphics and images as well a s sound. E-mail can also be used to communicate with more than one person at a time, to conveniently schedule meetings, to keep contact on important events. Today, it is widely used by all. E-mail link computers by wired or wireless connections and allows users, through their keyboards and the use of a user ID, to post messages and to read responses on their display screens.

**Voice Messaging Systems**

Voice mail digitizes incoming voice messages and stores them in the recipient “voice mail box” is digitized form. It then convert the digitized versions back to voice messages.

They can receive large number of incoming calls and route them to the “voice mail boxes”. They can also deliver the same message to many people. These systems allow callers to leave “voice mail” – recorded voice message even forward calls to any place, if you wish.

**Video-conferencing**

Video conferencing is the use of television video and sound technology as well as computers to enable people in different locations to see, hear and talk with one another.

In video conferencing, meetings are conducted among people who are dispersed, using a communication link.

Video conferencing is an enterprise collaboration tool that enables real-time video/audio conferences among

1. Networked PC's known as desktop video conferencing
2. Network conference room or auditorium in different location, called tele conferencing.

Tele conferencing is an important form of enterprise collaboration sessions are held in real time, with major participants being televised while participants at remote sites may only take part with voice input of questions and responses (See Fig 10.2).

Desktop video conferencing can now take place over the internet, intranet, extranet as well as public telephone and other networks.



Fig 10.2

### Shared Resources

An important aspect of connectivity is allowing microcomputer users share expensive hardware. Another important aspect of connectivity is the ability to share data. The data might be stored on your computers hard disk or might be located any where.

Group members work together and share the task of drafting then review and revise each other's work with the help of connectivity.

### Online Services

Online services provide a variety

1. Teleshopping
2. Home Banking
3. Investing
4. Travel Reservation
5. Internet Access

## 10.3 Data Transmission

Several technical matters affect data communication. They are bandwidth serial versus parallel transmission, direction of flow modes of transmission and protocols.

### Bandwidth

Bandwidth is the bits-per-second transmission capability of channels. The speed and capacity of data transmission rates are measured in bits per second(BPS).

Bandwidth may be of three types:

### Voice band

Voice band is the bandwidth of a telephone line and used for micro computer transmission.

### Medium band

The medium band is the bandwidth of special leased lines used mainly with mini computers and mainframe computers.

## Broadband

Broadband includes microwave, satellite, coaxial cable and fiber optic channels. It is used for high speed computer.

## Direction of Data Transmission

There are three modes of data flow in a data communication system.

### Simplex Communication

Under simplex communication system data only travel in one direction only. (See Fig 10.3). The simplex mode is not frequently used in data communication system today.

### Half duplex Communication

In half-duplex communication data can travel in either direction, but not simultaneously i.e, data flows in only one direction at any one time(See Fig 10.3). Half-duplex is frequently used for linking micro computers by telephone lines to other micro computers.

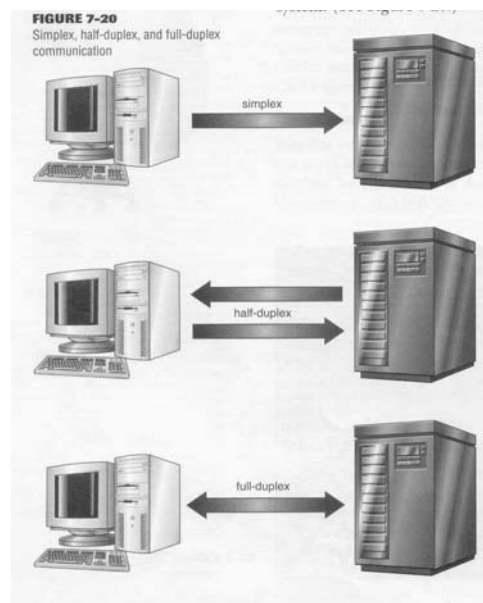


Fig 10.3

### Full duplex Communication

In full duplex communication data is transmitted in both directions at one (See Fig 10.3). It has been widely used for mainframes and now, it is becoming a standard mode for micro computers also. It is the fastest and most efficient form of two-way communication.

## Protocols

Protocols for data transmission to be successful sender and receiver must follow a set of communication rules for the exchange of information. A protocol is an accepted format for transmitting data between two devices. The International Standards Organization has defined a set of communication protocols called the Open Systems Interconnection(OSI).

## 10.4 Models of Connectivity for Networks

There are different models for achieving connectivity in telecommunications networks. The TCP/IP (Transmission Control/Internet Control) model was developed by the US department of defense in 1972 and is used in the Internet.

### OSI

OSI (Open System Interconnect) model is an alternative model developed by the ISO for linking different types of computers and network. It was designed to support global networks with large volumes of transaction processing.

## 10.5 Models of Data Transmission

Data may be sent by asynchronous or synchronous transmission.

### Asynchronous Transmission

In asynchronous transmission, data is sent one bit at a time, in a series one after another. This method is frequently used with computers.

### Synchronous Transmission

It is used to transfer great quantities of information by sending several bytes or a block at a time. In synchronous communication, data exchange requires a synchronous signal that identifies the units of data being exchanged.

## 10.6 Communication Devices

### Network Interface Cards (NICs)

Every computer on the network needs a hardware component to control the flow of data. The device that performs this function is the Network Interface Card (NIC); also known as a network adapter card or network card.

### Network Linking Devices

To create a network some type of linking mechanism is needed to interconnect at least two computers. The various linking devices that are available include:

#### Hubs

Hubs are the simplest network devices, and their simplicity is reflected in their low cost. Hubs with more ports are available for networks that require greater capacity. Computers get connected to a hub via a length of twisted-pair cabling. In addition to ports for connecting computers, even a very inexpensive hub generally has a port designated as an uplink port that enables the hub to be connected to another hub to create larger networks (See Fig 10.4).





Fig 10.4

### Switches

As with a hub, computers are connected to a switch via a length of twisted-pair cable. Multiple switches can be used, like hubs, to create larger networks. Despite their similarity in appearance and their identical physical connections to computers, switches offer significant operational advantages over hubs. Rather than forwarding data to all the connected ports, a switch forwards data only to the port on which the destination system is connected (See Fig 10.5).



Fig 10.5

### Routers

Routers are an increasingly common sight in any network environment, from a small home office that uses one to connect to an Internet service provider (ISP) to a corporate IT environment where racks of routers manage data communication with disparate remote sites. Routers are network devices that literally route data around the network. By examining data as it arrives, the router is able to determine the destination address for the data; then, by using tables of defined routes, the router determines the best way for the data to continue its journey.



Fig 10.6

### Bridges

Bridges are networking devices that divide up networks. In the days before routers and switches became popular, bridges were used to divide up networks and thus reduce the amount of traffic on each network. Network switches have largely replaced them. A bridge functions by blocking or forwarding data, based on the destination MAC address written into each frame of data.



Fig 10.7

### Multiplexer

A multiplexer allows several users to share communication channels. This saves money. Larger companies generally use multiplexers for sending and receiving data through various channels. Some multiplexers are also intelligent and perform other functions.

### Gateways

The term *gateway* is applied to any device, system, or software application that can perform the function of translating data from one format to another. The key feature of a gateway is that it converts the format of the data, not the data itself. Software gateways can be found everywhere. Many companies use an email system such as Microsoft Exchange or Novell GroupWise.

### Modems

Modem is a contraction of the terms *modulator* and *demodulator*. Modems perform a simple function: They translate digital signals from a computer into analog signals that can travel across conventional phone lines. The modem modulates the signal at the sending end and demodulates at the receiving end. Modems provide a relatively slow method of communication. In fact, the fastest modem available on the market today has a maximum speed of 56Kbps.



Fig 10.8

## 10.7 Summary

Communication technology vastly expands the opportunity for information sharing and increased productivity. Options of connectivity available to users are e-mail, fax, Voice Messaging systems, Video conferencing systems, Shared resources and Online services. Major hardware components are NIC, Hubs, Routers and Gateways.

## 10.8 Key words

E-mail  
Fax  
Shared resources  
Half duplex  
Full duplex  
Asynchronous transmission  
Hubs  
Switches  
Gateways

## 10.9 Self Assessment Questions

1. What is the connectivity available for users?
2. Explain the communication devices.
3. What are the ways available for data transmission?
4. What is meant by synchronous transmission?

## 10.6 References

1. "Teach yourself Computer Basics in 24hours" - Sams
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## Lesson 11

# CONNECTING THE WORLD-INTERNET

### 11.0.Aims and Objectives

This lesson covers the concept of Internet and various concepts of Internet such as its evolution and various services it offers to mankind.

### Contents

- 11.1 Basics of Internet
  - 11.1.1 Introduction
  - 11.1.2 Evolution of Internet
  - 11.1.3 Accessing the Internet
- 11.2 Introduction to www
- 11.3 Basic Features of Web
- 11.4 Internet services
- 11.5 Benefits of Internet
- 11.6 Summary
- 11.7 Key Words
- 11.8 Self Assessment Questions
- 11.9 References

### 11.1 Basics of Internet

#### 11.1.1 Introduction

The Internet is a world wide collection of networks that use a common protocol to communicate with each other. Using the Internet, any computer can communicate with any other computer in the net throughout the world. It is very much similar to the telephone connection where you can talk with any person anywhere in the world. In Internet a huge resource of information is accessible to people across the world. Information in a wide range of fields of human knowledge such as education, science, health, medicine, history, geography, business, and news. can be retrieved through Internet.

#### 11.1.2 Evolution of Internet

The Internet began as a U.S. Department of Defense network to link scientists and university professors around the world. In the late 1960s when the U.S. Defense advanced Research Project Agency began as an experimental project funded by the Defense Advanced Research Projects Agency ARPA. The goal of the project was to build communication network that was capable of surviving a nuclear war. Later on other universities and R & D institutions were allowed to connect to the Network. This led to creation of ARPANET in 1969. ARPANET was quickly evolved and was conformed to other Networks like BITNET, CSNET, NSINET and NORDNET. In 1971 E-mail was invented by Ray Tomlison. In 70's TCP protocols became popular. In 1982 TCP/IP was established as a protocol suite for use with ARPANET. In 1983 First domain name server is used.

In 1986, the U.S. National Science foundation (NSF) initiated the development of the NSFNET, which became a major component of the Internet. Other networks throughout the United States and the rest of world were connected into the growing Internet. In 1989 Tim Berners-Lee created a more efficient way of transmitting information by defining the HTTP Hypermedia protocol, and standard document addressing format URL and the programming language HTML. This technology eventually became the basis of the WWW (World Wide Web).

In the early 1990s, congress decided to privatize the Internet. Privatization and invention of WWW led to a dramatic increase in the number of Internet users. In 1993 the first web browser Mosaic was released. First online shopping mall was developed in 1994 and it was the beginning of the on-line shopping.

### **11.1.3. Accessing the Internet**

There are three ways to connect to the Internet. The method chosen is determined by the size and capability of the organization or individual.

#### **Connect via LAN Server**

This approach requires the user to install on his or her PC a network adapter card and ODI (Open Data link Interface) or NDIS (Network Driver Interface Specification) packet drivers. These drivers

allow multiple transport protocols to run on one network card simultaneously. LAN servers are typically connected to the Internet at 56 KBPS or faster. In addition, the higher cost of this service can be shared among users.

#### **Connect via SLIP/PPP**

This approach requires a modem and TCP/IP protocol software plus SLIP (Serial Line Internet Protocol) or PPP (Point-to-Point Protocol software. SLIP and PPP are two communications protocols that transmit packets over telephone lines, allowing dial-up access to the Internet. Users must also have an Internet Service purchased from an ISP (Internet Service Provider). Once the connection is made, you are on the Internet and can access any of its resources.

#### **Connect via an On-Line Service**

This approach requires nothing more than what is required to connect to any of the On-Line information services, such as modem, standard communications software, and an On-Line information service account. Increasing, On-Line services are offering DSL, satellite, and cable connection to the Internet, offering faster speeds. The On-Line information services provide a wide range of services, including e-mail and WWW.

## **11.2.Introduction to the World Wide Web(WWW)**

The World Wide Web is an Internet service, based on a common set of protocols, which allows a particularly configured search computer to distribute documents across the Internet in a standard way. World Wide Web is a collection of documents and other content together via the Internet through the use of hyperlinks. World Wide Web was created in 1989 in Geneva, Switzerland, as a method for incorporating footnotes, figures, and cross-references into online documents. Burners-Lee developed a method for creating and viewing hyperlinked documents. Web documents can be linked together when they are created in a hypertext format. Hypertext documents provide an easy way of navigation of large data. A hypertext document is called Web page. A collection of related web pages is called as Web site. . A Web site has unique Internet address called URL

(Uniform Resource Locator). Websites are housed in Web servers. Web servers process user request for web pages.

### **Web Browsers**

A browser is a software programme, designed to provide an interface on the web, web browser display web pages and move between web sites in an easy to use manner. Internet Explorer and Netscape Navigator are two popular browsers. Both Navigator and IE are available over the Internet at no charge. Microsoft designed Internet Explorer for the Windows Operating System. But it is now available, for Macintosh and some Unix Systems, as well. Navigator is available for Windows, Macintosh or Unix and Linux Operating Systems.

With Browsers we can do the following on www.

- Follow the links that one of our interest.
- Go to a specific web Address (URL) where we start our Browser.
- Insert Bookmarks that enable to Jump back to an interesting page without having to retrace our steps or bring up a history of where we have been.
- Save (download) or mail interesting documents and files.
- View the hidden URL (web address)
- The use of the Web for politics will be canvassing and to get users involved in decision making with online voting.
- Web offers a unique tool for enhancing the learning process.
- Web marketing through E-Commerce.
- No language barrier
- Management through electronic office.

Millions of People around the world use the World Wide Web to search for and retrieve information on all sorts of topics in a wide variety of areas including the arts, business, government, humanities, news, politics, recreation and the sciences.

The Web as a communication system can provide many kinds of communications such as.

- a. Interpersonal communication by creating home pages.
- b. Group communication through conferencing, chat etc.
- c. Organizational communications through E-Commerce on Web.
- d. Mass Communication through bulletin and board service, E-Publishing etc.

## **11.3 WWW Standards**

This web standard allows programs on many different computer platforms to properly format and display the information from server. These standards include HTTP, HTML, and standards used for accessing the Web using wireless devices.

### **Hyper Text Transfer Protocol (HTTP)**

It is the standard most commonly used for requesting and sending Web pages. HTTP was created by Berners-Lee in 1991 and later modified by W3C (World Wide Web Consortium). The purpose of http is to establish connection between client and server. It requests data from the server, handle the request on the server side and close the connection.

### **Hyper Text Markup language (HTML)**

This markup language is used to create web pages it determines how the content will look in the browser.

**Web standard**

The standards for wireless web technologies are WAP and WML. The Wire less Protocol (WAP) defines how wireless devices request and receive the content. Wireless Markup Language is used to create web pages for the micro browsers used in wireless devices.

**11.4. Internet Services**

The Internet has become the largest and most important network of networks to day. Today it has evolved into a global information superhighway. The Internet is constantly expanding and it has also become a key platform for a rapidly expanding business applications and services.

Following are the most important and available Internet services.

**E-Mail**

Electronic mail, or E-mail has been used internally in business networks for years, but the spread of Internet use, it is now commonly used for national & International communications E-mail is also known as personal messaging (E-Mail). An E-mail message can be quickly typed and sent. Unlike the use of the telephone, it does not need the recipient to be available to take a call. The E-mail can be sent to many recipients. It is a matter of record and its electronic content can be saved, edited and / or used in other documents. The E-mail does not facilitate a conversation in the way that a telephone does but it can and is replacing most memos and many telephone calls within organizations and between individuals and organizations.

E-mail is no longer limited to simple text messages. It enables us to send text, sound and images to others. E-mail has changed the way people communicate. It improves the efficiency of communication by reducing interruptions from the telephone and unscheduled personal contacts. Also, messages, can be distributed to multiple recipients easily and quickly without the inconvenience and delay of scheduling meetings. Messages are received at a time convenient to the recipient, the recipient has time to respond more clearly and to the point.

**Telnet**

Telnet is a terminal Emulation protocol that enables us to log on to other computers on the Internet to gain access to their publicly available files. Telnet is particularly useful for pursuing library card files and large database. It is also called remote logon.

**FTP(File Transfer Protocol)**

Is a protocol that describes a file transfer process between a host and a remote computer. Using FTP can copy a file from another computer to your computer. FTP is often used to gain access to a wealth of free software on the Internet.

**Usenet**

Usenet is a system closely allied with the Internet that users E-mail to provide centralized news service. It is actually a protocol that describe how groups of messages can be store or and sent between computers. Following the use net protocol, email messages are sent to a host computer that acts as a Usenet server. This server gathers information about a single topic into a central place for messages. Thus Usenet forms a virtual forum for the electronic community, and this forum is divided into newsgroups.

### **News Groups**

A newsgroup is essentially an on-line, discussion group that focuses on a particular topic. Newsgroups are organised into various hierarchies by general topic, and within each topic there can be many subtopics. On the Internet, there are tens of thousands of newsgroups, covering topics from astrology to zoology, Discussions take place via E-mail, which is sent to the news groups address.

### **Chat Rooms**

A chat room is a facility that enables two or more people to engage in interactive “Conversation” over the internet. In a chat room there may be dozens of participants from around the world. Multi person chats are usually organized around specific topics and participants adopt nicknames also called handles/in order to maintain anonymity. One form of Chat room, IRC (Internet Relay Chat), require participants to type their conversation rather than to speak. Voice chat is also an option, but you must have a microphone, sound card and speakers, a fast modem and voice-chat software compatible with the other participants.

### **Internet Phone and Video Conferencing**

Internet phone service enables us to communicate with other Internet users around the world who have equipment and software compatible. This service is relatively in expensive and can make sense for International Calls. Voice Mail and fax capabilities are also available.

Using Voice-Over-IP (VOIP) Technology, network managers can route phone calls and fax transmissions over the same network they use for data which means no more phone bills. Gateways installed at both ends of the link convert voice IP Packets into voice and back.

### **Internet Video conferencing**

Which supports both voice and visual communications, which is another emerging service. Hardware and Software are available to support a two party conferencing system. This type of Internet service supports simultaneous voice and visual communications.

### **Content Streaming**

Content Streaming is a method for transferring multimedia files over the internet so that the data stream of voice and pictures plays more or less continuously, without a break, or very few of them. It also enables users to browse large files in real time.

### **Shopping on the web**

Shopping on the web for books, clothes, cars, drugs and even medical advice can be convenient and easy. Buying and Selling of all goods and services is termed as ‘E-Commerce’. Buyers and Sellers are the two parties to perform this type of trading. Even payments can also be possible through net only. People are using bots to search for information or shop on the Internet. A bot is a software tool that searches the web for information, product, prices etc.

### **Web Auctions**

A web Auction is a way to match people and companies that want to sell products and services with people who want to buy products and services. In addition to typical products and services, Internet auction sites are offering unique and hard-to-find items.



### **Music, Radio and Video on the Internet**

Music, radio and video are hot growth areas on the Internet. Audio and Video programs can be played on the Internet or files can be downloaded. It is possible to download music from the Internet and listen to it anywhere using small portable music players. A number of companies are now offering music over the Internet. Internet is also being used to form music collaboration that would be difficult otherwise. It is also possible to listen to radio broadcasts over the Internet or to download radio programs. The web radio program is used to download audio books for later listening. This technology is similar to the popular books on tape audio. Internet Video is used to broadcast messages or to advertise on the web.

### **Office on the Web**

An Internet office is a web site that contains files, phone numbers, Email-addresses, an appointment calendar and more. Using a standard web browser people can access important files & information through the web.

### **Education & Jobs through Internet**

Different Universities are offering various courses to distant students through Internet. Through Internet students can find the required courses, fee, university norms, fee etc. Many colleges and universities are now allowing students to take courses without ever visiting campus. Business is also taking advantage of distance learning through the Internet.

## **11.5 Internet Benefits**

- ◆ Connecting and Global reach
- ◆ Reduced communication costs
- ◆ Lower transaction costs
- ◆ Interactivity, flexibility and customization.
- ◆ Accelerated distribution of knowledge.

## **11.6 SUMMARY**

Internet refers to the Global Information system, evolved by the DOD of U.S. The WWW is a part of the Internet, but it is not a collection of networks, rather, it is information that is connected or linked together like a web. We access this information through one interface called a Web Browser. Internet provides different services like, FTP, Email and instant messaging, Telnet, Usenet newsgroups, chat rooms, internet phone and video conferencing, constant streaming, shopping on the web, web auctions, music, radio, and video on the net, office on the web, education and jobs through internet etc.

## **11.7. KEYWORDS**

ARPA Advanced Research Project Agency.

Browser

Content Streaming

Chat Rooms

DOD. Department of Defense.

E-mail. Electronic Mail.

FTP. File Transfer Protocol.

IAB. Internet Activities Board.

IP. Internet Protocol.

IRC. Internet Relay Chat.

LAN. Local Area Networks

Search Engine

Telnet. Terminal Emulation protocol

TCP. Transmission Control Protocol.

URL. Uniform Resource Locator.

VOIP. Voice Over IP.

VBNS. Very High Speed Backbone Network.

WAN. Wide Area Network

WWW. World Wide Web.

Web Server

### 11.8. Self-Assessment Questions

1. Define Internet. Explain how Internet was evolved.
2. How can you access the Internet? Explain.
3. Write about the WWW.
4. What are the WWW standards?
5. What are the different services provided by the Internet? Explain.

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## Lesson 12

# THE SOCIAL CHALLENGES

## 12.0. Aims and Objectives

This lesson covers the concept of social issues in information technology such as computer waste, computer crimes, preventive mechanisms, privacy, and health concerns.

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  - 12.2.2 Computer Crime
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## 12.1 Introduction

The vital role of information technology and systems in society raises societal and ethical issues in terms of their impact on employment, working condition, health and computer crime. Like most technologies, information technology has good and bad uses. It may create millions of jobs and improve efficiency of organizations. Its uses also eliminate jobs.

## 12.2 Social Issues In Information System

There are some important social issues in information system. They are:

1. Computer waste and mistakes
2. Computer crime
3. Privacy
4. Health concerns
5. Ethical issues
6. Patent and copyright violations

### **12.2.1. Computer waste and mistakes**

Computer related waste and mistakes are major causes of computer problems, computer waste involves the inappropriate use of computer technology and resources. Computer related mistakes refer to errors, failures and other computer problems that make computer output incorrect or not useful, caused mostly by human error. Common cause for computer waste is the improper management of information systems and resources.

Unclear expectations and a lack of feedback can cause mistakes, or a programmer might develop a program that contains errors. In other cases, a data entry clerk might enter the wrong data. Unless errors are caught early and prevented the speed of computer can intensify mistakes. As information technology becomes faster, more complex and more powerful, organizations and individuals face increased risks of experiencing the results of computer related mistakes.

### **12.2.2. Computer crimes**

An IT crime can be of 2 types. They are

1. Crimes against computers and communications.
2. Crimes using computers and communications.

#### **12.2.2.1. Crimes against computers and communications**

Crimes against computers and communications mainly include

- a. Theft of soft ware
  - b. Theft of time and services
  - c. Theft of information
  - d. Hardware theft
  - e. Theft of software and internet

#### **a) Theft of software**

Stealing software can take the form of physically meeting off with someone's diskettes, but it is more likely to be the copying of programs. Another type of software theft is copying or counterfeiting of well-known software programs.

#### **b) Theft of time and services**

The theft of computer time is more common than you might think. Probably the biggest use of it is people using their employer's computer time to play games and use it for personal purpose. Theft of cable and telephone services has increased over the years. Recently thieves have been able to create the codes of the fast growing digital satellite industry using illegal decoders. "Phone-freaks" may get into company voice mail systems then use an extension to make long distance calls.

**c) Theft of information**

Information thieves have been caught infiltrating the files of the social security administration, stealing confidential personal records and selling the information. Thieves have also been used the information to change purchases or have record it to other people.

Data and information represent assets or goods that can also be stoles. Individuals who illegally access systems often do so to steal data and information numbers and passwords. Some criminals try different identification number and passwords until they find ones that work.

**d) Hard ware Theft**

In addition to theft of data and software, all types of computer systems and equipment have been stolen from officers. Printers, desktop computers and scanners are often targets. Portable computers such as laptops are especially easy for thieves to take. Without adequate protection and securities measures, equipment can easily be stolen.

**e) Theft of software and Internet:**

The act of illegally duplicating software is called software piracy. Technically software purchases are granted the right only to use the software under certain conditions. They do not really own the software. Internet piracy involves illegally gaining access to and using the Internet. Although not yet as prevalent as software piracy, the amount of Internet piracy is growing rapidly. When unauthorized people use Internet services, Internet firms loose valuable revenues. Internet piracy can also be directed against individuals.

**12.2.2.2. Crimes using Computers**

A computer can also be the object of the crime rather than the tool for committing it. They are

**a) Illegal Access and Use**

Crimes involving illegal system access and use of computer services are a concern to both government and business. Sometimes criminals are more interested in abusing computers and Tele communications system than in profiting from them. A hacker is a person who enjoys computer technology and spends time learning and using computer systems. In many cases, criminal hackers are people who are looking for fun and excitement.

**b) Data Alternation and Destruction**

Data and information are valuable corporate assets. The intentional use of illegal and destructive programs to alter or destroy data is as much a crime as destroying tangible goods. Most common of these types of programs are viruses and worms, which are software programs, that when loaded into computer system, will destroy, interrupt, or cause errors in processing.

A virus is a program that attaches itself to other programs. An infected user must take some sort of action to spread a virus to others. A worm has the ability to self propagate from an infected user's computer to other computer system or network for days or large until the problem is found and repaired. In other cases, a viruses, or worms can destroy important data and programs. If backups are inadequate the data and programs may never be fully functional again.

Some viruses and worms attack personal computers, while other attack network and client/server systems. A personal computer can get a virus from an infected disk, an application, or e-mail attachment received from the Internet. A virus or worm that attacks a network or client/server

system is usually more severe because it can affect hundreds or thousands of personal computers and other devices attached to the network.

### 12.2.3 Privacy

Another important social issue in information systems involves privacy. With information systems, privacy deals with the collection and use or misuse of data. Data is constantly being collected and stored on each of us. This data is often distributed over easily accessed networks and without our knowledge or consent.

With today's computers, the right to privacy is an especially challenging problem. The issue of privacy is important because data of an individual can be collected, stored, and used without that person's knowledge or consent. For Example, when some one is born, takes certain high school exams, starts working, enrolls in a college course, applies for a driver's license, purchases a car, serves in the military, gets married, buys insurance, gets a library card, applies for a change card or loan, buys a house, or merely purchases certain products, data is collected and stored some where in computer data base.

#### 12.2.3.1. Privacy at Work

The right to privacy at work is also an important issue. Currently, the rights of workers who want their privacy and the interests of companies that demand to know more about their employees are in conflict. E-mail also raises some interesting issues about work privacy. Federal law permits employers to monitor email sent and received by employees.

#### 12.2. 3.2 Individual effort to protect privacy

Although numerous state and federal laws deal with privacy, privacy laws do not completely protect individual privacy. Some of the steps those individuals can take to protect personal privacy they are

- a) Find out what is stored about you in existing databases.
- b) Be careful when you share information about yourself.
- c) Be proactive to protect your privacy.
- d) When purchasing anything from a websites, make sure you safeguard your credit card numbers, passwords and personal information.

#### 12.2.4. Health Concerns

Working in an office with computers is, compared to many other occupations, a very low risk job. Computers are however taking up more of our time for many people, so such issues should be considered. The use of computers in the work place raises a variety of health issues like eyestrain, CTS and Techno stress. The inefficient design of keyboard has led to repetitive stress injuries such as Carpal Tunnel syndrome (CTS). CTS symptoms include wrist pain, numbness in the hands, hand weakness and loss of feeling in some fingers. If a room is too cold muscles can go into spasm and injury is more likely.

#### **Avoiding Health and Environmental Problems:**

Many computers related health problems are minor and caused by a poorly designed work environment. Following are the important recommendations to avoid health and environmental problems.

- Maintain good posture and positioning.
- Do not ignore pain or discomfort.
- Use stretching and strengthening exercises.
- Reduce Repetitive stress injury.

The study of designing and positioning computer equipment to improve worker productivity and minimize workers injuries called ergonomics.

### 12.2.5. Ethical Issues

Computer ethics is used to describe the issues and standards of conduct in the use of information systems. Information privacy, accuracy, property right are the major issues. Information privacy is concerned with what information an individual should have to reveal to others. Information accuracy is concerned with authenticity of information and identifying who is responsible for information errors. Property right is concerned with who owns the computerized information about people. Intellectual property right is one of most controversial ethical issue. Now a days books, music, movies are available in digital format. Any one with little knowledge

can make copies and illegally distribute them over Internet. IPR Laws are needed for controlling this illegal access.

## 12.3. Preventive Mechanisms

### 12.3.1 Preventing computer related waste and mistakes

#### Preventing waste and mistakes involves

- (a) Establishing polices and procedures
- (b) Implementing
- (c) Monitoring
- (d) Reviewing effective policies and Procedures

#### a) Establishing polices and procedures:

The first step of prevent computer related waste is to establish policies and procedures regarding efficient acquisitions, use and disposal of systems and devices. Prevention of computer related mistakes begin by identifying the most common types of errors. Important preventive policies are

#### Preventive policies and procedures

- Acquisition and use of computers, with a goal of avoiding waste and mistakes.
- Training programs for individuals and workgroups.
- Manuals and documents are to be maintained and used.
- Approval of certain systems and applications before they are implemented.
- Standards should be accepted.

Once companies have planned and developed policies and procedures, they must consider how best to implement them.

**(b) Implementing policies and procedures**

Implementing policies and procedures to maintain waste and mistakes varies according to the business conducted. The policies offer focus on the implementation of source data and the use of data. Some of the policies are

- Changes to critical tables, HTML and URLs should be tightly controlled with all authorities.
- A user manual should be maintained.
- Each system report should indicate its general content
- The system should have controls.
- Users should implement proper procedures to ensure correct input data.
- Training to users.

**(c) Monitoring policies and procedures:**

By understanding what is happening in day-to-day activities, organizations can make adjustments or develop new procedures. Implementations of internal audits to measure actual results by the organizations is essential. For example

- (i) Percentage of end-user reports produced on time.
- (ii) Percentage of data input errors rejected.
- (iii) No. of input transactions entered per eight hour shift.

**(d) Review policies and procedures**

The final step is to review existing policies and procedures and determine whether they are adequate. Review checking are.

- Do current polices cover existing practices adequately.
- Were any problems or opportunities uncovered during monitoring.
- Does the organizations plan any new activities in the future.
- Are contingencies and disasters covered.

**12.3.2 Security**

Information systems professionals and users still need to be aware of the resource throughout the organizations. Information Technology requires vigilance in security. Security is a system of safeguards for protecting information technology against disasters, system failures and unauthorized access that can result in damage or loss. We consider four components of security.

- 1) Identification
- 2) Encryption
- 3) Protection of software & data
- 4) Disaster – recovery planning

**12.3.2.1 Identification & Access**

There are 3 ways a computer system can verify that you have legitimate right of access. Some security systems use a mix of these techniques. The system tries to authenticate your identity by determining.

- a) What you have
- b) What you know
- c) Who you are



**What you have**

Security systems like cards, keys, signatures, badges such as credit cards, debit cards and cash machine cards all have magnetic strips are built in computer for identification.

**What you know**

Authorized users use PINs, passwords and digital signatures to gain access authorized data.

**Who you are**

Some forms of identification can't be easily faked –such as your physical traits. Biometrics tries to use these in security devices.

Biometrics is the science of measuring individual body characteristics.

**Ex:** Handprints, fingerprints etc.

**12.3.2.2 Encryption**

Encryption is the process of converting an original electronic message into a form that can be understood only by the intended recipients. A key is a variable value that is applied using an algorithm to a string or a block of unencrypted text to produce encrypted text or to decrypt encrypted text. Encryption methods rely for their security on the limitations of computing power.

Encryption is clearly useful for some organizations, especially those concerned with trade secrets military matters and other sensitive data.

Access to online files is restricted only to those who have a legitimate right to access because they need them to do their jobs. Many organizations have a transaction log that notes all accesses or attempted accesses to data.

**Audit Controls**

Networks have audit controls that track, which programs and servers were used, which files opened, and so on. This creates an audit trail.

**People Controls**

Because people are the greatest threat to a computer system, security precautions begin with the screening of job applicants. Print outs, printer ribbons, and other waste that may yield passwords and trade secrets to outsider is disposed.

**12.3.2.4. Disaster – Recovery Plans**

A disaster recovery plan is a method of restoring information-processing operations that have been halted by destruction or accident. A disaster – recovery plan is more than a big fire drill. It includes a list of all business functions and the hardware, software, data and people to support those functions. It includes arrangements for alternate locations, either hot sites or cold sites.

A hot site is a fully equipped computer center, with everything needed to resume functions. A cold site is a building or other suitable environment in which a company can install its own computer system. The disaster- recovery plan includes ways for backing up and storing programs and data in another location, ways of altering necessary personnel and training for those personnel.

**12.4. Challenges of Computer Systems**

As a result of the increasing power of image, voice, and expert systems, the day is coming when computer systems will provide many of the services now supplied by managerial support staff. Managers will rely on their computer systems to gather information, analyze it, and present it to workers and decision-makers in immediately usable form.

A broad range of tools is converging on computer systems to create this level of support, which is likely to further revolutionize the work environment. These tools include compound documents, electronic messaging, interactive video teleconferencing and intelligent networks that provide access to thousands of external public databases. They also include specialized workstation technologies such as legal, medical, and engineering expert systems that help professional better use their creative capacities. Such developments have significant influences on those who use computer systems, requiring them to change from being merely participants in the system to becoming system designers themselves. Successful users will be those who are able to think and plan strategically encourage innovation and develop computer solutions to their own business problems. In many ways, computer systems are at the center of a technological and organizational revolution that is changing today's society.

### 12.5. Summary

The information super way is a vision or metaphor. It provides different services to different organizations like commerce, government, home services, education, health care, mobile communication etc., Important social challenges are computer waste and mistakes, computer crimes, privacy, health concerns, ethical issues etc. Computer crimes can be of two types. They are crimes against computers and communications and crimes using computers. Crimes against computers and communications mainly include theft of software, theft of time and services, theft of information, hardware theft, theft of software and Internet. Crimes using computers are Illegal Access and Use, Data alteration and destruction. Four components of security can be considered as preventive mechanisms. They are Identification, Encryption, Protection of software and data, and disaster recovery planning.

### 12.6. Key Words

Computer waste and mistakes

Data Alteration

Disaster Recovery

Email privacy

Encryption

Ethical issues

Hackers

Health cares

Metaphor

Phone Freaks

Posture

Privacy

URL

User Manual

### 12.7. Self Assessment Questions

1. Explain the different services of Information to different organizations.
2. What are important social issues in Information System? Explain each.
3. What are computer waste and mistakes? How can you prevent the computer waste and mistakes?
4. Explain different computer crimes with examples.
5. What is Computer Security? Explain different components of Security.
6. Write short notes on Privacy.

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## Lesson 13

# TRADITIONAL USES OF COMPUTER

### 13.0. Aims and Objectives

This lesson will enable you to understand the impact of computers on people. It deals with applications/ uses of computer systems in various organizations. It also deals with different applications of Information Technology within the Organizations.

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- 13.1. The Impact of Computer on people
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  - 13.1.2. Negative Impact
  - 13.2.3. Computer Limitations
- 13.2. Important Computer Professionals
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### 13.1. The Impact of Computer on People

The computer is one of the most powerful forces in society today. It is being put to use everywhere in homes and in organization of all sizes. The computers impacted our lives in many ways. Most of the jobs today require the use of computers. Computers helped the world a lot and helped us take a large step into the future. Businesses and entertainment uses them to make profits, Education use them to help educate students better, the Medical field uses computers in different ways, and other areas. Without the computers help, none of this would be possible.

#### 13.1.1 The Positive Impact

Some managers and employees in organizations have found their jobs more rewarding because of computer systems, and consumers have received benefits from the ways in which organizations use computers. Positive benefits that people may receive from their dealings with computer using organizations are

- Greater efficiency
- Higher quality products
- Better service
- Aid to handicapped
- Improved safety
- Better information retrieval
- Benefits of greater personal efficiency
- Educational benefits
- Communication Benefits

Without computers many recreational and educational benefits wouldn't be feasible, handicapped persons would be denied tools that make their lives more meaningful, and retrieving needed information would be a more tedious task. A computer is a machine that handles data. Data are facts that are gathered and entered into the computer. It is difficult to imagine a day that is not in some way affected by computers. Computers are changing people's lives in areas as diverse as medicine, education, publishing, business, the home and transportation.

Computers have altered completely the structure of business. Large volumes of accounting and record keeping data can be manipulated, organized, stored, retrieved and used for specific purposes. Bills /statements can be processed and sent to customers in much less time and with much less effort than would be required for the same processes done manually.

Financial projections are made with greater ease, as the computer helps managers organize and manipulate financial data, planning and decision thus become more efficient and accurate. In manufacturing industries, computers direct production, guide machine tools, control quality, design parts and monitor inventories.

In Modern offices, word processing saves times for people at all levels of the organization and helps ensure accurate letters, reports and memos. Automated filing uses far less storage space than endless stacks of paper and enables workers to retrieve documents rapidly, when they are needed. With more organized and consistent file systems, data management becomes a more efficient task.

Modern banking would be impossible without the computer. Medical record keeping is vastly improved. Information related to patient records, births, deaths, blue cross, medicine insurance malpractice, are computerized. Some computers are being programmed to assist doctors with diagnosis by analyzing symptoms and the variables.

Computers analyze scientific data, test variables, and monitor experiments in almost every scientific field. It would be difficult for the federal Governments to function without computers. Economic and demographic statistics can be more easily collected, analyzed and reported. The Internal Revenue service can keep better tax record. Computers Aid Law-enforcement officials in monitoring laws and rapidly communicating information related to their duties. National Defense Systems are guided and managed by computer systems. Global communication has been facilitated by the electronic transmission of data that connects individuals, regardless of geographic location, almost instantaneously. These are only a few of the countless tasks or applications performed by computers.

### 13.1.2. Negative Impact

Although some managers and employees have benefited by the use of computers on the job, others haven't been so fortunate. Some have lost their jobs or have suffered a loss of status and prestige when computer systems were installed. Computers for example has displaced clerical employees, and production employees are being threatened by the rapidly growing use of computer controlled robots.

In private life some people have been inconvenienced and confused by computer information systems employing questionable data processing practices. Data are sometimes gathered without a valid reason or a careful check of their accuracy, and many people have also been victimized by systems error and inaccurate data input.

## 13.2. Important Computer System Professionals / Users

### 13.2.1 Computer Programmers

Computer Programmers are individuals whose main job is programming. This group has wide range of responsibilities and educational backgrounds. Programmers write programs according to the specifications determined primarily by computer software engineers and Systems Analysts. After the design process is complete, it is the job of the programmer to convert that design into logical series of instructions that the computer can follow. The programmer codes these instructions in a conventional programming language. Many programmers update, repair, modify and expand existing programs. Programmers test a program by running it to ensure that the instructions are correct and that the program produces the desired outcome.

Computer programmers are often are grouped into two broad types

#### a) Application Programmer

Writes programs to handle a specific job, such as a program to track inventory within an organization.

#### b) System Programmer

Writes programs to maintain and control computer systems software such as operating systems, networked systems and database systems. Programmers in software Development Company may work directly with experts from various fields to create software. In some organizations, particularly small ones, workers commonly known as programmer-Analysts are responsible for both the systems, i.e., analysis and the actual programming.

### 13.2.2 Computer Software Engineers

Computer software engineers are incorporated with the tasks to design and develop new computer software systems. They apply the principles and techniques of computer science, engineering, and mathematical analysis to the design, development, testing and evaluation of the software. Software engineers are grouped into two categories.

#### a) Computer applications software engineers

Analyze user's needs and design, construct and maintain general computer applications software or specialized utility programs. These workers use different programming languages, depending on the purpose of the program.

**b) Customer systems software engineers**

Coordinate the construction and maintenance of a company's computer systems and plan their future growth. Working with the company they coordinate each department's computer needs-ordering inventory, billing and payroll record keeping. Computer Software Engineers normally work in well-lightened and comfortable offices or laboratories in which computer equipment is located. Employers of computer software engineer's range from start companies to established industry leaders.

**13.2.3 Computer Scientists**

Computer scientists work as theorists, researchers or inventors. The rapid spread of computers and information technology has generated a need for highly trained workers proficient in various job functions. These workers- Computer scientists, Data Base Administrators, and network systems and data communication analysts, include a wide range of computer specialists.

Data Base Administrators work with database management systems software and determine ways to organize and store data. They identify user requirements, setup computer databases, and test and co-ordinate modifications to the computer database systems. Computer Scientists and database administrators normally work in offices or laboratories in comfortable surroundings. Computer scientists and data base administrators must be able to think logically and have good communication skills.

**13.2.4 Computer Systems Analysts**

Computer systems analysts solve computer problems and apply computer technology to meet the individual needs of an organization. They help an organization to realize the maximum benefit from its equipment, personnel and business processes. Systems Analysts may plan and develop new computer systems or devise ways to apply existing systems resources to additional operations. They may design new systems, including both hardware and software, or add a new software application to improve computer power.

Systems Analysts begin an assignment by discussing the systems problem with managers and users to determine its exact nature. Defining the goals of the system and dividing the solutions into individual steps and separate procedures, systems analysts use techniques such as structured analysis, data modeling, information engineering, mathematical model building, sampling and cost accounting to plan the system. They specify the inputs, design the process steps, and format the output to meet user's needs. They also help in preparing financial statements.

**13.2.5 Statisticians**

Statistics is the scientific application of mathematical principles to the collection, analysis and presentation of numerical data. Statisticians contribute to scientific inquiring by applying their mathematical and statistical knowledge to the design of surveys and experiments.

Computers are used extensively for statistical applications, a strong background in computer science is highly recommended. Good communications skills are important. Statisticians usually work regular hours in comfortable offices. Statisticians also are employed by nearly every government agency. Some government statisticians develop surveys that measure population growth, consumer prices or unemployment. Thus statisticians are also acting as an important IS professionals.

### 13.2.6 Mathematicians

Mathematics is one of the oldest and most fundamental sciences. Mathematicians use mathematical theory, computational techniques, algorithms, and the latest computer technology to solve economic, scientific, engineering, physics and business problems. Mathematicians are part of interdisciplinary teams that may include economists, engineers, computer scientists, physicists, technicians and others.

Mathematicians need good reasoning ability and persistence to identify, analyze and apply basic principles to technical problems. Communication skills also are important, as mathematicians must be able to interact and discuss proposed solutions with people who may not have extensive knowledge of mathematics.

All these are the computer professional those who are working with computers to fulfill different applications of the end users.

## 13.3. Different Types of End Users

Traditional user is also known as End Users. These Users interact with the DBMS or required application through a terminal. They can perform all the functions of retrieval, creation, deletion and modification.

These users are of different types like

### Super User

They have the largest amount of control over all areas of the system.

### Web Master

A Web Master is a person who has the ability to edit, approve and make live changes to the site. Managers should be the only people who are given the Web Master Status.

### User Master

A user master is a person who has the ability to edit, delete and add users to the site. They do not have access to the "Web"; i.e. they can't edit the site.

### Site Administrator

A site Administrator has the ability to administer a site completely. They can be set to receive emails when a site editor makes any changes to the site. They are only able to edit the sites; they are setup as an administrator on.

### Site Editor

A site Editor can only edit pages within a specific page. They can be set to receive emails when a page editor makes any changes to the site. They are only able to edit the pages. They are setup as an administrator on.

### Page Editor

A page editor is a person who has the ability to change the status of a page to " up for edit and apply for approval ". They can't make pages live, archive or delete pages. All the above said are related to the Web.

## 13.4. Summary

Computer is one of the most powerful forces in society today. Computers have both positive and negative approaches in homes and in organizations. Few important computer professionals are programmers, computer software engineers, computer scientists, computer system analysts, statisticians, mathematicians etc.



### **13.5 Keywords**

Computer Programmers  
Computer Scientists  
Computer Software Engineers  
Global Communication  
Mathematicians  
Statisticians

### **13.6. Self – Assessment Questions**

1. Explain the impact of computers on people.
2. Explain about important computer professionals or users.
3. Who are the end users of computers?

### **13.7 References**

1. Suresh K. Basandra, "Computers today", Galgotia Publications
2. Muneesh Kumar, "Business Information Systems", Vikas Publishing House
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## **Lesson 14**

# **PC HARDWARE BUYER'S GUIDE**

## **14.0. Aims and Objectives**

The main objective of this lesson is to evaluate and select the best computer system among different alternatives. It also presents different types of available systems and types.

## **Contents**

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## **14.1. Introduction**

A computer system is a special sub system of an organization's overall informative system. It is an integrated assembly of advises. In an effective and efficient system, components are selected and organized with an understanding of the inherent trade-offs between overall system performance and costs, central and complexity. When we selecting computer subsystem devices, we must consider the current and future users to which system will be put. Our choice of a particular computer system should always allow for later improvements in the overall information system.

PC Hardware buyer's guide includes a simple reference chart with recommended brands and models. This helps us to identify, which parts are

- Computable to each other.
- Regarded as the best performing
- Closest in live with your budget.

## 14.2 COMPUTER SYSTEM TYPES

### 14.2.1. Classification of Computer System

In general based upon the use of computers, computers are classified as either special purpose or general-purpose computers.

#### **Special purpose computers**

Military and scientific research groups such as the CIA and NASA use Special purpose computers for limited applications. Other applications include specialized processors found in appliances, card and other products.

Special purpose computers are increasingly being used by business. For example, Automobile repair shops connect special purpose computers to identify as well as to repair.

#### **General-purpose computers:**

General-purpose computers are used for a variety of applications and are the most common. These computers are used to perform business applications.

General-purpose computers combine processors, memory, secondary storage input and output devices, a basic set of software and other components. These systems can range from inexpensive personal components to expensive super components. These systems display a wide range of capabilities.

### 14.2.2. Computer system ranges

Computer systems can range from desktop (or smaller) portable computers to massive super computers that require in large rooms. Important computer system types are

#### **14.2.2.1. Personal Computers (PCs)**

Personal Computers are relatively small, inexpensive computer systems some times called Microcomputers. PCs are designed primarily for individual users, they are often tied in a large computer and information systems as well. Several types of personal computers are there, they are

##### **(a) Desktop computers**

Desktop computers are the most common personal computer system configuration. Powerful desktop computers can provide sufficient memory and storage for the most business computing tasks.

##### **(b) Laptop Computers**

Laptop computer is a small, lightweight PC, about the size of a briefcase. It is useful for the improvement of individual worker's productivity. It can be easily carried from place to place.

##### **(c) Hand held Computers**

These are palmtop computers. These PCs provide increased portability because of their smaller size. These systems often include a wide variety of software and communication capabilities.

**(d) Embedded Computers**

Embedded computers are computers placed inside other products to add features and capabilities. In automobiles, embedded computers can help with navigation, engine performance, banking and other functions.

**(e) Network Computers**

The Network Computer is a cheaper to buy and cheaper to run. This version of the PC is used primarily for accessing networks and the Internet and E-mail.

**(f) Work Stations**

Workstations are computers that fit between high-end personal computers and low-end midrange computers in terms of cost and processing power. Workstations are used to support engineering and technical users who perform heavy mathematical computing, computer-aided-design, and other applications requiring a high-end processor.

**14.2.2.2. Midrange Computers**

Midrange computers are also formerly called minicomputers. These systems are about the size of small three-drawer file cabinet that accommodates several users at one time.

Midrange computers often have excellent processing and decision-making support capabilities.

**14.2.2.3. Main Frame Computers**

Mainframe Computers are large, powerful computers often shared by hundreds of concurrent users connected to the machine via terminal. The mainframe computer must reside in an environment controlled computers room or data center with special heating, venting and air-conditioning equipment to control the temperature, humidity and dust levels around the computer.

Most mainframes are kept in a data center with limited access to the room through some kind of security system. The traditional role of the mainframe computer was the large, centrally located computer. Today the role of the mainframe is undergoing some remarkable changes as lower-cost midrange computers, workstations, and personal computers become increasingly powerful. Many computer jobs that used to run on mainframe computers have migrated on these smaller, less expensive computers. This informative processing migration is called computer downsizing. The mainframe is capable of handling the millions of daily transactions associated with airline, automobile, and hotel/motel reservation systems.

**14.2.2.4 Super Computers**

Super computers are the most powerful computer systems, with the fastest processing speeds originally; super computers were used primarily by the government agencies to perform the high-speed number crunching needed in weather forecasting and military applications.

Military and research organizations use these machines to solve complex problems. But they are being used more broadly for commercial purposes today.

**14.2.2.5. Server Computers**

A Computer server is a computer designed for a specific task, such as network or Internet applications. Servers typically have large memory and storage capacities, along with fast and efficient communication abilities.

They can range in size; from a PC to a mainframe system, depending on the needs of the organization. Servers offer great scalability, the ability to increase the processing capabilities of a computer system, so that it can handle more transactions in a given period. Adopting more or more powerful processors increases scalability.

These server computers are of many types, they are

**Web Server:** This is used to handle Internet traffic and communications.

**Internet Caching Server:** Stores websites that are frequently used by a company.

**Enterprise Server:** Containing programs that collectively serve the needs of an entire organization.

**File Server:** Stores and Co-ordinates program and data files.

**Transaction Server:** Transaction Server is used to store and process business transactions.

**Database Server:** Used to hold different databases.

### 14.3. Planning for Computers

Planning for a new computer is complex and requires the knowledge of different disciplines, besides the utmost understanding and support of management. The sequential process from concept to commissioning of a computer system constitutes a number of phases and decision-making based on several parameters. Broadly the steps for planning can be identified as

1. Specification of requirement
2. Alternative Selection-purchase/hire/lease
3. System study and Configuration
4. Invitation to Tender
5. Evaluating the Tender
6. Selection and ordering
7. Delivery and installation
8. Acceptance and Take-Over
9. Post Installation

#### 1. Specification of requirement

This is also known as Need for Analysis or Identification including feasibility study. This analysis is to determine that it is technically possible and economically useful to use a computer in an organization or to replace an existing computer. The main objectives of the feasibility study should be:

1. To access information requirements and determine whether data processing techniques can be applied to the process.
2. To determine the economic consequences
3. To establish a complete plan of action
  
4. To provide management with requisite documentation for planning, control, and ultimate implementation.

#### 2. Alternatives Selection

This phase is used to evaluate various alternatives available for using a computer system

. Essentially, there are three financing alternatives for computer systems: Purchase, rental, and lease. Usually all of them are available from manufacturers or their representatives and rental and lease arrangements can also be made through a third party.

#### (a) Purchase

The primary advantage of purchasing equipment is the potential cost savings, if the equipment is kept for its useful life. If the equipment is purchased, the company has several maintenance alternatives.

- Purchase a maintenance agreement
- Pay for maintenance on a per-call basis
- Use the company's own employees for maintenance

#### (b) Rental

Under the rental option, the company rents the equipment on a monthly basis directly from the manufacturer or a third party. Renting is the most costly approach in terms of overall cash flow.

#### (c) Leasing

Leasing is a compromise between purchasing and renting. Typically, leasing costs less than renting but more than purchasing. Leasing offers substantial cost savings over renting.

### 3. System study and Configuration

'What' to buy is the most important in the process of selecting the 'right' computer. The following points need to be taken into account while configuring a system.

Word Length	: Will depend on the type of application such as business, Data, engineering and Scientific.
Memory (Main)	: Type of Application/Data.
Auxiliary Storage	: Data volumes, backup requirement, databases, nature of Commercial applications.
Terminals	: Type of applications, number of users
Graphics	: Total terminal time requirements for computer aided engineering and manufacturing.
Plotters	: Computer Aided Engineering and manufacturing
Printers	: Printing loads, Word processing applications
Communications	: Distribution of Operations.

### 4. Request for quotation

The request for quotation/proposal (RFP) document puts the requirements for the equipment and software in a form that vendors of hardware and software can respond to. It serves as a communication tool between potential buyer and vendor. The following are the important terms and conditions for final contract for the supply of the computer system.

1. A description of present and proposed applications, including for each application.
2. Reliability requirements.
3. Backup requirements
4. Vendor Service requirements

5. Outline of any specific hardware or software features required, such as printer speed or disk capacity.
6. Criteria for evaluating proposals.
7. Plan for the vendor demonstration of hardware and software.
8. Price constraints.
9. List of any questions about the characteristics of the vendor's hardware and software
10. Implementation Schedule.
11. Clear specifications of various components.
12. Acceptance Conditions, Warranty, maintenance schedule for various milestones, software support, prices, media and the user's environmental conditions.
13. Checklist.

## 5. Evaluation

Performance evaluation of computer hardware and software is a major tool used in the selection of new equipment. Evaluation is based on

1. The system capabilities based up on the hardware and software requirements.
2. Expansion capabilities for meeting future needs.
3. Ease of maintenance.
4. User Friendliness.
5. Expandability in terms of main memory, peripherals, protection mechanism in case of failure.
6. User feedback from the existing users.
7. Manufacturer's commitment.

There are traditional and current techniques for evaluating computer systems. For most firms, a combination of Benchmarking and workload models is the best technique for evaluating performance. Benchmarking programs are sample programs to test jobs that represent at least a part of the buyer's primary computer workload.

Workload models are computer programs that accurately represent the buyer's planned computer workload.

## 6. Selection and ordering

The computer system, which fulfills various user requirements and gives the optimum price-performance ratio, is the right system. The order on the manufacturer should be unambiguous and define:

1. The important units of system, their numbers, makes and capacities.
2. Delivery schedules agreed during negotiations and penalties.
3. Prices and terms of payment
4. The services committed during warranty period and penalties for default.

## 7. Delivery and installation

As the process of manufacturing and assembling the various components of the ordered system and delivery by the manufacturer takes 3 to 4 months, the phase regarding training and software development can be started after the issue of purchase order.

## 8. Acceptances and Taking over

The acceptance phase needs utmost and stringent acceptance procedures for all components of the system. The rigorous testing of various components of the system often reveals bugs or unresolved modules of the system. The system should be taken over after it has undergone the specified performance parameters.

## 9. Post Installation

The warranty maintenance – corrective maintenance, preventive maintenance would have been defined in the purchase order. The manufacturer's commitment can be obtained in regard to this schedule for preventive maintenance and it needs to be ensured that the same is fulfilled.

## 14.4. Computer Sources, Selection

The successful use of a computer can only be expected if the user has access to the right type of hardware capable of running software suited to his needs. The selection procedure of a computer system has become quite lengthy due to the availability of large variety of computer systems and associated sub systems.

### 14.4.1. Criteria for choice of a source

Listed below are the criteria of choice of computer power from among the different alternatives. They are

Control of data processing

1. Projected-costs:
  - a. Acquisition Costs
  - b. Implementation Costs
  - c. Continuing operations costs
2. The flexibility required for future growth.
3. The organization's past experience with data processing
4. Management's willingness to devote attention to information systems development.
5. The organization's competitive strategies
6. The pattern of data processing activities
7. The length of time for which the data processing is required.
8. Accounting and tax considerations.

### 14.4.2. Representative List of Items for hardware selection

A representative list of the items for which acceptance criteria may be given follows, together with additional commitments and explanations.



**Central Processor**

User should have a clear understanding of broad distinctions between desktop computers, microcomputers, minicomputers, and mainframe machines.

**Internal working store or main memory**

The tender specification should quote the general requirements for the internal working store. Factors in the evaluation of main memory capabilities include: the basic word length, the type of memory, the basic cycle time, the basic instruction set, the number of registers, and the size of memory.

**Floating point Hardware**

The computer may process floating-point arithmetic operations via specific hardware registers or by coded instructions. Hardware floating-point operations are considerably faster in performance than software and for technical or scientific applications floating point hardware is generally an essential facility.

**Interfaces with devices from other suppliers**

The proposed configuration should be capable of supporting two terminals, one of which is local, the other remote and connected in modems and dial-up lines. These interfaces should be tested before acceptance.

**Input /output Channels**

The number of input/output channels for peripheral devices must be specified. For example, line printer, digitizer etc.

**Mass Storage Devices**

The general specification must provide an indication of the backing store required. Generally disk storages are intended for it.

**14.4.3. Selection of software packages**

The invitation to tender should outline the user's software requirements. Tenders may be required to demonstrate large programs and conversion requirements. Tenders should also state what program packages are available in the engineering database/management science fields, together with any additional costs.

**14.4.3. Suppliers support services****Training**

Free initial training may be provided for each software system implemented.

**System Engineers**

Technical assistance with the installation of the system should be provided for a specified period.

**Hardware maintenance and back-up support**

Machines are prone to breakdown, failure, etc., so, the effectiveness of any system depends on how soon or how effectively the troubles are rectified. Hardware engineers should be available, either on demand or under the terms of maintenance contract.

**Testing**

The supplier should provide testing facilities free of charge on implementation.

**User groups**

The manufacturer may sponsor and organize specialist user groups amongst his customers.

## 14.5 System Purchase Considerations

The PC market place offers a bewildering range of choices. There are hundreds of different processor units, thousands of peripheral devices of all descriptions, tens of thousands of software packages, and many square miles of retail showroom space. While purchasing, the following are the important considerations that the user has to follow:

### 1. Define your needs

Identify the basic purpose, is your objective is to improve personal Productivity, or it is to explore education, entertainment or other interest.

### 2. Identify your primary applications

What are likely to be your primary applications, will your primary applications be the use of word processing, spread sheet, time management, database management, or other similar packages.

### 3. Identify your general hardware needs

What hardware features are needed to support the primary applications, for example a graphics interface may require a colour display screen, and the manipulated of large databases and spread sheets may require a substantial amount of primary and secondary online storage.

### 4. Consider the computability issue

The system you select need to will interface with those of friends, work associates, or others? Will it need to support a particular piece of input/output equipment?

### 5. Investigate those systems that satisfy your general hardware and software needs

Clearly identify the objectives with that of the system components outputs. Find out your satisfaction with that of hardware and software.

### 6. Consider the need for future expansion

Are you likely to need more computing power in the future? Is so, are future storage upgrades did other improvements possible with the systems you are considering.

### 7. Shop for the best buy

You have priced comparable systems at different suppliers, does a supplier offer satisfactory service arrangements and maintenance contracts. There may be significant differences in the prices quoted be retail stores. Mail-order houses often sell for less than retail stores, but they usually give fewer services.

## 14.6. PC Installation

Installation of a PC is very simple and the following steps given below can do it.

1. Configuring the mother board
2. Identifying the connectors and cables.
3. Adding memory models
4. BIOS Setup.

5. Configuring the IDE Card.
6. Final Assemble and software installation.

### **1. Configuring the mother Board**

All the motherboards have some jumper settings for CPU selection clock speed selections, processor power selections, EPROM type selection, Cache RAM selection etc. The settings should be done carefully referring the motherboard manual supplied by the manufacturing in compliance with the existing configuration.

### **2. Identifying the connectors and cables**

The locations different connectors and the cables for connecting the devices should be identified.

### **3. Adding Memory Models**

There are separate connectors available for inserting memory models in the motherboard. Depending upon the memory requirement, memory models should be in respect into the connectors carefully.

### **4. BIOS Setup**

BIOS stands for basic input output system. There are two types of BIOS setup programs. One is text based menu setup and the other is Win BIOS set up in which the menu will be in graphics.

### **5. Configuring the IDE Card**

In the BIOS setup there is a facility for automatically configuring the parameters for the hard disks connected with the IDE Card. The BIOS setup will display all possible models being supported by the hard disk drive.

### **6. Final Assemble and Software installation**

The hardware installation is over with the verification of above points. Selected software should be installed.

## **14.7. Trouble Shooting and Servicing**

Providing hardware facilities is one job but keeping them available at all times without downtime is equally important.

A computer system includes the motherboard, daughter boards, SMPS, floppy drives, monitor, keyboard and other peripherals, which are interconnected through connectors and cables. Problems in any of the devices will affect the operation of other devices and sometimes the overall system operations may be distributed. The following checks will help to trouble shoot the problem.

1. Check whether the SMPS main power cable and DC voltage cables are connected properly.
2. Check whether the keyboard cable is connected properly.
3. Check whether the monitor power cable and signal cable are connected properly.
4. Check whether the CMOS settings are set for proper configurations
5. Check whether the drive powers cable and data are connected properly.
6. Check whether all daughter boards are inserted in the I/O slot properly.
7. Check whether the reset switch is connected properly.
8. Check whether the speaker connections are connected properly.

After all the above checks are carried out, switch on the system and observe POST error messages. The POST is a series of program routines buried in the motherboard ROM firmware. From the POST message localize the problem area and trouble shoot it.

### 14.8. Summary

A computer system is a special subsystem of an organization's overall purpose. Based upon their applications computers are classified as General purpose computers and Special purpose computers. PC Hardware buyer's guide includes a simple reference chart with recommended brands and models. By this the user/organization can select the required hardware and software components. The users can evaluate the best-proposed system for their purpose.

### 14.9. Keywords

Benchmarking  
BIOS  
CMOS  
Computer Architecture  
POST  
Parallel computing  
SMPS  
Workload model

### 14.10. Self-Assessment Questions

1. Explain different types of computer systems based upon their applications.
2. How can you plan for a computer? Explain.
3. Write about the selection procedure to select a computer system.
4. Write about evaluation procedure.
5. What are system purchase considerations? Explain.
6. Write short notes on PC Installation procedure.
7. Explain the term 'trouble shooting'.

### 14.11 Refereces

1. Suresh K. Basandra, "Computers Today", Galgotia Publications.
2. Louis Columbus, "Computers in a Day", Bpb publications
3. D. Balasubramanian, "Computer Installation and servicing", Tata McGraw Hill.
4. Allen L. Wyait, "Success with Internet", Galgotia publications  
Ralph M. Stair, George W. Reynolds, and "Principles of Information Systems".