# **FUNDAMENTALS OF COMPUTER & IT**

**BCA-101** 



Dr. Babasaheb Ambedkar Open University Ahmedabad



# **Fundamentals of Computer and IT**





Knowledge Management and Research Organization
Pune

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#### ROLE OF SELF INSTRUCTIONAL MATERIAL IN DISTANCE LEARNING

The need to plan effective instruction is imperative for a successful distance teaching repertoire. This is due to the fact that the instructional designer, the tutor, the author (s) and the student are often separated by distance and may never meet in person. This is an increasingly common scenario in distance education instruction. As much as possible, teaching by distance should stimulate the student's intellectual involvement and contain all the necessary learning instructional activities that are capable of guiding the student through the course objectives. Therefore, the course / self-instructional material are completely equipped with everything that the syllabus prescribes.

To ensure effective instruction, a number of instructional design ideas are used and these help students to acquire knowledge, intellectual skills, motor skills and necessary attitudinal changes. In this respect, students' assessment and course evaluation are incorporated in the text.

The nature of instructional activities used in distance education self-instructional materials depends on the domain of learning that they reinforce in the text, that is, the cognitive, psychomotor and affective. These are further interpreted in the acquisition of knowledge, intellectual skills and motor skills. Students may be encouraged to gain, apply and communicate (orally or in writing) the knowledge acquired. Intellectual-skills objectives may be met by designing instructions that make use of students' prior knowledge and experiences in the discourse as the foundation on which newly acquired knowledge is built.

The provision of exercises in the form of assignments, projects and tutorial feedback is necessary. Instructional activities that teach motor skills need to be graphically demonstrated and the correct practices provided during tutorials. Instructional activities for inculcating change in attitude and behavior should create interest and demonstrate need and benefits gained by adopting the required change. Information on the adoption and procedures for practice of new attitudes may then be introduced.

Teaching and learning at a distance eliminates interactive communication cues, such as pauses, intonation and gestures, associated with the face-to-face method of teaching. This is particularly so with the exclusive use of print media. Instructional activities built into the instructional repertoire provide this missing interaction between the student and the teacher. Therefore, the use of instructional activities to affect better distance teaching is not optional, but mandatory.

Our team of successful writers and authors has tried to reduce this.

Divide and to bring this Self Instructional Material as the best teaching and communication tool. Instructional activities are varied in order to assess the different facets of the domains of learning.

Distance education teaching repertoire involves extensive use of self-instructional materials, be they print or otherwise. These materials are designed to achieve certain pre-determined learning outcomes, namely goals and objectives that are contained in an instructional plan. Since the teaching process is affected over a distance, there is need to ensure that students actively participate in their learning by performing specific tasks that help them to understand the relevant concepts. Therefore, a set of exercises is built into the teaching repertoire in order to link what students and tutors do in the framework of the course outline. These could be in the form of students' assignments, a research project or a science practical exercise. Examples of instructional activities in distance education are too numerous to list. Instructional activities, when used in this context, help to motivate students, guide and measure students' performance (continuous assessment)



#### **PREFACE**

We have put in lots of hard work to make this book as user-friendly as possible, but we have not sacrificed quality. Experts were involved in preparing the materials. However, concepts are explained in easy language for you. We have included may tables and examples for easy understanding.

We sincerely hope this book will help you in every way you expect.

All the best for your studies from our team!



## **Fundamentals of Computer and IT**

#### **Contents**

#### **BLOCK 1: COMPUTER FUNDAMENTALS**

#### UNIT 1 COMPUTER FUNDAMENTALS

Introduction, Evolution of Computer Technology, Basic Computer Organization, Advantages of Computers, Programming Languages, Types of Computers, Applications of Computer, Summary, Let us Sum Up, Other Books For Reading

#### BLOCK 2: COMPUTER DEVICES

#### **UNIT 1 INPUT DEVICES**

Introduction, Keyboards , Pointing Devices, Scanning Devices, Voice Recognition Systems, Summary, Let us Sum Up, Other Books For Reading

#### **UNIT 2 OUTPUT DEVICES**

Introduction, Monitors, Printers, Summary, Let us Sum Up, Other Books For Reading

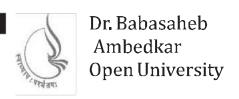
#### **BLOCK 3: SOFTWARE**

#### **UNIT 1 SYSTEM SOFTWARE**

Introduction, Operating Systems, Network Operating Systems, Utilities, Summary, Let us Sum Up, Other Books For Reading

#### **UNIT 2 APPLICATION SOFTWARE**

Introduction, Word Processing Software, Spreadsheets,
Database Management Systems, Presentation Programs,
Graphic Programs, Multimedia Authoring Applications,
Entertainment and Education Software, Summary, Let us Sum
Up, Other Books For Reading



## **Fundamentals of Computer and IT**

### BLOCK 1: COMPUTER FUNDAMENTALS

UNIT 1

**COMPUTER FUNDAMENTALS** 

02



## BLOCK 1: COMPUTER FUNDAMENTALS

#### **Block Introduction**

In this current 21'st century, the working style and personal lifestyle of a human being has been drastically changed due to the application of computers. Now-a-days, computers are used everywhere - at offices, homes, schools, colleges, hotels, shops and what not. This revolutionary change in a lifestyle has made our life easy and comfortable. For instance, we can perform number of activities using computer based systems - we type a draft on word processor and mail it to others, we do several simple and complex calculations using electronic spreadsheet and also draw graphs based on the data in the spreadsheet accordingly, create database of known people like friends or our own customers with name, phone number, address and e-mail ID etc. It is difficult to perform these activities using existing traditional systems (manual system).

The computer also can be used for other variety of tasks such as word processing, designing (graphics), web site development, database management etc. Therefore, the computer should be referred as a 'data processor'. Data might be of any type like numeric, alphanumeric, alphabetic, voice and graphics so on.

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## UNIT 1 COMPUTER FUNDAMENTALS

#### **Unit Structure**

- 1.0 Learning Objectives
- 1.1 Introduction
- **1.2** Basic Computer Organization
- 1.3 Advantages of Computers
  - 1.3.1 High Accuracy
- 1.4 Programming Languages
  - 1.4.1 Language
  - 1.4.2 Processor is different
  - 1.4.3 There are two types of software:
  - 1.4.4 Computer Data Processing
- 1.5 Types of Computers
  - 1.5.1 Analog computers
  - 1.5.2 Digital Computers
- 1.6 Applications of Computers
- 1.7 Let Us Sum Up
- 1.8 Assignment
- 1.9 Check Your Progress: Possible Answers
- 1.10 Reference Books
- 1.11 Activities
- 1.12 Glossary

#### 1.0 LEARNING OBJECTIVES

#### At the end of this unit, you will be able to:

After working through this unit, you should be able to:

- Explain the basic organization of computer system and its various components
- Enlist various types of Computers
- Discuss the working of personal computer, Laptop computer and Palmtop computer
- Enumerate the advantages of computers as compared to traditional systems.
- State the evolution of computers and the principle of working of analogue and digital computers
- Describe the concept of batch processing, time sharing, system and application software

### 1.1 INTRODUCTION

### **Evolution of Computer Technology**

The origin of computer technology took place in 19th century. People in those days desired to have a machine that would perform mathematical calculations. ABACUS is considered as the first computer in the world. It was used to perform simple measurements and calculations.

In later period, the scientist named as Pascal developed a machine that could perform mathematical calculations. This machine had number of gears. The movement of gear mechanism used to perform some calculations. He named machine as PASCALINE.

However, the concept of a modern computer was put forward by the scientist and mathematician named Charles Babbage. He first wrote how to use logic and loops in a process execution. Based on the concept of logic and loops, Babbage developed two models for performing computations - Analytical Engine and Difference engine. In those days, electronics was not developed. Therefore these models proposed by Babbage were having existence only on paper. However, the ideas given by Babbage were implemented after invention of electronics.

George Boolean developed famous Boolean algebra based on binary numbers. De Morgan put forward theorems on logic gates. These theorems are known as De Morgan's Theorems.

#### Lady Ada is the first computer programmer.

The real applications of computers began in the late fifties(50s). The computers were used in United States for various applications such as census, defense, R&D universities etc.

Check your progress 1
1. Explain the significant work done by Charles Babbage for his machine.
2. What was the contribution made by Pascal to computer technology?
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## 1.2 BASIC COMPUTER ORGANIZATION

In simple words, computer is defined as an electronic device or machine that accepts data from Input device processes it and stores in a disk and displays it on output device such as monitor. (Storing of data takes place in secondary memory)

The basic block diagram of a computer is shown in Fig. 1.1. For all types of computers such as Personal Computer, Lap Top, Palm top etc., the fundamental principle of working will remain the same.

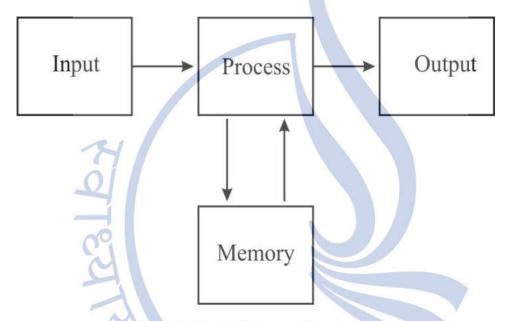


Fig. 1.1: Block diagram of computer

As shown in Fig 1.1, there are four main building blocks of a computer organization – input, processor, output and memory. The data is inputted through input device. Keyboards, Disks, Mouse are the input devices. The input devices translate data and programs that the human being can understand into the form that the computer can process.

The data received from keyboard is processed by the CPU i.e. Central Processing Unit. The CPU controls and manipulates data that produce information. The CPU is usually housed within the protective cartridge.

The processed data is either stored in the memory or sent to output device, as per the command given by the user. The memory unit holds data and program instructions for processing data.

Output devices like monitor (display unit), printer translate the processed information from CPU into the form that the human being can understand.

Check your progress 2
Define a computer.
2. Explain the block diagram of computer.
<b>4</b>
A A

## 1.3 ADVANTAGES OF COMPUTERS

Compared to traditional systems, computers offer lot of significant features. That's why the traditional systems are being replaced speedily by computer based systems. In traditional system human performs the task of writing data in the registers or books and used to perform calculations or making a report apart from this preserving the data in hard copies, files and folders with all human errors. This used to take lot of space to store. Many times records gets destroyed due to natural calamity and theft. The main advantages offered by the computers are as follows:

### 1.3.1 High Accuracy

- 1. High Speed of operation
- 2. Large Storage Capacity
- 3. User Friendly features
- 4. Portability
- 5. Platform independence
- 6. Economical on long term

Check your progress 3
1. What do you mean by traditional system?
2. Make a list of the advantages of using a computer as compared to traditional systems.
7 7 7

### 1.4 PROGRAMMING LANGUAGES

The computer performs activity as per instruction given by the user. The set of such instruction written for a particular task is known as computer program.

Program is the instruction that tells computer how to process the data into the form you want.

The language in which computer program is written is known as programming language. The programming languages are classified as Low level language and high level language.



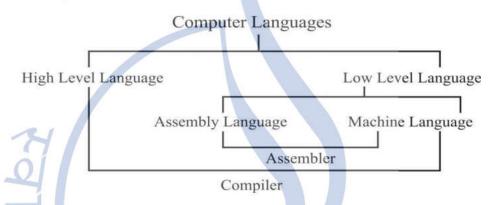


Fig. 1.2: Programming Languages

Low level language is further classified as Assembly language and Machine

### 1.4.1 Language

Machine language is expressed in terms of binary numbers i.e. 0 and 1 as the processor understands binary numbers only. However, for a human being, it is difficult to read and write the program in terms of 0s and 1s. The machine language code is therefore simplified by converting it to the code called op code. The op code depends upon type of processor. The program written in op code is known as Assembly Language code. During the run time, it is necessary to convert op code into machine language so that the processor will understand and process the code. The internal program that translates op code to machine code is known as Assembler. The examples of Assembler are Microsoft Assembler (MASM), Z-80, 8085, 8086 etc. The Assembler for each

#### 1.4.2 Processor is different

Use of assembly language requires knowledge of Assembly language and even computer hardware. For everyone it is much convenient to write a program in a High Level Language. The High Level Language comprises of instructions in simple English. Examples of High Level Language are BASIC, FORTRAN, and COBOL etc. Compiler is the internal program that translates High Level Language to Machine language.

Software is the other name for program. In most cases, the terms 'software' and 'program' are interchangeable. Software generally referred to the collection of various program to do tasks for the users.

#### 1.4.3 There are two types of software:

- System Software and
- 2. Application Software or Utility Software.

Application software is the end user software. The programs written under application software are designed for general purpose and special purpose applications. The example of application software is internet explorer, accounting software, Customer Billing, In-time and out - time recoding and salary processing software etc.

System Software makes application software interact with the computer hardware. System software runs in the background that helps computer to manage its own internal resources. The most important system software is the operating system. The system software performs important tasks such as running of program, storage of data, processing of data etc. Windows XP is the example of system software.

We will be studying in details about system software and application software later in this book.

### 1.4.4 Computer Data Processing

As we have learnt earlier that computer is a machine which takes data as input, process and gives out put in a user required form. Now we will learn about data processing. Computer data processing referred to the tasks like sort, search, merge, copy, transfer, collate, compare, store, create, enter, perform, compare, display and compute etc. are carried out time to time as per the requirement of the users of the computer. All these tasks are carried out by using different technologies.

There are mainly three types of data processing technologies available such

as:

- **1.** Batch Processing (Off-Line)
- 2. Time Sharing (Simple On-Line)
- 3. Real time (quick response, On-Line)

#### 1. Batch Processing and Time Sharing

The computer works on basis of either batch processing or time sharing. Batch Processing: In batch processing, the computer acts as a 'standalone' unit. As such, it is available for a single user. Therefore, number of tasks can be done one after the other. In a small business unit, only one computer doing the entire task collecting batch wise data accordingly.

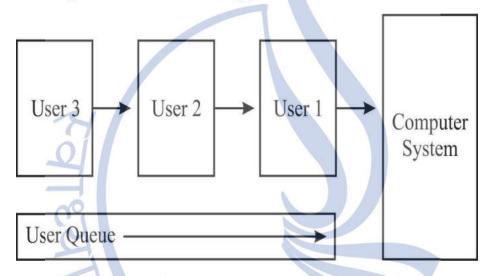


Fig. 1.3: Batch Processing

#### 2. Time sharing

Unlike batch processing, the time sharing offers simultaneous usage of computer. The computer is provided with multiple terminals from which the system can be accessed simultaneously by number of users. User has time slot to process their tasks one after the other.

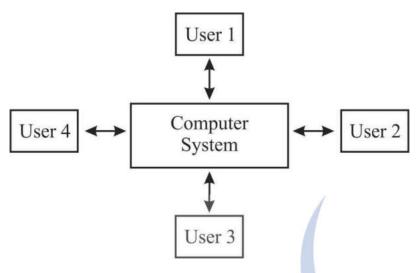


Fig. 1.4: Time Sharing

#### 3. Real time

This method of processing done without delay because there are various processors in the main machine available which take the request of the users from various corners and allocate the processor to process the task immediately without delay. Hence processing done quickly. Examples like Radar System in Defense organization, online railway booking, airline booking and online examination and result declaration system etc.

Check your progress 4
1. Explain the types of software.
2. What is the concept of Batch processing, time sharing and real time system?
3. List out the example of Batch processing, time sharing and real time system
J. List out the example of Batch processing, time sharing and real time system
7 79:

### 1.5 TYPES OF COMPUTERS

The computers are classified in variety of ways depending upon the principle of working, construction, size, applications. Various types of computers are discussed in this section.

#### **Digital and Analog Computers**

#### 1.5.1 Analog computers

The computers that process analogue signals are known as Analogue Computers. Analogue signal is a continuous signal. For example sine wave is the analogue signal. The analogue quantities are based on decimal number systems. Examples of Analogue computers are slide rule, ABACUS etc.

The operational amplifiers are widely used in the construction of analogue computers when the analogue electrical signal is to be processed. For example, differentiator is the op amp circuit that differentiates input signal. If the input signal

V sin q is given to analogue computer; the output would be V cos q. accordingly, the analogue computer that generates second order differential equation can be drawn as given in Fig 1.3.

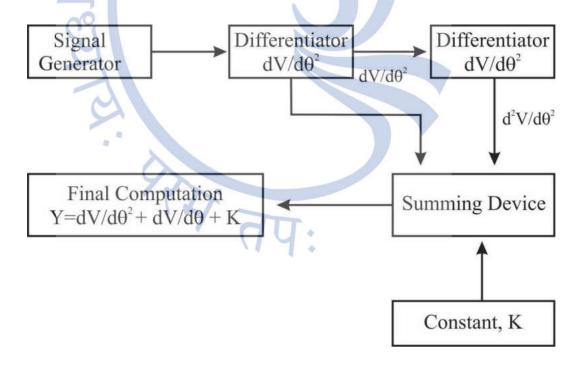


Fig. 1.5: Analog Computers

#### 1.5.2 Digital Computers

On other hand the computers that process digital signals are known as Digital Computers. The Digital signal is a discrete signal. It has two states 0 and 1. In practice, the digital computers are used and not analogue!

Examples of digital computers are Personal Computers, Supercomputers, mainframe computers etc.

#### 1. Supercomputers:

Supercomputers are the most powerful computers in terms of very speed of execution and large storage capacity. NASA uses supercomputers to track and control space explorations.

Mainframe Computers: have the capacity next to supercomputers. The mainframe computers are multi terminal computers which can be shared simultaneously by multiple users. Unlike personal computers, mainframe computers offer time sharing.

For example, insurance companies use mainframe computers to process information about millions of policyholders.

#### 2. Minicomputers:

These computers are also known as midrange computers. These are desk sized machines. These computers are used in medium scale applications. For example, production departments use mini-computers to monitor various manufacturing processes and assembly-line operations.

#### 3. Microcomputers:

As compared to supercomputers, mainframes and minicomputers, the microcomputers are least powerful, but these are very commonly used and fastest growing computers.

#### 4. Personal Computer:

PC is the term related to the computer that is designed for use by a single person. PCs are also called microcontrollers because these are smaller as compared to mainframe and minicomputers. The term 'PC' is often used to refer desktop computers. Although PCs are used by individuals, they can also be used in computer networks.

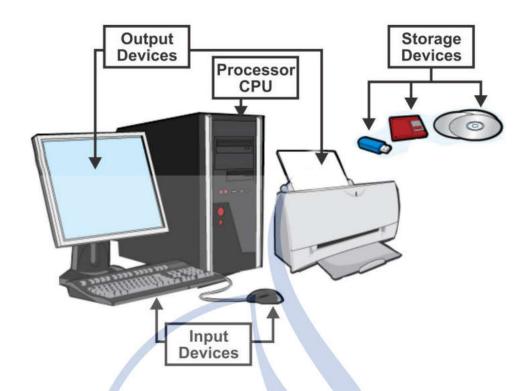


Fig. 1.6: Computer System

#### 5. Desktop Computer:

These are the most commonly used personal computer. It comprises of keyboard, mouse, and monitor and system unit. The System unit is also known as cabinet or chassis. It is the container that houses most of the components such as motherboard, Disk Drives, ports, switch mode power supply, add-on cards etc. The desktop computers are available in two models- Horizontal model and Tower model.

#### 6. Lap Tops:

Lap Tops are also called notebook computers. These are the portable computers. They have a size of 8.5 x 11 inch and weight of about 8 pounds.

Palm Tops: The Palm Tops are also called hand held computers. These are the computing devices small enough to fit in your hand. The size of a palm top is like an appointment book. The palm tops are generally kept for personal use such as taking notes, developing list of friends, keeping track of dates, agendas etc.

The Palm Top can also be connected to PC for downloading data. It also provides value added features such as voice input, internet, cell phone, camera, movie player and GPS.

### Personal Digital Assistant (PDA):

# **Computer** Fundamentals

PDA is the palm type computer. It combines pen input, writing recognition, personal organizational tools and communication capabilities in a small package.

Check your progress 5				
1. Explain analogue and digital computers.				
2. What do you mean by personal computer, desktop computer and PDA?				
3. Differentiate between various types of computers.				
· · · · · · · · · · · · · · · · · · ·				

### 1.6 APPLICATIONS OF COMPUTERS

Today's age is described as computer age. The computer based applications are being widely used in almost all fields. Some of the fields are mentioned below where computers are invariably used.

- 1. Health care and Insurance sectors
- 2. Research and Development
- Defense and Security sectors
- 4. Air lines and aviation sector
- Education schools, colleges, universities
- 6. Media and Film sector
- 7. Government population, taxes, Police, defense
- 8. Medicine Manufacturing of medicines, surgery
- 9. Agriculture- composition of fertilizers.
- 10. Industry Design, shipping, process control

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- 11. Home communication, business work at home, schoolwork, entertainment, Finances
- 12. Business Decision Support, Business information systems.

Check your progress 6					
1. Explain the use of computers in government, medicine and home.					
. Collect more information on the applications of computers in various fields					
and present it in your own words.					

## 1.7 Let Us Sum Up

Computer is an electronic device that processes data and converts into an information that is useful to the people.

Basically, there are two types of computers - analog and digital. Most of the users use digital computers.

Computers designed for use by a single person are desktop computers, workstations, notebooks, tablet and handheld computers.

The term personal computer or microcomputer can be used when referring to any computer meant for use by a single person.

The desktop computer is the most common type of personal computer.

Workstation is the specialized single user computer that typically has more power and features than the desktop.

Notebooks are the full featured PCs that can be easily carried away..

Lap Tops are also called notebook computers. These are the portable computers. They have a size of 8.5 x 11 inch and weight of about 8 pounds.

Palm Tops are also called hand held computers. These are the computing devices small enough to fit in your hand.

Personal Digital Assistant (PDA) is the palm type computer. It combines pen input, writing recognition, personal organizational tools and communication capabilities in a small package.

The computer based applications are being widely used in almost all fields including education, industry, agriculture, medicine etc.

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## 1.8 Assignment

#### **Broad Questions**

- 1. Discuss the working of computer with basic block diagram of computer organization.
- 2. Discuss various components of computer organization.
- 3. Discuss various types of computers. Explain their features.

#### **Short Notes**

- a. Digital and analogue computer
- b. High Level Language with example and role of compiler in it
- c. Assembler. Also, state the examples of assembler
- d. Features of assembly language
- e. Evolution of computers
- f. Features of machine language
- g. Difference between batch processing and time sharing

## 1.9 Check Your Progress: Possible Answers

Check your progress 1

**Answers: See Section 1.2** 

Check your progress 2

**Answers: See Section 1.3** 

Check your progress 3

**Answers: See Section 1.4** 

Check your progress 4

**Answers: See Section 1.5** 

Check your progress 5

**Answers: See Section 1.6** 

Check your progress 6

**Answers: See Section 1.7** 

## 1.10 Reference Books

- 1. Computer Essentials, Timothy J. O'Leary, Linda O'Leary, MKCL Publishing
- 2. Fundamentals of Computers, V. Rajaraman, Prentice Hall of India
- 3. Introduction to Computers, Peter Norton, McGraw Hill Publishing Technology
- 4. Edition

## 1.11 Activities

### Activity 1

 Obtain more information about various components of computers using internet and discuss it in your own words.



1.12	Glossary
------	----------

Basic Computer	In Computer System,	different parts of a computer
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Organization The actions of organization -> systematic

arrangement of elements, systematic approach to

tasks.

Computer is a programmable machine that

receives input, stores and manipulates data and

provides output in a useful format.

Database Management A Database Management System (DBMS) is a set

Multimedia Authoring A program that helps you write hypertext or

Applications multimedia applications. Authoring tools usually

enable you to create a final application merely by linking together objects, such as a paragraph of text,

an illustration, or a song.

Network Operating System It is an operating system that includes special

functions for having connectivity with computers and other devices into a local area network (LAN).

It is generally reserved for software that enhances a

basic operating system by adding networking

features.

Printer In computing, a printer is a peripheral (Hardware

component) which produces a text and/or graphics) of documents stored in electronic form, usually on

physical print media such as paper or transparencies.

**Programming Language** A programming language is an artificial language

designed to express computations that can be

performed by a machine, particularly a computer.

Scanning Devices Devices uses a magnetic or photo-electric source to

scan and convert images into electric signals that

can be processed by an electronic apparatus, such as

a computer.

#### **Spreadsheets**

A spreadsheet is a computer application that simulates a paper, accounting worksheet. It has multiple cells that together to make up a grid consisting of rows and columns, each cell containing alphanumeric text, numeric values or formulas.

**Utilities** 

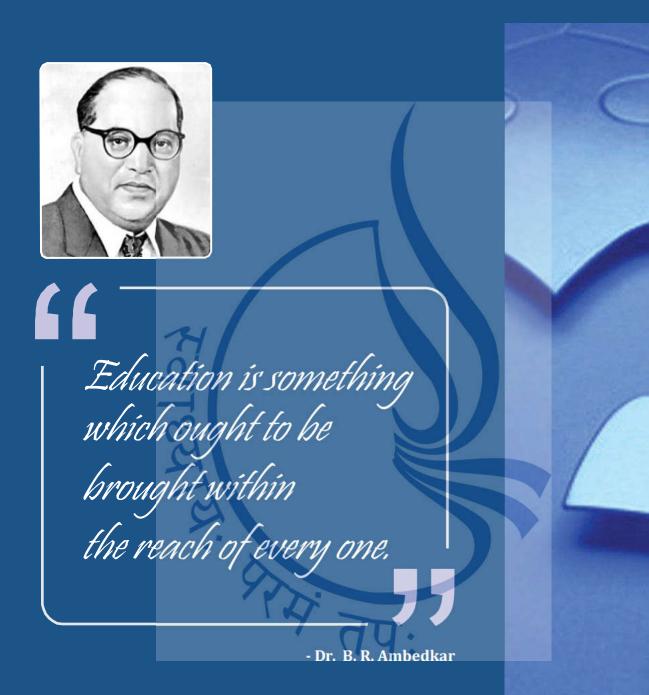
Utility is a kind of system software designed to help analyze, configure, optimize and maintain the computer.

Voice Recognition Systems This system converts spoken words to text. The term "voice recognition" is sometimes used to refer to recognition systems which must be trained by a particular speaker — as it is the case for most desktop recognition software. Recognizing the speaker can simplify the task of translating speech.

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Word Processing Software A word processing software is a computer application used for the production (including composition, editing, formatting and possibly printing) of any sort of printable material

Ei	nrolment No.						
1.	1. How many hours did you need for studying the units?						
	Unit No.	1	1	2		3	4
	No. of Hrs						
2.	Please give your rea	ctions to th	ne fo	llowing	items l	oased on you	r reading of the
	Items	Excellent	Ver	y Good	Good		Give specific example if any
	Presentation Quality						
	Language and Style		E				
	Illustration used (Diagram, tables etc)						
	Conceptual Clarity						1
	Check your progress Quest						
	Feed back to CYP Question						
3.	Any other Comment	S					
· 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7							
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#### ROLE OF SELF INSTRUCTIONAL MATERIAL IN DISTANCE LEARNING

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Our team of successful writers and authors has tried to reduce this.

Divide and to bring this Self Instructional Material as the best teaching and communication tool. Instructional activities are varied in order to assess the different facets of the domains of learning.

Distance education teaching repertoire involves extensive use of self-instructional materials, be they print or otherwise. These materials are designed to achieve certain pre-determined learning outcomes, namely goals and objectives that are contained in an instructional plan. Since the teaching process is affected over a distance, there is need to ensure that students actively participate in their learning by performing specific tasks that help them to understand the relevant concepts. Therefore, a set of exercises is built into the teaching repertoire in order to link what students and tutors do in the framework of the course outline. These could be in the form of students' assignments, a research project or a science practical exercise. Examples of instructional activities in distance education are too numerous to list. Instructional activities, when used in this context, help to motivate students, guide and measure students' performance (continuous assessment)



#### **PREFACE**

We have put in lots of hard work to make this book as user-friendly as possible, but we have not sacrificed quality. Experts were involved in preparing the materials. However, concepts are explained in easy language for you. We have included may tables and examples for easy understanding.

We sincerely hope this book will help you in every way you expect.

All the best for your studies from our team!



## **Fundamentals of Computer and IT**

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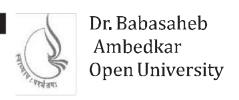
#### **BLOCK 3: SOFTWARE**

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## **Fundamentals of Computer and IT**

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## **BLOCK 2: COMPUTER DEVICES**

#### **Block Introduction**

To have communication human being use language which is basically constructed from letters, words, sentences, numbers and punctuation symbols. Likewise, computer can understand only the binary machine language expressed in terms of 0s and 1s. Input and Output devices are basically translators. Input devices are peripherals (piece of computer hardware equipment) used to provide data and control signals to an information processing system like a computer. Input devices converts letters, numbers and actions that people understand into symbols that computer can understand and process.

Output devices perform reverse action – they translate machine output to the output, which people can understand.

Data or the information entered or given to the computer is called input. The user is used to provide input to the computer whenever he uses system or application programs. For example, while using word processing program, the user enters data in the form of numbers, letters and then issues commands to computer like save or print. User can also enter data and issue commands by pointing to items, using his voice, and by writing on special devices. Other inputs are like scanned or photographed images.

Input device are hardware components used to provide input to the computer for example, while using word processor, we typically use a keyboard to enter text and mouse to select commands. In addition to keyboard and mouse, mostly used input devices can do scanning, image capturing, digitizing and audio input. These devices basically meant to take input into various forms and translate into computer understandable form. म्यः तपः

## UNIT 1 INPUT DEVICES

#### **Unit Structure**

- 1.0 Learning Objectives
- 1.1 Introduction
- 1.2 Pointing Devices
  - 1.2.1 Mouse
  - 1.2.2 Track Balls
  - 1.2.3 Joy Stick
  - 1.2.4 Touch Screen
  - 1.2.5 Light Pen
- 1.3 Scanning Devices
  - 1.3.1 Optical Scanners
  - 1.3.2 Bar Code Readers
  - 1.3.3 Digital Camera
  - 1.3.4 Web Camera
- 1.4 Voice Recognition Systems
- 1.5 Let Us Sum Up
- 1.6 Assignment
- 1.7 Check Your Progress: Possible Answers

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- 1.8 Reference Books
- 1.9 Activities

#### 1.0 LEARNING OBJECTIVES

#### After going through this unit, you will be able to:

- Specify the types of I/O devices and their use in computer systems
- State the basic principle of working of keyboard and its various types
- Name various types of key switches
- Enlist various types of mouse used in computer systems
- Explain the principle of working of mouse, joystick, OCRs and trackball

#### 1.1 INTRODUCTION

#### Keyboards

One of the general and most common ways to input data is by keyboard. The Keyboards convert or translate numbers, letters and special characters that people understand into electrical signals. These electrical signals are sent to and processed by the system unit.

There are wide varieties of different keyboard designs. They range from the traditional keyboards to ergonomic keyboards to space saving or flexible keyboards.

There are four types of keyboards on basis of type of key switch - Mechanical, Membrane, and Capacitor and Hall Effect keyboards. Let us discuss these types:

#### **Mechanical Keyboard**

As the name suggested, the mechanical keyboard comprises of mechanical key switches. In mechanical switch keys, two pieces of metal are pushed together when the key is pressed. The switch elements are made up of phosphor bronze alloys with gold plating on contact areas. The key switch is provided with a spring to return the key to the non-pressed position. The small piece of foam is provided to help damp out bouncing.

#### Advantage:

The main advantage is a low cost.

#### Disadvantage:

- 1. The mechanical key switches suffer from contact de-bounce. The pressed key may make and break contact several times before it makes a solid contact.
- 2. Over the period of aging, the contacts may become oxidized or dirty. As a result the key switches become sluggish and insensitive.

#### Life:

The life of higher-quality mechanical key switches is about 1 million keystrokes.

#### Membrane Keyboard

The membrane key switches comprise of three layer plastic or rubber sandwich. The top layer has a conductive line of silver ink running under each row of keys. The middle layer has a hole under each key position. The bottom layer has a conductive line of silver ink running under each column of keys.

When you press the key, you push top ink line through the hole to contact the bottom ink line.

#### Advantage:

The advantage of such type of keyboards is that they can be made very thin, sealed units.

#### Disadvantage:

These keyboards have a limited usage. You have seen these keyboards in mobile phones, calculators, billing machines etc. However you cannot use these keyboards as general purpose keyboards.

#### Life:

The life of these keyboards varies over a wide range.

#### **Capacitive Keyboard**

As name indicates, this type of keyboard comprises of capacitive type of key switches. The capacitive key switch has two small metal plates on printed circuit board and another metal plate at the bottom of piece of foam. When you press the key, the movable plate is pushed closer to the fixed plate. This changes the capacitance between two plates. This change in capacitance is detected by the

sense amplifier circuit. This generates a logic level signal that indicates that the key has been pressed.

Input Devices

#### Advantage:

There are no mechanical contacts to become oxidized or dirty.

#### Disadvantage:

The sense amplifier circuit should be able to identify the key closure at all the times.

#### Life:

The life of capacitive key switches is about 20 million keystrokes.

#### Hall Effect Keyboard

The other type of key switch has no mechanical contacts. It takes advantage of deflection of moving charge by a magnetic field.

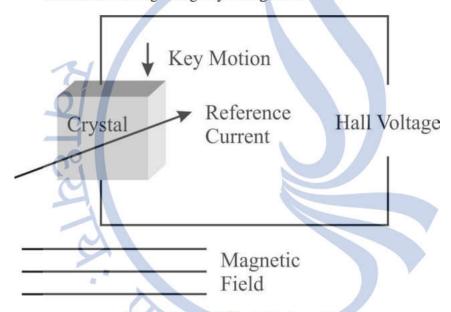


Fig. 2.1: Hall Effect Keyboard

The working of the Hall Effect key switches is shown in Fig. 2.1. The reference current is passed through a semiconductor crystal between two opposing faces. When the key is pressed a crystal is moved through a magnetic field which has its flux lines perpendicular to the direction of current flow in the crystal. Moving crystal through magnetic field causes a small voltage to be developed between two of the opposing faces of the crystal. This voltage is amplified and used to indicate that the key is pressed.

#### Advantage:

There are no mechanical contacts to become oxidized or dirty.

#### Disadvantage:

Hall Effect keyboards are more expensive because of more complex switch mechanisms.

#### Life:

The life of capacitive key switches is about 100 million keystrokes. Working of Key Board (How computer accepts input from Keyboard)

The working of keyboard takes place as shown in the functional block diagram. (Fig 2.2)

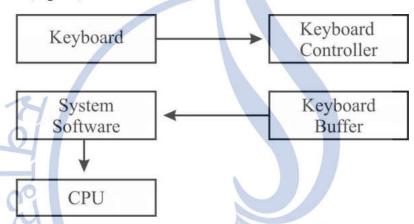


Fig. 2.2: Working of a keyboard

#### The various steps are as follows:

- The key is pressed on keyboard.
- 2. The scan code sent by keyboard controller for the key to the keyboard buffer.
- 3. The interrupt request sent by keyboard buffer to the system software.
- System software then responds to the interrupt by reading scan code from the buffer of the keyboard.
- 5. Then the system software passes the scan code towards the CPU.

When you press any key on keyboard, the chip keyboard controller comes to know that the key is pressed. The keyboard controller places a code corresponding to pressed key, into part of its memory unit is known as keyboard buffer. Buffer is mainly a temporary storage area that holds data until it can be processed. Then, the keyboard controller delivers a signal to the system software. When the system

Input Devices

software get or receive signal to generate relevant response, the keystroke occurs to the system that reads the memory location in the keyboard buffer which contains code of the key that was pressed. The system software then sends that code to CPU.

The keyboard buffer can store many keystrokes at a time. This is necessary because sometimes, there are elapses between pressing of the key and computer's reading of that key from the keyboard buffer. With keystrokes stored in the buffer, the program can react with them when it is convenient.

#### **IBM Enhanced Keyboard**

The keyboard conforming to IBM standard is known as IBM enhanced Keyboard. The keyboard has about 100 keys. Each key when pressed generates a separate signal for CPU. The 100 keys are arranged in five groups. The keys on keyboard are having following sections:

#### 1. Alphanumeric keys:

This section comprises of alphabetical keys viz. A, B, C ....Z and numeric keys viz. 0, 1, 2...9

#### 2. Modifier Keys:

The SHIFT, ALT (Alternate) and CTRL (Control) keys are called Modifier Keys, because they modify input received from the other keys.

#### 3. Numeric keypad:

It is located at the right side of the keyboard. It looks like a calculator's keypad. It has 10 numeric keys and mathematical operator keys (+, -, \* and /). The numeric key pad can be activated by using NUM LOCK key.

#### 4. Function keys:

There are 12 function keys viz. F1, F2, F3....F12, situated at top of the keyboard. Each key has a purpose as per program being used. Usually F1 key gives help menu.

#### 5. Cursor movement keys:

The four arrow keys are provided for movement of cursor on the screen. These four keys are up, down, right and left arrow keys.

## 6. Special purpose keys:

The special keys provided are ESC, Print Screen, Pause, Insert, Delete and Scroll lock.

Check your progress 1		
1. What are the different types of keyboards?		
2. Explain the working of keyboard in your words.		
74/		
2		
4		
7 77.		
11 7 .		

## 1.2 POINTING DEVICES

Pointing devices provide an interface with the system unit by accepting point gestures and converting them into machine readable input. There are wide variety of different pointing devices including mouse, joystick, touch screen and light pen. While the most frequent pointing device by far is the mouse, and many more devices have been developed.

#### **1.2.1 MOUSE**

In early 1980s, when the Personal Computer was introduced, it was having only keyboard as the main input device. The pointing device was not much required in those days. However, the requirement of mouse was realized as new software's came in. Today, mouse has become an integral part of the computer system.



Fig. 2.3: Mouse

The various events performed on mouse are click, double click, right click, drag and drop.

#### The main components of mouse are as follows:

- 1. Left Button: It involves two events single click and double click. Single click on item on monitor to select it. Double click to perform an action.
- 2. Right Button: Single right clicking on the object displays a short cut menu of options.

- 3. Mouse Cable: It connects and sends electronic signals from mouse to system unit.
- 4. Roller Ball: It converts movement of mouse into electronic signals.

You can configure mouse properties. For example, you can change the shape of a mouse pointer. Select start > settings > control panel > mouse. The dialog box 'mouse properties' will appear on the screen. The various options are buttons, pointers, pointer options, Hardware, activities and wheel. Select the required option for configuration.

#### A. Mechanical Mouse:

Is the most common type of point device. It contains a small rubber ball that protrudes through a hole in the bottom of mouse body. A ball rotates inside the case as you move the mouse around on flat surface. Inside the mouse, rollers, sensors send or deliver signals to the computer telling it the distance, direction and speed of the ball's motion. The computer uses this data to point the mouse pointer on the screen.

#### **B. Optical Mouse:**

This mouse is a non-mechanical type of mouse. This type of mouse uses a light-emitting diode and photodiodes to detect movement relative to the underlying surface, rather than internal moving parts as other mechanical mouse does. It emits a beam of light from its underside; it uses light's reflection to judge the distance, direction and speed of travel. The optical mouse offers two benefits:

- Without using cursor movement keys the mouse lets you position the curser anywhere on the screen quickly. Then you move the pointer to the on-screen position you want and press the mouse button, the cursor display at that location.
- 2. Instead of forcing to type or issue commands from keyboard, the mouse based operating system allows you to use menus and dialog boxes.
- 3. Compared to mechanical mouse, the optical mouse is maintenance free. It does not require periodic cleaning.
- 4. The optical mouse is more precise as compared to the mechanical mouse.

This type of mouse has a small wheel among its buttons. This wheel can be used for scrolling through a long document. Not all applications and operating systems support the use of wheel.

Cordless or wireless mouse is a battery powered device that uses radio waves or infrared light waves to communicate with the system unit. This type of mouse eliminates mouse cord and free up desk space. A cordless mouse frees you from cord problems. It connects to your computer with a radio (rather than an infrared) signal, powered by two AAA batteries

#### 1.2.2 TRACK BALLS

This is a pointing devices similar to mouse are trackballs, touch surfaces and pointing sticks. It is a pointing device which looks like an upside-down mouse with an exposed protruding ball. The user rolls the ball with the thumb, fingers, or the palm of the hand to move a cursor. You can use trackball (also called roller ball) to control pointer by rotating ball with your thumb. A touch surface (track pad) is a pointing device consisting of specialized surface that can translate the motion and position of a user's fingers to a relative position on screen. You can also use touch surfaces to control the pointer by moving and tapping you finger on surface of a pad. You can use pointing stick located in the middle of a keyboard to control the pointer by directing the stick with your finger.

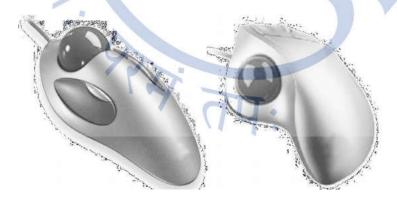


Fig. 2.4: Trackball

#### 1.2.3 JOY STICK

Joystick is the most commonly used input device for computer games. The game actions are controlled by varying pressure, speed and direction of Joystick. Additional controls such as buttons and triggers are used to specify commands or initiate specific actions. The joystick has been the principal flight control in the cockpit of many aircraft, particularly military fast jets.

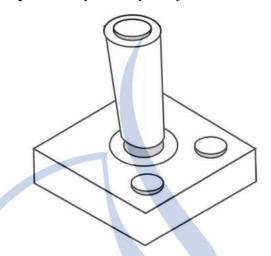


Fig. 2.5: Joystick

#### 1.2.4 TOUCH SCREEN

It is a particular kind of monitor screen covered with a plastic layer. Behind this layer are crisscrossed invisible beams of infrared light. This arrangement enables someone to select actions or commands by touching the screen with finger.

Touch screens are easy to use, especially when people need information quickly. These types of displays can be attached to computers or to networks as terminals. These are commonly used at restaurants, automated teller machines (ATMs) and information centers.



Fig. 2.6: Touch Screen

## 1.2.5 LIGHT PEN

Light pen is light sensitive pen like device. A light pen is a computer input device in the form of a light-sensitive wand used in conjunction with a computer's CRT TV set or monitor. It allows the user to point to displayed objects, or draw on the screen. The light pen is placed against the monitor. This closes photoelectric circuit and identifies the spot for entering or modifying data. Light pens can be used to do graphical representations on a computer. For example, light pens are used to edit digital images.

Check your progress 2
1. What is the use of joystick and touch screen?
2. Describe the components of a mouse.

#### 1.3 SCANNING DEVICES

Scanners read data or information from source and which can be a written document, inventory card, price tag, photograph or picture. A scanning device reads data or information and converts it into a form that the computer can process. There are three types of scanning devices: Optical scanners, bar code readers and character and mark recognition devices.

#### 1.3.1 OPTICAL SCANNERS

The optical scanner copies or reproduces text as well as images. These devices record light as well as dark areas and also color of the scanned document. After scanning the image, it can be displayed, printed on paper and stored in memory. There are two categories of optical scanners – Flatbed and portable.

Flatbed scanner is similar to a copying machine. The image which is to be scanned is placed on the glass surface above the scanner which records image from below.

Portable scanner is a type of hand held device that slides across the image making a direct contact.

The optical scanners are used widely in the world. These are the powerful tools for a wide variety of end users. This includes advertising and graphic professionals who scan images and combine with text. Lawyers and students use portable scanners as a valuable research tool to record information.

#### 1.3.2 BAR CODE READERS

Input Devices

As we all have seen bar code readers at different stores. Wand readers or platform scanners are photoelectric scanners that read the bar codes or vertical zebra-striped marks, printed on product containers. The electronic cash registers are used in supermarkets. There the bar code system is called Universal Product

Code (UPC). The bar code identifies product to the supermarket's computer which has a description and least price for the product. The computer automatically tells electronic cash register, the price of the product. These devices are easy to operate and user friendly.



Fig. 2.7: Bar Code Reader

#### **Character and Mark Recognition Devices**

These are the scanners that are able to recognize special characters and marks. They are the special devices that are essential tools for certain applications. There are following three types of Character and Mark Recognition Devices -

- 1. Magnetic Ink Character Recognition (MICR): It is used in banks to automatically read the MICR Number printed at the bottom of the cheque. It is read by special purpose machine known as reader / sorter which reads characters. These characters are made by ink containing magnetized particles.
- 2. Optical Character Recognition (OCR): The preprinted characters can be read by the light source and can be converted into a machine-readable code.

- The common OCR device is a hand held wand reader. These are used in the departmental stores to read retail price tags by reflecting light on the printed characters.
- 3. **Optical Mark Recognition (OMR):** It is also called mark sensing. An OMR device senses whether the mark as pencil mark is present or absent. The OMR technique is used in evaluation of competitive examination performance. This technique is used for evaluating marks in examinations such as Graduate Record Examination (GRE), Scholastic Aptitude Test (SAT) etc.



Fig. 2.8: Optical Mark Recognition

## 1.3.3 DIGITAL CAMERA

Optical scanners, like traditional copying machines, can make a copy from an original object. For example, we can copy a photograph by using optical scanner. Digital camera is an image capturing device which creates or captures original images. Digital camera is similar to traditional camera except that the images are recorded digitally. The images are stored in the memory of the camera or on the disk and not on the film itself. We can take a picture, view it instantly, store it in a memory and place it on web page. This can be done immediately.

Digital cameras are now available at low cost. Using digital camera and special software, you can edit photographs on computer. The digital cameras work much like a regular camera with a value addition of capturing and digital storage of images internally. Typically photographs are transferred to the computer through USB port. These photographs are read through PC software. This software can further be used to edit, print, e-mail and archive the photographs.



Fig. 2.9: Digital Camera

#### 1.3.4 WEB CAMERA

Web camera is the Digital video camera. It is the other kind of image capturing device. Unlike traditional video cameras the web camera record motion digitally in the memory of the camera or on the disk. The Webcams capture images which can be sent to a computer across the globe using the internet.

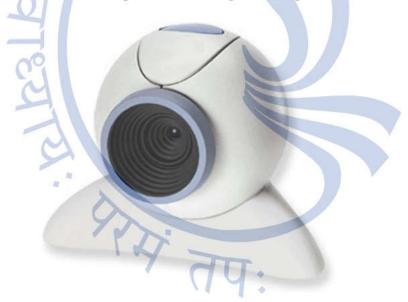


Fig. 2.10: Web Camera

Graphic tablets and digital notebooks: Graphic tablets and digital notebooks are digitizing devices. Using digitizing devices the diagram can be converted into the form that is process-able by the computer. These devices are provided with a flat surface and writing device. As the user moves writing device across the surface, the digitization device records the movement as a series of points and sends this information to the computer.

The Graphic tablets comprise of the special graphics surface or tablet and special stylus or a pen like device. The user draws a diagram directly on the tablet or traces images that are placed on the tablet. These devices are widely used by artists, draftsman and engineers. Artists create pictures, draftsman creates maps and engineers digitally save the mechanical drawings.

Digital notebooks: The digital notepad is positioned on the top of the tablet. Using a regular pen, the user takes notes and creates drawings on the notepad. The underlying electronic pad records the movements. Later, the notes taken by the user can be processed, edited and used with a word processing program.

Check your progress 3
1. Explain the use of graphics tablet and web camera.
2. What is the use of bar code reader and character and mark recognition devices?
3. Discuss the advantages of various scanning devices over each other.
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Input Devices

## 1.4 VOICE RECOGNITION SYSTEMS

The Voice Recognition Systems are the audio input devices which convert sound into the form that can be read and processed by the computer. The most commonly used audio input device is the microphone. Microphone is the main part of Voice Recognition Systems. Other components are sound card and special software. Using this system the document with voice command can be created. It is an input system that uses a microphone (or a telephone) as an input device and converts a person's speech into digital signals by comparing the electrical patterns produced by the speaker's voice with a set of prerecorded patterns stored in the computer. Voice-recognition technology is useful in situations where people are unable to use their hands to input data or need their hands free for other purposes. Some Voice Recognition Systems can translate dictation taken from language to other language. For example, it is possible to translate from English to Japanese.

Check your progress 4
1. What are voice recognition systems?
2. What are the components of voice recognition systems?
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$\mathcal{G}_{1}$
79:

## 1.5 Let Us Sum Up

Input devices translate letters, numbers and actions that people understand into symbols that computer can understand and process.

Output devices perform reverse action — they translate machine output to the output which people can understand.

Input device hardware's are used to provide input to the computer. For example while using word processor, we typically use a keyboard to enter text and mouse to issue commands. In addition to keyboard and mouse, mostly used input devices contain scanning, image capturing, digitizing and audio input devices. These devices are basically translators from what people can understand to what the computer can process & understand

One of the most common ways to input data is by keyboard. The Keyboards convert or translate numbers, letters and special characters that people understand into electrical signals. These electrical signals are sent to and processed by the system unit.

There are four types of keyboards on basis of type of key switch - Mechanical, Membrane and Capacitor and Hall Effect keyboards.

#### The various steps in working of keyboard are as follows-

- 1. The key is pressed on keyboard.
- 2. The scan code sent by keyboard controller for the key to the keyboard buffer.
- 3. The interrupt request sent by keyboard buffer to the system software.
- **4.** The system software responds to the interrupt by reading scan code from the keyboard buffer.
- 5. The system software passes the scan code to the CPU.

The keyboard conforming to IBM standard is known as IBM enhanced Keyboard. The keyboard has about 100 keys. Each key when pressed generates a separate signal for CPU. The 100 keys are arranged in five groups. The keys on keyboard are having following sections alphanumeric keys, modifier keys.

Numeric keypad, Function keys, Cursor movement keys, Special purpose keys

Pointing devices provide an interface with the system unit by accepting point gestures and converting them into machine readable input. There are wide variety of different pointing devices including mouse, joystick, touch screen and light pen.

Input Devices

Various types of mouse are Mechanical. optical, wheel. cordless.

Three devices similar to mouse are trackballs, touch surfaces and pointing sticks. You can use trackball (also called rollerball) to control pointer by rotating ball with your thumb.

Joystick is the most commonly used input device for computer games.

Touch screens are easy to use, especially when people need information quickly.

Light pen is light sensitive pen like device. The light pen is placed against the monitor.

A scanning devices read data or information and then converts into a form that the computer can process. There are three types of scanning devices - Optical scanners, bar code readers and character and mark recognition devices.

The optical scanner copies or reproduces text as well as images. There are two categories of optical scanners – Flatbed and portable.

The bar code identifies product to the supermarket's computer which has a description and least price for the product.

#### CHARACTER AND MARK RECOGNITION DEVICES

These are the devices or scanners that are able to identify special characters and marks. There are three types scanners – 1] Magnetic Ink Character Recognition (MICR) 2] Optical Character Recognition (OCR) 3] Optical Mark Recognition (OMR)

To image capturing Digital camera device is use which creates or captures original images. Web camera is the Digital video camera.

The Voice Recognition Systems are the audio input devices which convert sound in the form that can be processed and read by the computer.

## 1.6 Assignment

#### **Broad Questions**

- 1. Discuss the working of keyboard with functional block diagram. What do you mean by IBM enhanced key board?
- 2. What are Character and Mark Recognition Devices? Discuss their various types

#### **Short Notes**

- a. Working of mouse
- b. Various types of mouse
- c. Various types of scanning devices
- d. Light pen
- e. Joystick

## 1.7 Check Your Progress: Possible Answers

Check your progress 1

**Answers: See Section 1.1** 

Check your progress 2

**Answers: See Section 1.2** 

Check your progress 3

**Answers: See Section 1.3** 

Check your progress 4

**Answers: See Section 1.4** 

Input Devices

## 1.8 Reference Books

- 1. Computer Essentials, Timothy J. O'Leary, Linda O'Leary, MKCL Publishing
- 2. Fundamentals of Computers, V. Rajaraman, Prentice Hall of India
- 3. Introduction to Computers, Peter Norton, McGraw Hill Publishing Technology Edition

## 1.9 Activities

#### Activity 1

Explain in brief any five input devices along with their uses.



## UNIT 2 OUTPUT DEVICES

#### **Unit Structure**

- 2.0 Learning Objectives
- 2.1 Introduction
- 2.2 Monitors
  - 2.2.1 Other Monitors
- 2.3 Printers
  - 2.3.1 Dot Matrix Printers
  - 2.3.2 Laser Printer
  - 2.3.3 Led Printer
- 2.4 Let Us Sum Up
- 2.5 Assignment
- 2.6 Check Your Progress: Possible Answers

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- 2.7 Reference Books
- 2.8 Activities
- 2.9 Glossary

#### 2.0 LEARNING OBJECTIVES

#### After going through this unit, you will be able to:

- Specify the principle of working of monitor
- Enlist various types of output devices
- State the types of printers
- Explain the working of dot matrix printer, ink jet printer, laser printer and LED printer
- Discuss the concept of e-book reader, data projector and HDTV
- Identify the role of output devices in computer systems

#### 2.1 INTRODUCTION

Output is defined as a processed data from computer. Output is available to us in the form of hard copy or soft copy of text, graphics, audio, video modes.

The hardware used to provide output processed by the computer is known as output device. Monitors, printers, plotters are the commonly used output devices. For example let us suppose that you have prepared PowerPoint presentation on some topic. You would practice the presentation on Monitor, take printouts from printer and listen to presentation using audio systems. These output devices translate the information processed by computer into the form that people can understand and use.

#### 2.2 MONITORS

A monitor or display (also called a visual display unit) is a piece of electrical equipment which displays images generated by devices such as computers, without producing a permanent record. The monitor comprises the actual display device, circuitry and an enclosure. The display device in modern monitors is typically a thin film transistor liquid crystal display (TFT-LCD), while older monitors use a cathode ray tube (CRT).

Monitor is the most frequently used output device. The main features of monitor are size and clarity. The size of a display is typically given as the distance between two opposite screen corners. The size of monitor is specified as 15", 17",

19" etc. Larger monitors have the advantage of displaying more information on screen. However these are more expensive.

Resolution of monitor indicates clarity. The unit of resolution is pixels. Pixels are individual dots or 'picture elements' that form images on monitor. For a given size monitor, greater the resolution (i.e. more pixels), better the clarity of image. For a higher level of clarity, larger monitors require higher resolution (i.e. more pixels).

To indicate resolution capabilities of a monitor, several standards are available. The most common standards are SVGA, XGA, SXGA and UXG $\Lambda$ .

The resolution standards of monitor are furnished in the Table.

Standard	Expanded name	Pixels	Monitor Size
SVGA	Super Video Graphics Array	800 X 600	15"
XGA	Extended Graphics Array	1024 X 768	17" and 19"
SXGA	Super Extended Graphics Array	1280 X 1024	19" and 21"
UXGA	Ultra Extended Graphics Array	1600 X 1200	21"

As seen from the above table, the minimum resolution is provided by SVGA and maximum by UXGA. UXGA is the newest and highest standard. The UXGA monitors are primarily used for high end engineering design and graphic arts.

#### There are two main types of monitors:

• The CRT monitor, which is big and heavy. It is the oldest technology used by monitors. It looks like a television, but has a bigger display resolution and often a higher frequency. CRT stands for cathode-ray tube. The advantages of CRT monitor are low cost and high resolution. The disadvantage is larger size

**Output Devices** 

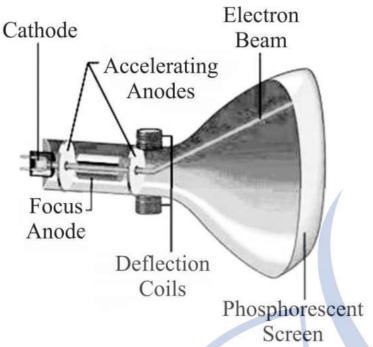


Fig. 3.1: Working of Monitor

The LCD monitor (also called Flat Panel Monitor) is thin, flat and lightweight type of monitor. It is a newer technology item than CRT type. The quality can be the same or even better than a CRT, but this type of monitor costs more than a CRT monitor. There are two types of LCD Monitors - passive matrix and active matrix. Passive matrix (also called dual scan monitors) creates images by scanning entire screen. This type of monitor requires a little power but clarity is not much sharp. Active matrix or thin film transistor (TFT) monitors do not scan down the screen. Instead, each pixel is activated independently. More colours with better clarity can be displayed. These types of monitors are expensive and require more power

#### 2.2.1 OTHER MONITORS

There are some other types of monitors used for specialized applications. Let us understand the working of these monitors.

1. The hand-held book size devices called is E-book which displays text and graphics. Using contents which are downloaded from the web, these devices are used to read newspapers, magazines and entire books. These readers are very economical. The cost of producing and distributing e-book content is less than publishing. And delivering traditional print media. The other benefit is the time required to create and distribute content is less. Therefore it is predicted that the e-books will be popular soon

- 2. Data projectors are specialized devices like slide projectors. These types of devices however connect to computer like microcomputers and project computer output just as it would appear on a traditional monitor. Salesmen, demonstrators, students make and deliver power point presentations on data projectors. The data projectors are mostly used for presentation at any place like classroom and boardroom.
- 3. High Definition Television (HDTV) is the recent development in the integration of computer and television. The High Definition Television (HDTV) views much clearer and more detailed wide screen picture than a regular television. Because, the output is digital, users can easily freeze video sequences to create high quality steel images. The video and still images can then be digitized, edited and stored on disk for later use. This technology is very useful to graphic artists, designers and publishers.

Check your progress 1
1. What are voice recognition systems?
2. What are the components of voice recognition systems?
7 71.

## 2.3 PRINTERS

The output view on monitor is referred as a soft copy. The output printed on paper through a printer or plotter is called a hard copy. Printer is an important output device for maintaining a hard copy of documents. The commonly used printers are dot matrix, Ink-jet, laser, LED printers. Let us study these types of printers.

#### 2.3.1 DOT MATRIX PRINTERS

A dot matrix printer/impact matrix printer is a commonly used printer. It is use in situations where printed content is more important than quality.

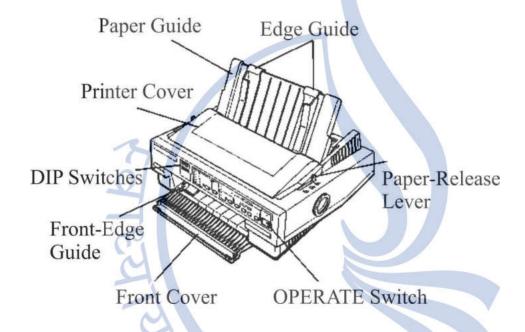


Fig. 3.2: Printer

The printer mechanism comprises of a print head that runs back and forth, or in an up and down motion, on the page and prints by impact, striking an inksoaked cloth ribbon against the paper, much like a typewriter. Because the printing involves mechanical pressure, these printers can create carbon copies and carbonless copies.

Typical output from a dot matrix printer operating in draft mode. This image represents an area of printer output approximately  $4.5 \text{ cm} \times 1.5 \text{cm}$  (1.75 × 0.6 inches) in size.

Each dot is produced by a tiny metal rod, known as a "wire" or "pin", which is driven forward by the power of a tiny electromagnet or solenoid, either

directly or through small levers (pawls). Facing the ribbon and the paper is a small guide plate pierced which contains holes to serve as guides for the pins.

#### **Advantages**

- 1. These machines are highly durable.
- 2. The cost of these printers is less as compared to other printers.
- 3. Dot matrix printers such as impact printer, which can make carbon-copies or print on multi-part stationery.
- 4. Printers like Impact printers which have the lowest printing costs for one page.

#### **Disadvantages**

- Impact printers can only print low resolution graphics, with limited color performance, limited quality and comparatively low speed.
- These are noisy printers, to the extent that sound dampening enclosures are available for use in quiet environments.

#### 3. Inkjet printer

Inkjet printers are the most common type of printer for the general consumer due to its benefits like high quality of output, low cost, capability of printing in different colors and ease of use. These printers operate by propelling variably-sized droplets of liquid or molten material (ink) onto almost any sized page.

The main manufacturers are Epson, Hewlett-Packard and Canon.

The disadvantage of this type of printer is that cost of ink is high.

#### 2.3.2 LASER PRINTER

A laser printer is a common type of printer that rapidly produces high quality text and graphics on plain paper. As with digital photocopiers and multifunction printers (MFPs). laser printers employ a xerographic printing process but differ from analog photocopiers in that the image is produced by the direct scanning of a laser beam across the printer's photoreceptor.

A laser beam projects an image of the page to be printed onto an electrically charged rotating drum coated with selenium. Photoconductivity

Output Devices

removes charge from the areas exposed to light. Dry ink (toner) particles are then electrostatic ally picked up by the drum's charged areas. The drum then prints the image onto paper by direct contact and heat, which fuses the ink to the paper.

#### 2.3.3 LED PRINTER

In the print head LED technology uses a light-emitting diode array as a light source. The LED bar pulse-flashes across the entire page width and creates the image on the print drum or belt as it moves fast.

Because they have fewer moving parts LEDs are more efficient and reliable than conventional laser printers. Depending on design, LED printers can have faster rates of print than some laser-based designs and are generally cheaper to manufacture. Laser systems are the combinations of rotating mirrors and lenses that remain in alignment throughout their use. The laser scans from one end of a line to another and then starts on the next line. Unlike laser printers, an LED print head has no moving parts.

Check your progress 2
1. Explain the technology used in LED printers.
2. Differentiate between dot matrix printer and laser printer.
14 3
(179:

## 2.4 Let Us Sum Up

The hardware used to provide output processed by the computer is known as output device. Monitors, printers, plotters are the commonly used output devices. A monitor or display (also called a visual display unit) is a piece of electrical equipment which displays images generated by devices such as computers, without producing a permanent record. To indicate resolution capabilities of a monitor, several standards are available. The most common standards are SVGA, XGA, SXGA and UXGA.

#### The TWO main types of monitors are:

- The CRT monitors, which are big and heavy. This is the oldest technology
  used by monitors. It looks like a television, but has a bigger display resolution
  and often a higher frequency. CRT stands for cathode-ray tube. The
  advantages of CRT monitor are low cost and high resolution. Its main
  disadvantage is its large size.
- The LCD monitor (also called Flat Panel Monitor) is thin, flat and lightweight type of monitor. It is a newer technology item than CRT type.

E-books are hand held book size devices which displays text and graphics. Using contents downloaded from the web, these devices are used to read newspapers, magazines and entire books.

Data projectors are specialized devices similar to slide projectors. These devices however connect to microcomputers and project computer output just as it would appear on a traditional monitor.

High Definition Television (HDTV) it is the recent development in the integration of computer and television. The HDTV delivers much clearer and more detailed wide screen picture than a regular television.

Printer is an important output device for maintaining a hard copy of documents. The commonly used printers are dot matrix, Ink-jet, laser, LCD printers. Let us study these types of printers.

A dot matrix printer or impact matrix printer is a commonly used type of printer. It is ideal for use in situations where printed content is more important than quality.

Inkjet printers are the most common type of computer printer for the general consumer due to benefits such as low cost, high quality of output, capability of printing in different colors and ease of use.

**Output Devices** 

A laser printer is mostly used printer that rapidly produces high quality text and graphics on plain paper.

In the print head LED technology uses a light-emitting diode array as a light source. The LED bar pulse-flashes across the page width and creates the image on the print drum or belt as it moves past.

# 2.5 Assignment

# **Broad Questions**

- 1. What do you mean by Dot Matrix Printer? State its advantages and disadvantages.
- 2. Discuss the principle of working of output devices in computer systems.

#### **Short Notes**

- a. Ink Jet Printers
- b. LED Printers
- c. HDTV
- d. Data Projector
- e. e-book reader

# 2.6 Check Your Progress: Possible Answers

Check your progress 1

**Answers: See Section 2.2** 

Check your progress 2

**Answers: See Section 2.3** 

# Computer Devices

# 2.7 Reference Book

- 1. Computer Essentials, Timothy J. O'Leary, Linda O'Leary, MKCL Publishing
- 2. Fundamentals of Computers, V. Rajaraman, Prentice Hall of India
- 3. Introduction to Computers, Peter Norton, McGraw Hill Publishing Technology Edition

# 2.8 Activities

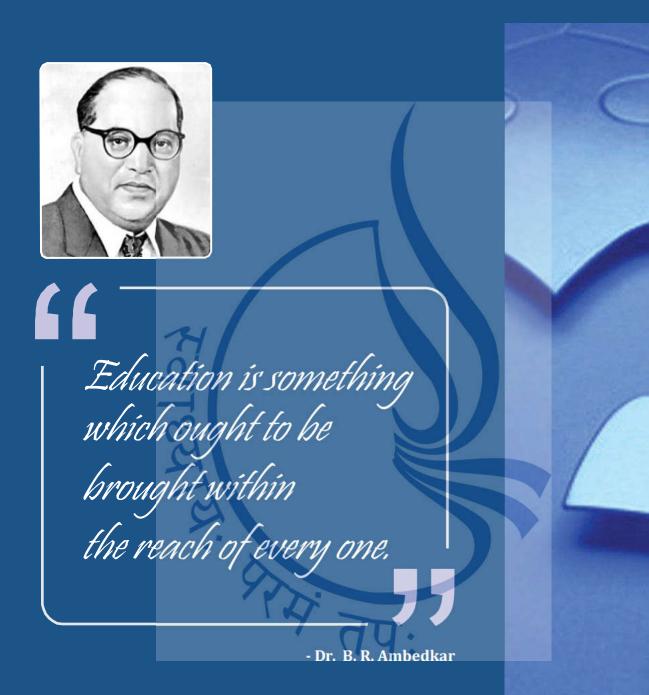
Activity 1

Explain in brief any five output devices along with their use.



2.8 Glossary	
Systems	of computer programs that controls the creation, maintenance and the use of a database.
Education Software	Educational software is computer software, the primary purpose of which is teaching or self-learning.
Entertainment	Entertainment consists of any activity which provides a diversion or it allows people to amuse themselves in their leisure time.
Graphic Programs	In computer graphics, graphics software or image editing software is a program or collection of programs that enable a person to manipulate/modify visual images on a computer.
Monitor	A monitor or display (known as a visual display unit) is an electronic visual display for computers. The monitor comprises the display device, circuitry and an enclosure.

Unit No.		1 2		3	4	
No. of Hrs				550.5		
Please give your reactions to the following items based on your reading of the block:						
Items	Excellent	Very Good	Good	Poor	Give specific example if an	
Presentation Quality						
Language and Style						
Illustration used (Diagram, tables etc)						
Conceptual Clarity						
Check your progress Quest						
Feed back to CYP Question						
					-	
3. Any other Comme	nts					



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# **FUNDAMENTALS OF COMPUTER & IT**

BCA-101



Dr. Babasaheb Ambedkar Open University Ahmedabad



# **Fundamentals of Computer and IT**





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#### ROLE OF SELF INSTRUCTIONAL MATERIAL IN DISTANCE LEARNING

The need to plan effective instruction is imperative for a successful distance teaching repertoire. This is due to the fact that the instructional designer, the tutor, the author (s) and the student are often separated by distance and may never meet in person. This is an increasingly common scenario in distance education instruction. As much as possible, teaching by distance should stimulate the student's intellectual involvement and contain all the necessary learning instructional activities that are capable of guiding the student through the course objectives. Therefore, the course / self-instructional material are completely equipped with everything that the syllabus prescribes.

To ensure effective instruction, a number of instructional design ideas are used and these help students to acquire knowledge, intellectual skills, motor skills and necessary attitudinal changes. In this respect, students' assessment and course evaluation are incorporated in the text.

The nature of instructional activities used in distance education self-instructional materials depends on the domain of learning that they reinforce in the text, that is, the cognitive, psychomotor and affective. These are further interpreted in the acquisition of knowledge, intellectual skills and motor skills. Students may be encouraged to gain, apply and communicate (orally or in writing) the knowledge acquired. Intellectual-skills objectives may be met by designing instructions that make use of students' prior knowledge and experiences in the discourse as the foundation on which newly acquired knowledge is built.

The provision of exercises in the form of assignments, projects and tutorial feedback is necessary. Instructional activities that teach motor skills need to be graphically demonstrated and the correct practices provided during tutorials. Instructional activities for inculcating change in attitude and behavior should create interest and demonstrate need and benefits gained by adopting the required change. Information on the adoption and procedures for practice of new attitudes may then be introduced.

Teaching and learning at a distance eliminates interactive communication cues, such as pauses, intonation and gestures, associated with the face-to-face method of teaching. This is particularly so with the exclusive use of print media. Instructional activities built into the instructional repertoire provide this missing interaction between the student and the teacher. Therefore, the use of instructional activities to affect better distance teaching is not optional, but mandatory.

Our team of successful writers and authors has tried to reduce this.

Divide and to bring this Self Instructional Material as the best teaching and communication tool. Instructional activities are varied in order to assess the different facets of the domains of learning.

Distance education teaching repertoire involves extensive use of self-instructional materials, be they print or otherwise. These materials are designed to achieve certain pre-determined learning outcomes, namely goals and objectives that are contained in an instructional plan. Since the teaching process is affected over a distance, there is need to ensure that students actively participate in their learning by performing specific tasks that help them to understand the relevant concepts. Therefore, a set of exercises is built into the teaching repertoire in order to link what students and tutors do in the framework of the course outline. These could be in the form of students' assignments, a research project or a science practical exercise. Examples of instructional activities in distance education are too numerous to list. Instructional activities, when used in this context, help to motivate students, guide and measure students' performance (continuous assessment)



## **PREFACE**

We have put in lots of hard work to make this book as user-friendly as possible, but we have not sacrificed quality. Experts were involved in preparing the materials. However, concepts are explained in easy language for you. We have included may tables and examples for easy understanding.

We sincerely hope this book will help you in every way you expect.

All the best for your studies from our team!



# **Fundamentals of Computer and IT**

# **Contents**

#### **BLOCK 1: COMPUTER FUNDAMENTALS**

## UNIT 1 COMPUTER FUNDAMENTALS

Introduction, Evolution of Computer Technology, Basic Computer Organization, Advantages of Computers, Programming Languages, Types of Computers, Applications of Computer, Summary, Let us Sum Up, Other Books For Reading

#### BLOCK 2: COMPUTER DEVICES

#### UNIT 1 INPUT DEVICES

Introduction, Keyboards, Pointing Devices, Scanning Devices,
Voice Recognition Systems, Summary, Let us Sum Up, Other
Books For Reading

#### **UNIT 2 OUTPUT DEVICES**

Introduction , Monitors, Printers, Summary, Let us Sum Up, Other Books For Reading

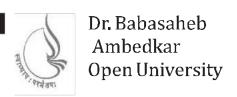
# **BLOCK 3: SOFTWARE**

## **UNIT 1 SYSTEM SOFTWARE**

Introduction, Operating Systems, Network Operating Systems, Utilities, Summary, Let us Sum Up, Other Books For Reading

#### UNIT 2 APPLICATION SOFTWARE

Introduction, Word Processing Software, Spreadsheets,
Database Management Systems, Presentation Programs,
Graphic Programs, Multimedia Authoring Applications,
Entertainment and Education Software, Summary, Let us Sum
Up, Other Books For Reading



# **Fundamentals of Computer and IT**

# BLOCK 3: COMPUTER APPLICATION UNIT 1 SYSTEM SOFTWARE 02 UNIT 2 APPLICATION SOFTWARE 14

# **BLOCK 3: SOFTWARE**

# **Block Introduction**

In unit 1, we had an introduction to the basic concepts of system software and application software. Now, in this unit, we'll discuss about these concepts in detail.

System software is the program that controls computer hardware. It also maintains computer operation efficiently. The main components of system software are operating system, network operating system and utility. Similarly, the application software is used to provide applications to the users. Examples include enterprise software, accounting software, and office suites and graphics software and media players.



# **UNIT 1 SYSTEM SOFTWARE**

# **Unit Structure**

- 1.0 Learning Objectives
- 1.1 Introduction
- 1.2 Network Operating Systems
  - 1.2.1 The commonly used Network Operating Systems are discussed bellow
  - 1.2.2 The network operating systems perform the following functions:
  - 1.2.3 Network operating system features may include:
- 1.3 Utilities
- 1.4 Let Us Sum Up
- 1.5 Assignment
- 1.6 Check Your Progress: Possible Answers

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1.7 Activities

# 1.0 LEARNING OBJECTIVES

# After working through this unit, you should be able to:

- Explain the basic concept and role of system software in computer systems
- State the concept and functions performed by Operating Systems in computers
- Define Microsoft Operating System, Unix Operating system, Linux Operating system and Network Operating Systems (NOS)
- Mention the significant features and functions performed by NOS
- Specify various types of NOS

# 1.1 INTRODUCTION

#### **Operating Systems**

As we have discussed in pervious Unit, Operating system (OS) is software, having various programs and data that runs on computers which controls the computer hardware and provides common services for efficient execution of various application software.

For hardware functions such as input and output and memory allocation, the operating system work as an intermediary between computer hardware and application programs, although the application code is usually executed by the hardware, but will regularly call the operating system (OS) or be interrupted by it. Operating systems (OS) are found on almost any device that contains a computer from video game consoles and cellular phones to super computers and web servers.

Examples of popular modern operating systems (OS) for personal computers are Microsoft Windows, Mac OS X and GNU/Linux.

The components of an operating system (OS) all exist in order to make the different parts of a computer work together. All software—from financial databases to film editors—needs to go through the operating system in order to use any of the hardware, whether it is as simple as keyboard or mouse or complex as an Internet connection.

With the aid of the firmware and device drivers, the operating system extends the most basic level of control over all of the computer's hardware devices. It manages memory access for programs in the RAM, it determines which

programs get access to which hardware resources, it sets up or resets the CPU's operating states for optimal operation at all times and it organizes the data for long-term non-volatile storage with file systems on such media as disks, tapes, flash memory, etc.

The operating system acts as an interface between an application and the hardware. The user interacts with the hardware from "the other side". The operating system is a set of services which simplifies development of applications. Executing a program involves the creation of a process by the operating system. The kernel generates a process by assigning memory and other resources, establishing a priority for the process (in multi-tasking systems), loading program code into memory and executing the program. The program then interacts with the user and/or other devices and performs its intended function.

Common contemporary operating system (OS) families include Darwin (Mac OS X), BSD, Linux, SunOS (Solaris/Open Solaris) and Windows NT (XP/Vista/7). While servers basically run embedded system Unix or some Unix-like operating system, markets are divided amongst several

Operating systems (OS). Operating system (OS) tells computer how to use its components. Operating System (OS) work as an interpreter between the hardware, application program and the user. When the program wants hardware to do something, it convey through the operating system (OS). Similarly, when the user wants computer to do something (e.g. printing, copying), the user request is handled by the operating system (OS). The examples of operating system (OS) are UNIX, Microsoft Windows, Macintosh and LINUX.

# The operating system performs following functions-

From the user's point of view, the purpose of an operating system (OS) is to assist him in the mechanics of solving problems. Specifically, the following functions are performed by the system:

- 1. Job sequencing, scheduling and traffic controller operation
- 2. Input/output programming
- 3. Protecting itself from the user; protecting the user from other users
- 4. Secondary storage management
- 5. Error handling

Action	OS Does This
You turn on the computer	Hardware management
You execute an application	Process management
Application reads a tape	Hardware management
Application waits for data	Process management
Process waits while other process runs	Process management
Process displays data on screen	Hardware management
Process writes data to tape	Hardware management
You quit, the process terminates	Process management
You turn off the computer	Hardware management

You can view a computer system as being built from 3 general components: the applications, the hardware and the operating system a (Ref. Figure 1.1.)The hardware includes pieces such as a keyboard, central processing unit (CPU), a printer and hard drive. You can think of these as the parts. You can touch it physically also. Applications are why you use computers; they use the rest of the system to perform the particular task (for ex., send electronic mail, play a game, edit a memo). The operating system (OS) is the component that on one side controls and manages the hardware and on the other manages the applications.

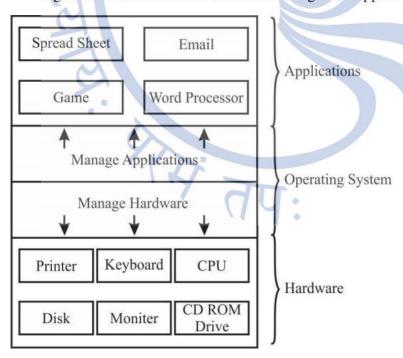


Fig. 1.1: Computer System Components

Check your progress 1	
1. What are the common operating system families?	
2. Explain the main functions of an operating system	
31	

# 1.2 NETWORK OPERATING SYSTEMS

A Networking Operating System is also Operating System (OS) that contains large number of programs and components that allow a computer running network operating system to serve requests from other computer for web sites, data and provide access to other resources such as file systems and printer.

The network operating systems allow computers to communicate and share data across the network while overseeing the network's security and controlling network operations.

# System Software

# 1.2.1 The commonly used Network Operating Systems are discussed bellow

- Novell: As the market leader, Novell set the stage for a long line of PC LAN innovations that extend well beyond simple file and print services. Novell designed the NetWare Load Module (NLM) to enable third-party companies to write server-side NetWare applications and enterprise-oriented features, such as data recovery and fault tolerance.
- In terms of scalability, Novell extended the power and performance of NctWare by allowing other companies to port NetWare from its Intel-only origin to high-end RISC systems, such as the HP9000. At the network level, the routing capabilities and simple client configuration of Novell's IPX protocol suite enables NetWare customers to easily construct networks of any size. Novell has further reinforced the ease-of-installation and ease-ofmaintenance of NetWare with the release of NetWare Directory Services (NDS), a global directory structure for all NetWare resources.
- Banyan Systems: Banyan Systems' VINES (Virtual Network Softwarc) provides file and print serving services similar to NetWare, but VINES runs with existing network protocols, such as TCP/IP, SNA and others. More significantly, VINES was the first PC LAN product to support a network directory service, which Banyan named StreetTalk. StreetTalk presents a single directory that encompasses multiple servers and allows users to login only once to access multiple servers. Of course, Novell later added its own network directory service in version 4.1 of NetWare and other network operating systems vendors are following suit. Banyan is, however, unbundling StreetTalk and offering it for other platforms, such as Windows NT.
- IBM: IBM's original PC LAN product was the LAN Server, a dedicated server product that shares the same protocol suite (NetBIOS/NetBEUI) and same overall architecture as Microsoft's LAN Manager Product. This should not be a big surprise because IBM was one of the core developers of the NetBIOS/ NetBEUI protocol suite and the Server Message Block (SMB) architecture used by IBM, Microsoft and others. IBM's DOS -based LAN Server technology was then integrated into its OS/2 server product. OS/2-based file and print servers have achieved a reputation for stability and

- reliability; however, OS/2 servers tend to be implemented in sites that have other IBM equipment--AS/400 and mainframes in particular.
- Microsoft: Microsoft acquired most of its networking technology from 3Com Corporation. Microsoft incorporated the 3Com technology in its main product lines, starting with LAN Manager, a dedicated file and print server similar to IBM's LAN Server offering. Microsoft then went on to extend its networking technology into workgroup environments with the release of Windows for Workgroups and Windows 95. None of these Microsoft products offered the stability or performance of a dedicated Novell NetWare server—but this changed with the advent of Windows NT Server.
- Windows NT Server is an enterprise-oriented product that can compete headto-head with NetWare. Windows NT Server also offers additional features and value--most notably, the capability to run on a wide range of platforms, fully integrated support for TCP/IP and support for a range of software products that enable an NT Server to function as a full-blown application server

# 1.2.2 The network operating systems perform the following functions:

- Add, manage and remove users who wish to use resources on the network.
- Allow users to access data on the network. This data reside on the server.
- Allow users to access data found on other network such as the internet.
- Allow users to access hardware connected to the network.
- Protect data and services located on the network.

# 1.2.3 Network operating system features may include:

- support for hardware ports
- Security features such as authentication, authorization, login restrictions and access control directory services and Name services
- Print, file, data storage, replication and backup services
- Remote access
- System management
- Auditing tools and Network administration with graphic interfaces

- Clustering capabilities
- High availability and Fault tolerance.

Check your progress 2	
1. Make a list of and explain the functions of network operating system.	
2. Write about the commonly used network operating systems	

# 1.3 UTILITIES

Utility is the program that makes computer system easy to use or perform highly specialized functions. Utilities are used to manage disks, troubleshoot hardware problems and perform other tasks that the operating systems are not able to do.

Utility software is a kind of system software designed to help analyze, configure, optimize and maintain the computer. A single piece of utility software is usually called a utility or tool. Utility software should be contrasted with application software, which allows users to do things like creating text documents, playing games, listening to music or surfing the web. Rather than providing such kinds of output-oriented or user-oriented functionality, utility software normally concentrate on how the computer infrastructure (including the computer hardware, application software, operating system and data storage) operates.

Due to this, utilities are often rather targeted and technical at people with a higher level of computer knowledge.

Most utilities are highly specialized and designed to perform only a single task or a small range of tasks. However, there are also some utility suites that combine several features in one piece of software. Most major operating systems come with several pre-installed utilities.

# 1.4 LET US SUM UP

System software is the program that controls computer hardware. It also maintains computer operation efficiently. The main components of system software are operating system, network operating system and utility.

An operating system (OS) is an interface between user and hardware; an OS is responsible for the coordination and management of activities and the sharing the resources of the computer.

The operating system (OS) acts as a host for computing applications that are run on the machine. As a host, one of the purposes of an operating system (OS) is to

# Handle the details of the operation of the hardware.

The operating system performs following functions-From the user's point of view, the purpose of an operating system is to assist him in the mechanics of solving problems. Specifically, the following functions are performed by the system:

- 1. Job sequencing, scheduling and traffic controller operation
- 2. Input/output programming
- 3. Protecting itself from the user; protecting the user from other users
- 4. Secondary storage management
- 5. Error handling

System Software

A Networking Operating System is an operating system (OS) that contains programs and components that allow a computer running network operating system to serve requests from other computer for web sites, data provide access to other resources such as printer and file systems. Novell Netware, UNIX and Windows NT are the main NOS.

# The network operating systems perform the following functions:

- It can add, remove and manage users.
- Allow users to access data which commonly resides on the server.
- It also allows users to access hardware connected to the network.
- It protects data and services located on the network.

# **Network operating system features may include:**

- It support features like security, authentication, authorization, login restrictions and access control
- Using NOS features we can access name services and directory services
- It supports features like exchange of files, print, data storage, backup and replication services
- Remote access is possible.
- Network administration and auditing tools with graphic interfaces
- Using NOS we can support clustering.
- In NOS Fault tolerance and high availability features.

Utility is the program that makes computer system easy to use or perform highly specialized functions. Utilities are used to manage disks, troubleshoot hardware problems and perform other tasks that the operating systems are not able to do.

# 1.5 Assignment

# **Broad Questions**

- 1. What do you mean by operating systems? State the functions performed by operating systems.
- 2. What are network operating systems? State the examples of NOS. Discuss the significant features and functions of NOS

## **Short Notes**

- 1. Utilities
- 2. Novell Netware
- 3. Windows NT
- 4. Unix Operating Systems.
- 5. IBM Operating Systems.

# 1.6 Check Your Progress: Possible Answers

Check your progress 1

**Answers: See Section 1.1** 

Check your progress 2

**Answers: See Section 1.2** 

Check your progress 3

**Answers: See Section 1.3** 

Activity 1

• Explain the importance of System Software in your own words.



# **UNIT 2 APPLICATION SOFTWARE**

## **Unit Structure**

- 2.0 Learning Objectives
- 2.1 Introduction
- 2.2 Word Processing Software
  - 2.2.1 The significant features of M.S. Word are as follows:
- 2.3 Spreadsheets
  - 2.3.1 Microsoft Excel
- 2.4 Database Management Systems
  - 2.4.1 Most DBMSs perform the following functions:
  - 2.4.2 Examples of various organizations and their databases are as follows:
- 2.5 Presentation Programs
- 2.6 Graphics Programs
  - 2.6.1 Computer Graphics has following features:
- 2.7 Multimedia Authoring Applications
- 2.8 Entertainment and Education Software
  - 2.8.1 Some examples of entertainment software are:
- 2.9 Let Us Sum Up
- 2.10 Assignment
- 2.11 Check Your Progress: Possible Answers
- 2.12 Activities

# 2.0 LEARNING OBJECTIVES

## After working through this unit, you should be able to:

- State the basic concept of application software
- Explain how the word processing software works and features of MS Word
- Describe how the basic SCM model is developed
- Mention the concept of applications of spread sheets and significant features of MS Excel
- Discuss the concept of Database Management Systems and the use of MS Access and oracle in DBMS applications
- Show how MS PowerPoint is used for presentations
- Illustrate Multimedia Authoring Applications and entertainment and education software

# 2.1 INTRODUCTION

We have studied the basic concept of application software in Unit 1. We have seen that the application software tells computer how to accomplish specific tasks such as word processing or drawing for the user. Thousands of applications are available for many purposes and the people of all ages. Some of the categories include:

- Word Processing Software
- 2. Spreadsheets
- 3. Database Management Software
- 4. Presentation Programs
- 5. Graphics Programs
- 6. Multimedia authoring applications
- 7. Entertainment and education software
- 8. Web design tools and Web browsers
- 9. Games

In this unit, we will take a review of main application software being used.

# 2.2 WORD PROCESSING SOFTWARE

Word processing software is used for creating documents. Drafts, letters, reports, essays, write ups etc. can be created using word processing software. Earlier.

Word Star was being used widely for this purpose. Sidekick, word Prefect are also used for drafting letters. However the most commonly used word processing package all over the world is Microsoft Word.

Microsoft Word is Microsoft's word processing software. It was first released in 1983 under the name Multi-Tool Word for Xenix systems. Versions were later written for several other platforms including IBM PCs running DOS (1983), the Apple Macintosh (1984), SCO UNIX, OS/2 and Microsoft Windows (1989). It is a component of the Microsoft Office system; however, it is also sold as a standalone product and included in Microsoft Works Suite. Beginning with the 2003 version, the branding was revised to emphasize Word's identity as a component within the Office suite; Microsoft began calling it Microsoft Office Word instead of merely Microsoft Word. The latest releases are Word 2007 for Windows and Word 2008 for Mac OS X. There is commercially available add-ins that expands the functionality of Microsoft Word.

# 2.2.1 The significant features of M.S. Word are as follows:

- 1. It is an easy and simple package for a general user.
- The features such as paragraph, font, symbols, spell check, table, drawing, bullets and numbering, page numbering etc. are provided by this package. This enables a user to develop a document in error free and attractive form.
- The text file generated by MS Word is .doc. This file can be used in other applications such as MS Excel, MS Visual Studio 6.0, MS Visual Studio.net, Web browser, pdf format etc.

# **Application Software**

Check your progress 1
1. What is the use of word processing software?
2. Explain the significant features of MS Word.

# 2.3 SPREADSHEETS

Spreadsheet is very well known and widely used computer applications that help us to work out a paper worksheet. It displays number of cells that together made a grid consisting of rows and columns, each cell consisting either alphanumeric text or numeric values. A spreadsheet cell defines a formula that how the contents of that cell are to be calculated from the contents of other cell that each time any cell is updated. Spreadsheets are used for financial information because of their ability to re-calculate the entire sheet directly as a change to a single cell is made.

VisiCalc is usually considered the first electronic spreadsheet and it helped to modify the Apple II computer into a success and greatly assisted in their widespread application. Lotus 1-2-3 was the leading spreadsheet when DOS was the dominant operating system (OS). Excel is now considered to have the largest market share on the Windows and Macintosh platforms

## 2.3.1 MICROSOFT EXCEL

Microsoft had been developing Excel on the Macintosh platform for several years at this point, where it had developed into a fairly powerful system. A

port of Excel to Windows 2.0 resulted in a fully functional Windows spreadsheet. The more robust Windows 3.x platforms of the early 1990s made it possible for Excel to take market share from Lotus. By the time Lotus responded with usable Windows products, Microsoft had started compiling their Office suite. Starting in the mid-1990s continuing through the present, Microsoft Excel has dominated the commercial electronic spreadsheet market.

Chec	k your progress 2	. 20
1. WI	hat you mean by spreadsheet applic	eation?
0.041191	nd out more information about Mic me.	crosoft Excel and prepare a report on the
	34/	
	2	

# 2.4 DATABASE MANAGEMENT SYSTEMS

A database Management system is a tool to collect, organize and manage large amount of data in systematic manner that can be retrieved and used as per the need of the organization.

# 2.4.1 Most DBMSs perform the following functions:

- To create and maintain data structures
- It allows concurrent access to many users
- Enforce security and privacy
- Allow extraction and manipulation of stored data
- It enable data entry and data loading
- Provide an efficient indexing mechanism for fast extraction of selected data
- Provide consistency among different records

Protect stored data from loss by backup and recovery process

# 2.4.2 Examples of various organizations and their databases are as follows:

- Manufacturing Company: stores product data.
- Bank: stores transactions data.
- Hospital: stores patient data.
- University: stores student data.

The commonly used DBMS packages are Microsoft Access and Oracle.

Microsoft Office Access is a relational database management system from Microsoft that combines the relational Microsoft Jet Database Engine with a graphical user interface and software development tools. It is a member of the

Microsoft Office suite of applications and is included in the Professional and higher versions for Windows.

Access stores data in its own format based on the Access Jet Database Engine. It can also import or link directly to data stored in other Access databases,

Excel SharePoint lists, text, XML, Outlook, HTML, dBase, Paradox, Lotus 1-2-3 or any ODBC-compliant data container including Microsoft SQL Server, Oracle, MySQL and PostgreSQL. Software developers and data architects can use it to develop application software and non-programmer "power users" can use it to build simple applications.

Check your progress 3
1. What are the functions of DBMS?
2. Which are the commonly used DBMS packages?
1/9:

# 2.5 PRESENTATION PROGRAMS

Microsoft PowerPoint is a presentation program developed by Microsoft. It is part of the Microsoft Office suite and runs on Microsoft Windows and Apple's Mac OS X computer operating systems.

PowerPoint is widely used for making presentation slides consisting of various types of information in text form, picture form by business people, educators, students and trainers and among the most prevalent forms of persuasive technology. Beginning with Microsoft Office 2003, Microsoft revised the branding to emphasize PowerPoint's place within the office suite, calling it Microsoft Office PowerPoint instead of just Microsoft PowerPoint. The current versions are Microsoft Office PowerPoint 2007 for Windows and 2008 for Mac.

Check your progress 4
1. What are presentation programs?
2. Explain the uses of Microsoft PowerPoint.
57/
nº.

# 2.6 GRAPHICS PROGRAMS

Computer graphics are graphics created by using computers and there presentation and manipulation of pictorial data by using various graphic support application software. The development of computer graphics has made computers easier to interact with and better for understanding and interpreting many types of data. Developments in computer graphics had a profound impact on many types of media and have revolutionized the animation and video game industry. All types

Application Software

of computers use some or more graphics and users expect to control their computer through icons and pictures.

# **2.6.1** Computer Graphics has following features:

- Representation and manipulation of pictorial data
- Display pictures, films and movies as per the users need
- Digitally synthesizing and manipulating visual content,

Today computers and computer-generated images touch many aspects of our daily life. Computer imagery is found in newspapers, on television, during surgical procedures and in weather reports. A well-constructed graph can present complex statistics in a form that is easier to interpret and understand. These graphs are used to illustrate reports, papers, these and other presentation material. A range of tools and facilities are available to enable users to visualize their data and computer graphics are used in many disciplines.

Check your progress 5
1. What do you mean by computer graphics?
2. Describe the features of computer graphics.
gi -
7.77

# 2.7 MULTIMEDIA AUTHORING APPLICATIONS

Multimedia is described as a medium having multiple content forms. Multimedia includes a combination of text, audio, images, animation and video in interactivity content forms.

Multimedia is usually recorded and played, displayed or accessed by information content processing devices, such as computerized and electronic devices, but can also be part of a live performance. Multimedia (as an adjective) also describes electronic media devices used to store and experience multimedia is similar to traditional mixed media in fine art, but with a broader scope. The term "rich media" is synonymous for interactive multimedia.

Ch	eck your progress 6
1.	What Justify the name 'multimedia'
2.	Explain various uses of multimedia in your words
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# 2.8 ENTERTAINMENT AND EDUCATION SOFTWARE

The computer application software is widely used for entertainment and education purpose. Thousands of computer games are available for school children. While playing, they learn so many things such as logical reasoning, strategic planning, simulation of various situation and solving the problems and knowledge acquisition etc. The software that imparts education on number of subjects such as mathematics, English, history etc. is also available.

Educational software is computer application software, the primary purpose of such software is to teaching or self-learning processes effectively. The design of educational software programmes for home use has been influenced strongly by computer gaming concepts – in other words, they are designed to be fun as well as educational. A further category of educational software is designed for use in school classrooms. Typically such software may be projected onto a large whiteboard at the front of the class and/ or run simultaneously on a network of desktop computers in a classroom. This type of software is often called classroom management software.

# 2.8.1 Some examples of entertainment software are:

- Find MP3 is an easy to use and powerful MP3 search tool that allows you to find thousands of free MP3 music files on the Internet. There are many search engines on the Internet that offer free MP3 files and 2 Find MP3 makes it easy to find and download the music you are looking for.
- Play and organize your favourite mp3 and movie files with all-in-one media player. All-in-One Media Player supports all popular audio and video formats including MP3, AVI, MPG and various DVD standards. You will never again lose track of your media collection which often is scattered over different folder locations and disks.



Check your progress 7									
1.	What is the use of computer software in education?								
2.	Explain the use of computer software in entertainment.								
3.	Collect information on various entertainment and education software								
;	available in the market and prepare a report on the same.								

# 2.9 LET US SUM UP

The application software tells computer how to accomplish specific tasks such as word processing or drawing for the user. Thousands of applications are available for many purposes and the people of all ages. Some of the categories include Word Processing Software, Spreadsheets, Database Management Software, Presentation Programs and Graphics Programs, Multimedia authoring applications and Entertainment and education software. Web design tools and Web browsers and Games

Word processing software is used for creating documents. Drafts, letters, reports, essays, write ups etc. can be created using word processing software. The most commonly used word processing package all over the world is Microsoft Word.

# The significant features of M.S. Word are as follows:

- It is an easy and simple package for a general user.
- These packages provide features such as paragraph, font, symbols, spell check, table, drawing, bullets and numbering, page numbering etc.

Application Software

• The text file generated by MS Word is .doc. This file can be used in other applications such as MS Excel. MS Visual Studio 6.0, MS Visual Studio.net, Web browser, pdf format etc.

Spreadsheet is a computer application that simulates a paper worksheet. It displays multiple cells that together make up a grid consisting of rows and columns, each cell containing either alphanumeric text or numeric values.

VisiCalc is usually considered the first electronic spreadsheet (although this has been challenged) and it helped turn the Apple II computer into a success and greatly assisted in their widespread application. Lotus 1-2-3 was the leading spreadsheet when DOS was the dominant operating system. Excel is now considered to have the largest market share on the Windows and Macintosh platforms

A database can be defined as a collection of information organized in such a way that it can be retrieved and used. A database management system (DBMS) can further be defined as the tool that enables us to manage and interact with the database. The commonly used DBMS packages are Microsoft Access and Oracle.

Microsoft PowerPoint is a presentation program developed by Microsoft. It is part of the Microsoft Office suite and runs on Microsoft Windows and Apple's Mac OS X computer operating systems.

Computer graphics are graphics which are created using computers and the representation and manipulation of pictorial data by a computer.

The development of computer graphics has made computers easier to interact with and better for understanding and interpreting many types of data. Developments in computer graphics had a profound impact on many types of media and have revolutionized the animation and video game industry.

Multimedia is described as a medium having multiple content forms. Multimedia includes a combination of text, audio, still images, animation, video and interactivity content forms.

The computer software's are widely used for entertainment and education purpose. Thousands of computer games are available for school children. While playing, they learn so many things such as logical reasoning, strategic planning, knowledge acquisition etc. The software that imparts education on number of subjects such as mathematics, English, history etc. is also available.

# 2.10 ASSIGNMENT

# **Broad Questions**

- 1. What do you mean by word processing software? List various words processing software. Discuss the significant features of Microsoft Word.
- 2. What do you mean by spread sheet? What are its utilities? List the various types of spreadsheets.

## **Short Notes**

- a. Database management system (DBMS)
- b. Microsoft PowerPoint
- c. Computer Graphics
- d. Multimedia Systems
- c. Entertainment and education software's



# **Application Software**

# 2.11 Check Your Progress: Possible Answers

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**Check your progress 1** 

**Answers: See Section 2.2** 

Check your progress 2

Answers: See Section 2.3

Check your progress 3

**Answers: See Section 2.4** 

Check your progress 4

**Answers: See Section 2.5** 

Check your progress 5

**Answers: See Section 2.6** 

Check your progress 6

**Answers: See Section 2.7** 

Check your progress 7

**Answers: See Section 2.8** 

# 2.12 Activities for this block

# Activity 1

• List different application software known to you and their practical use.



# Glossary

## **Operating System**

An operating system (OS) is software, consisting of programs and data that runs on computers and manages the computer hardware and provides common services for efficient execution of various applications software.

# **Pointing Devices**

It is an input device interface which allows user to input spatial data to a computer. CAD systems and graphical user interfaces (GUI) allow the user to control and provide data to the computer using physical gestures — point, click and drag.

# **Reference Books**

- 1. Computer Essentials, Timothy J. O'Leary, Linda O'Leary, MKCL Publishing
- 2. Fundamentals of Computers, V. Rajaraman, Prentice Hall of India
- 3. Introduction to Computers, Peter Norton, McGraw Hill Publishing Technology Edition

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		Illustration used (Diagram, tables etc)			]				
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