

**D.N.R.COLLEGE, (AUTONOMOUS): BHIMAVARAM**  
**DEPARTMENT OF MANAGEMENT STUDIES**



**COMPUTER APPLICATIONS IN MANAGEMENT**  
**II SEMESTER**

Presented By  
**R. SUBBA RAYUDU**  
**Dept of Management Studies**  
**D.N.R.College Bhimavaram- 534202**  
**Phone: 08816-224119**  
**E mail: [mbadnr123@gmail.com](mailto:mbadnr123@gmail.com)**  
**Website: <https://dnrcollege.org/en/>**

# Syllabus – 1<sup>st</sup> Unit

## Unit1

### Computer–AnIntroduction

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- 1.2 WhatisaComputer?
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# UNIT

# 1

## COMPUTER–ANINTRODUCTION

LEARNING	OBJECTIVES
After studying this unit, you should be able to understand:	
<ul style="list-style-type: none"><li>• Define a computer and its various parts.</li><li>• Classify computer according to purpose, technology used, size and capacity.</li><li>• Describe various characteristics of computer.</li><li>• Describe various Input and output devices.</li><li>• Understand the concept of Office Automation.</li><li>• Describe various components of a computer system.</li><li>• Describe various generations of the computer.</li></ul>	



### UNIT STRUCTURE

- 1.1 Introduction
- 1.2 What is a Computer?
- 1.3 Importance of Computers (Man vs. Machine)
- 1.4 Classification of Computers
- 1.5 Popularity of Personal Computers (IBM PC vs. Apple Mac PC)
- 1.6 Architecture of a Computer System
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- 1.8 Facilities Available in Computerised System
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- 1.10 Office Automation
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## 1.1 INTRODUCTION

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Nothing has revolutionized modern life the way rapid progress of computers has. For better or worse, computers have infiltrated every aspect of our society. Today, computers do much more than simply compute. They make airline or railway reservation and teach on-line; some superstore scanners calculate our grocery bills while keeping the store inventory; computerised telephones switching has greatly improved the telephone system and Automatic Teller Machines (ATM) let us conduct banking transactions from virtually anywhere in the world.

As computers become more widespread in the workplace, new ways to harness their potential developed. As smaller computers become more powerful, they could be linked together, or networked, to share memory space, software, and information and communicate with each other.



## 1.2 WHAT IS A COMPUTER?

mainly for doing high speed and accurate calculations, it is not just a calculating device. The computer can perform any kind of work involving arithmetic and logical operations on data. It gets the data through an input device, processes it as per the instructions given and gives the information as an output. We can define computer as follows:

### Definition

A computer is a fast electronic device that processes the input data according to the instructions given by the programmer/user and provides the desired information as an output.

The terminology used in the above definition is summarized in Table 1.1.

Table 1.1: Terminology Used in Definition of Computer.

Term	Meaning
Data	A set of basic facts and entities which itself has no meaning
Information	Data which has some meaning or value
Instruction	A statement given to computer to perform a task
Input	Data and instructions given to computer
Process	Manipulation of data
Output	Information obtained after processing of data

## 1.3 IMPORTANCE OF COMPUTERS (MAN VS. MACHINE)

Computers play a vital role for processing of data in an organization. Computer: help in processing the volumes of data efficiently and accurately within a short time. A computer has the following characteristics which make it so important for an organization:

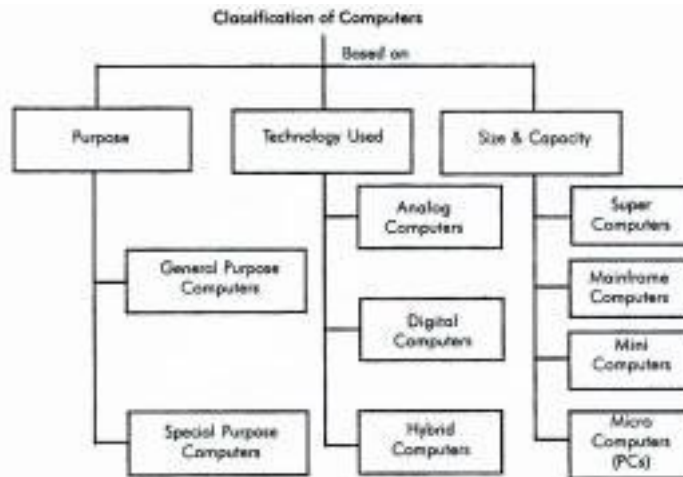
1. **Fast:** A computer is so fast that it can perform the given task (arithmetic or logical) in few seconds as compared to man who can spend many months for doing the same task. A computer can process millions of instructions per second.
2. **Accurate:** While doing calculations, a computer is more accurate than man can make mistakes in calculations but a computer does not make mistakes, if it is provided accurate instructions.
3. **Diligence:** A computer does not suffer from the human traits of tiredness and boredom. Man will be tired and bored while doing millions of calculations but a computer, being a machine, does this job very efficiently and without any tiredness and boredom.
4. **High Memory:** A computer has much more memory or storage capacity than human being. It can store millions of data and instructions, which can be retrieved and recalled even after a number of years. This is not possible in case of human brain.
5. **No Intelligence:** A computer is a machine and obviously has no intelligence of its own. Each and every instruction must be given to the computer for doing a task. Man has an intelligence and it is the man who invented computer and gives it all the instructions and logic to work. A computer cannot take decisions on its own and it is the main drawback of computer.

## 1.4 CLASSIFICATION OF COMPUTERS

The classification of computers is based on the following three criteria:

- (a) According to Purpose
- (b) According to Technology used
- (c) According to size and Capacity

**Figure 1.1: Classification of Computers Based on Different Criteria**



### According to Purpose

According to the utilization of computer for different uses, computers are of following two types:

1. **General Purpose Computers:** Computers that follow instructions for general requirements such as sales analysis, financial accounting, invoicing, inventory, management information etc. are called General Purpose Computers. Almost all computers used in offices for commercial, educational and other applications are general purpose computers.
2. **Special Purpose Computers:** Computers designed from scratch to perform special tasks like scientific applications and research, weather forecasting, space applications, medical diagnostic etc. are called Special Purpose Computers.

### According to Technology Used

According to the technology used, computers are of following three types:

1. **Analog Computers:** Analog computers are special purpose computers that represent and store data in continuously varying physical quantities such as current, voltage or frequency. These computers are programmed for measuring physical quantities like pressure, temperature, speed etc. and to perform computations on these measurements. Analog computers are mainly used for scientific and engineering applications. Some of the examples of analog computers are given below:
  - (i) **Thermometer:** It is a simple analog computer used to measure temperature. In thermometer, the mercury moves up or down as the temperature varies.
  - (ii) **Speedometer:** Car's speedometer is another example of an analog computer where the position of the needle on the dial represents the speed of the car.
2. **Digital Computers:** Digital computers are mainly general purpose computers that represent and store data in discrete quantities or numbers. In these computers, all processing is done in terms of numeric representation (Binary Digits) of data and information. Although the user enters data in decimal or character form, it is converted into binary digits (0's and 1's). Almost all the computers used nowadays are digital computers and we will discuss the detailed working and components of these computers in subsequent sections of this unit.
3. **Hybrid Computers:** Hybrid computers incorporate the technology of both analog and digital computers. These computers store and process analog signals which have been converted into discrete numbers using analog-to-digital converters. They can



properties using digital-to-analog converters. Hybrid computers are mainly used in artificial intelligence (robotics) and computer-aided manufacturing (e.g. process control).

### Student Activity 1

1. What is a computer?
2. What are the main characteristics of a computer?
3. What are general purpose computers?
4. What are analog computers? Give examples.
5. What are hybrid computers?

### According to Size and Capacity

According to the size and memory/storage capacity, computers are of the following four types:

1. **Supercomputer:** Supercomputer is the biggest and fastest computer, which is mainly designed for complex scientific applications. It has many CPUs (Central Processing Units-main part of computer) which operate in parallel to make it as fast as possible. It is typically used for the following applications:

- Weather Forecasting
- Petroleum Exploration and Production
- Energy Management
- Defense
- Nuclear Energy Research
- Structural Analysis
- Electronic Design
- Real-time Animation
- Medicine

Some of the examples of supercomputers are CRAY3, CRAY-XMP-14, NEC500, PARAM 9000 and PARAM 10000.

2. **Mainframe Computer:** Mainframe computers are very large and fast computers but smaller and slower than supercomputers. These are used in a centralized location where many terminals (input/output devices) are connected with one CPU and thus, allow different users to share the single CPU. They have a very high memory (several hundred Megabytes) and can support thousands of users. They are mainly used for the following applications:
  - Railway and Airline Reservations
  - Banking Applications
  - Commercial Applications of Large Industries/Companies

Some of the examples of mainframe computers are IBM3090, IBM4381, IBM4300 and IBM ES-9000.

3. **Minicomputer:** Minicomputers are medium-scale, smaller and generally slower than mainframe computers. Like mainframes, they have many terminals which are connected with one CPU and can support many users. The cost of a minicomputer is very less as compared to a mainframe. Therefore, it is mainly used in applications where processing can be distributed among several minicomputers rather than using a mainframe computer.

Some of the examples of minicomputers are PDP-1, IBM AS/400 and DEC MicroVAX. IBM AS/400, which is actually a midcomputer (computer with performance between a mainframe and minicomputer) is becoming very popular among minicomputers.

4. **Microcomputer:** A microcomputer is the smallest digital computer, which uses a microprocessor as its CPU. A microprocessor is a single chip (Integrated Circuit) CPU. A microcomputer is popularly called as Personal Computer (PC). It can be used both as a stand-alone machine and a terminal in a multi-user environment. Microcomputers are becoming very popular nowadays due to



very high processing power and memory. Today, a powerful microcomputer may be used as a substitute for mini or mainframe computer.

Microcomputers are either of desktop or portable model. Portable computers can be carried from one place to another. Some of the models are called as laptops while others as notebook computers. Notebook computers are smaller, lighter and costlier than laptops. Desktop computers fit on a desktop and are used widely in offices and homes. The pictures of some of the desktop and portable computers are shown in Figure 1.2.



**Figure 1.2: Some Desktop and Portable Computers**

There are many types and models of microcomputers, which are summarized in Table 1.2.

**Table 1.2: Different Types of Microcomputers along with the Technical Specifications of CPU**

CPUModel	Clock (MHz)	Date Bus	Register (BIT)	Max. Memory (RAM)	Comments
8088	8	8	16	1MB	First 8bit microprocessor (Original PC)
8086	8	16	16	1MB	First 16bit CPU on a chip (PC/XT)*
80286	20	16	16	16MB	5 times faster than PC/XT (PC/AT)**
80386SX	33	16	32	16MB	80386 with an 80286 bus
80386DX	40	32	32	4GB	True 32bit CPU on a chip
80486SX	40	32	32	4GB	Math co-processor disabled
80486DX2	66	32	32	4GB	More speed with Math co-processor enabled
80486DX4	100	32	32	4GB	More speed than 486DX2
Pentium Pro (P5)	200	64	32	4GB	Superscalar architecture Able to execute 2 instructions simultaneously
Pentium II (P6)	266	64	32	64GB	Faster than Pentium Pro

## 1.5 POPULARITY OF PERSONAL COMPUTERS (IBM PC VS. APPLE MAC PC)

IBM PC is the first personal computer, introduced in 1981 by the world's largest computer company - IBM (International Business Machines Corp., New York). This computer was based on Intel's 8088 microprocessor or chip. It became a success almost overnight. In later years, IBM manufactured 80286, 80386, 80486 and recently the Pentium PCs. Although IBM is still the largest supplier of PCs, the majority of PCs are manufactured by other companies as per the standards set by IBM. This whole family of PCs is known as IBM-compatible PCs.

\*XT stands for Extended Technology

\*\*AT stands for Advanced Technology



So, we never talk about a PC, it usually means one of the IBM-compatible PCs. PS/2 and PS/1 (PS stands for Personal System) are IBM compatible series introduced in 1987 and 1990 respectively. Apple Macintosh PC

(popularly called as Mac) is another series of 32-bit personal computers, introduced in 1984 by one of the first microcomputer manufacturing company - Apple (Apple Computer, Inc.). Apple is the largest independent manufacturer of non-IBM-compatible PCs. Apple Mac PC uses the Motorola (a leading manufacturer of semiconductor devices) 68000 processor family and a proprietary operating system. As this PC comes with its own operating system, there is no need of DOS or other operating system for operating it. The method of operating a Mac PC is known as Macintosh user interface. All Mac PCs have graphics displays, as their operating systems provide Graphical User Interface (GUI). The Mac PC always displays a row of menu titles at the top of the screen, from which options are selected.

Although the first Mac PC was praised by many users due to its ease of use and low-cost system, it was not exciting for most corporate buyers due to its slow speed, small screen and closed architecture (a system whose technical specifications are not made public). In 1987, Apple manufactured Mac II, which offers full-size screens, high-speed and open architecture (a system whose technical specifications are made public). In 1991, IBM formed an alliance with Apple to fully integrate Macs into IBM enterprise networks for developing Power PC with Motorola.

IBM-compatible PCs are used as stand-alone machines or as workstations/ file servers in a local area network (we will discuss about local area network in later part of this unit). These PCs are very popular as stand-alone systems, which run under DOS. IBM-compatible PCs (80486 & above) are also popular for using as client/server systems (we will also discuss about client/server systems in later part of this unit). On the other hand, Apple/Macintosh PCs are rarely used as the primary client computers in client/server systems. Macintosh PCs are useful mainly for desktop publishing systems, due to graphical user interface. IBM compatible PCs, on the other hand, are useful for any kind of business applications. They have become very popular among all users in India and abroad.

### Student Activity 2

1. What are supercomputers?
2. What is the difference between mainframes and mini computers?
3. What are microcomputers?

## 1.6 ARCHITECTURE OF A COMPUTER SYSTEM

In last section, we discussed that there are many types of computers. The internal architectural design of computers differ from one model to another, however the basic components of a computer remains the same for all models. The diagram of a generalized architecture of a computer system is shown in Figure 1.3. Before discussing the details of computer architecture, we would define the computer system as follows:

### Definition

A complete computer installation including the central processing unit, the peripherals such as hard disk drives, floppy disk drives, monitor, printer, mouse and operating system which are designed to work and interact with each other and with the user is called a computer system.

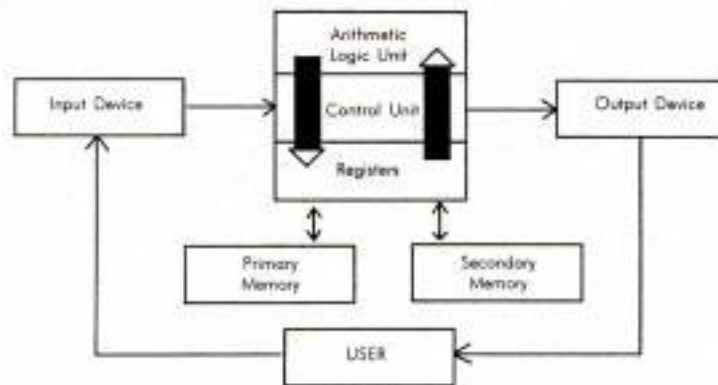


Figure 1.3: Functional Diagram of a Generalised Architecture of a Computer System

A computer system has following three main components:

- (a) Input/Output Unit
- (b) Central Processing Unit
- (c) Memory Unit

## Input/Output Unit

We know that the computer is a machine that processes the input data according to given set of instructions and gives the output. Before a computer does processing, it must be given data and instructions. After processing, the output must be displayed or printed by the computer. The unit used for getting the data and instructions into the computer and displaying or printing output is known as an Input/Output Unit (I/O Unit).

The Input Unit is used to enter data and instructions into a computer. There are many peripheral devices which are used as input/output units for the computer. The most common form of input device is known as a terminal. A terminal has a electronic typewriter like device, called keyboard along with a display screen, called Visual Display Unit (VDU) or monitor. Keyboard is the main input device while monitor can be considered both as an input as well as an output device. There are some other common input devices like mouse, punched card, tape, joystick, scanner, modem etc., which are explained in later part of this unit. Monitor, printer and plotter are the main peripheral devices used as output units for the computer.

## Central Processing Unit

Central Processing Unit (CPU) is the main component or "brain" of a computer, which performs all the processing of input data. Its function is to fetch, examine and then execute the instructions stored in main memory of computer. In microcomputers, the CPU is built on a single chip or Integrated Circuit (IC) and is called as Microprocessor. The CPU consists of following distinct parts:

1. **Arithmetic Logic Unit (ALU):** The arithmetic and logic unit of CPU is responsible for all arithmetic operations like addition, subtraction, multiplication and division as well as logical operations such as less than, equal to and greater than. Actually, all calculations and comparisons are performed in the arithmetic logic unit.
2. **Control Unit (CU):** The control unit is responsible for controlling the transfer of data and instructions among other units of computer. It is considered as a "Central Nervous System" of computer, as it manages and coordinates all the units of computer. It obtains the instructions from the memory, interprets them and directs the operation of the computer. It also performs the physical data transfer between memory and the peripheral device.
3. **Registers:** Registers are the small high speed circuits (memory locations) which are used to store data, instructions and memory addresses (memory location numbers), when ALU performs arithmetic and logical operations. Registers can store one word of data (1 word = 2 bytes & 1 byte = 8 bit; details of BITS and BYTES are discussed in later part of this unit) until it is overwritten by another word. Depending on the processor's capability, the number and type of registers vary from one CPU to another. Registers can be divided into six categories viz. General Purpose Registers, Pointer Registers, Segment Registers, Index Registers, Flags Registers and Instruction Pointer Registers, depending upon their function. The detailed functions of each and every register is beyond the scope of this book.
4.  **Buses:** Data is stored as a unit of eight bits (BIT stands for Binary Digit, i.e. (0 or 1) in a register. Each bit is transferred from one register to another by means of a separate wire. This group of eight wires, which is used as a common way to transfer data between registers is known as a bus. In general terms, bus is a connection between two components to transmit signal between them. Bus can be of three major types viz. Data Bus, Control Bus and Address Bus. The data bus is used to move data, address bus to move address or memory location and control bus to send control signals between various components of a computer.



5. Clockwise: Clockwise, with his chin, measuring as usual, respectively

and allocates a fixed time slot for processing each and every micro-operation (smallest functional operation). In simple terms, CPU is allocated one or more clock cycles to complete a micro-operation. CPU executes the instructions in synchronization with the clock pulse.

The clock speed of CPU is measured in terms of Mega Hertz (MHz) or Millions of Cycles per second. The clock speed of CPU varies from one model to another in the range 4.77MHz (in 8088 processor) to 66MHz (in Pentium) CPU speed is also specified in terms of Millions of Instructions Per Second (MIPS) or Million of Floating Point Operations Per Second (MFLOPS).

### Memory Unit

Memory Unit is that component of a computer system, which is used to store the data, instructions and information before, during and after the processing by ALU. It is actually a work area (physically a collection of integrated circuits) within the computer, where the CPU stores the data and instructions. It is also known as a Main/Primary/Internal Memory. It is of following three types:

- (a) Read Only Memory (ROM pronounced as "Ra-om")
  - (b) Random Access Memory (RAM pronounced as "R-aem")
  - (c) Complementary Metal Oxide Semiconductor Memory (CMOS)
- (a) **Read Only Memory:** Read Only Memory is an essential component of the memory unit. We know that the computer, being a machine, itself has no intelligence or memory and requires the instructions which are given by man. Whenever the computer is switched on, it searches for the required instructions. The memory, which has these essential instructions, is known as Read Only Memory (ROM). This memory is permanent and is not erased when the system is switched off. As appears with its name, it is read type of memory i.e. it can be read only and not be written by user/programmer. The memory capacity of ROM varies from 64 KB to 256 KB (1 Kilobyte = 1024 bytes) depending on the model of computer.

ROM contains a number of programs (set of instructions). The most important program of ROM is the Basic Input Output System (BIOS, pronounced as "bye-os") which activates the hardware (physical components of computer) such as keyboard, monitor, floppy disk etc. in communicating with the system and application software (set of instructions or programs).

Types of ROM: There are many types of ROM available for microcomputers like Mask ROM, PROM, EPROM, EEPROM and EAPROM.

#### Definitions

**Mask ROM:** Mask ROM is the basic ROM chip. In this type of ROM, the information is stored at the time of its manufacturing. So, it cannot be altered or erased later on.

**PROM:** PROM stands for Programmable Read Only Memory. In this type of ROM, the information is stored by programmers after its manufacturing. It cannot be altered or erased later on.

**EPROM:** EPROM stands for Erasable Programmable Read Only Memory. It is similar to PROM, but its information can be erased later on by ultraviolet light and it can be reprogrammed.

**EEPROM:** EEPROM stands for Electrically Erasable Programmable Read Only Memory. It is similar to EPROM, but its information can be erased by using a high voltage current.

**EAPROM:** EAPROM stands for Electrically Alterable Read Only Memory. As compared to EPROM and EEPROM, the information stored in EAPROM can be altered later.

- (b) **Random Access Memory:** Random Access Memory (RAM) is another important component of Memory Unit. It is used to store the data and instructions during the

execution of programme. Contrary to ROM, RAM is temporary and is erased when computer is switched off. RAM is a read/write type of memory and, thus can be read and written by user/programmer. As it is possible to randomly use any location of this memory, therefore, this memory is known as random access memory. The memory capacity of RAM varies from 640 KB to several megabytes (1 Megabyte = 1024 KB) with different models of Pc.

**Types of RAM:** There are two types of RAM used in PCs—Dynamic and Static RAM.

#### Definitions

**Dynamic RAM (DRAM):** The information stored in Dynamic RAM has to be refreshed after every few milliseconds, otherwise it is erased. DRAM has higher storage capacity and is cheaper than Static RAM.

**Static RAM (SRAM):** The information stored in Static RAM need not be refreshed, but it remains stable as long as power supply is provided. SRAM is costlier but has higher speed than DRAM.

- (c) **Complementary Metal Oxide Semiconductor Memory:** Complementary Metal Oxide Semiconductor (CMOS) memory is used to store the system configuration, date, time and other important data. When computer is switched on, BIOS matches the information of CMOS with the peripheral devices and displays error in case of mismatching.

#### Student Activity 3

1. State the basic units of a computer.
2. What are the various parts of CPU?
3. What is the function of ALU and CU?
4. What are registers?
5. What is the function of clock in CPU?
6. Define memory. Describe its various types.
7. Define CMOS.

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## 1.7 COMPUTERS IN BUSINESS

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Computers can process vast quantities of business data at enormous speed with unflinching consistency and unimaginable flexibility.

These capabilities of computers open new approaches to problem solving and data processing.

Following six characteristics of computers make them indispensable for use in business:

- (a) **Speed:** Computers speed up data processing by many orders of magnitude as compared to the manual system.
- (b) **Data Volume:** Vast amount of data can be stored and processed very quickly.
- (c) **Repetitiveness:** The more repetitive the task, the more profitable it is to automate it.
- (d) **Complexity:** Problems with several interacting variables can be solved quickly and accurately.
- (e) **Accurate Output:** As high accuracy can be obtained as needed; also accuracy is not affected by boredom and fatigue and is not subjective.
- (f) **Declining Costs:** There has been a steady decline in the cost of per unit of data processed.

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## 1.8 FACILITIES AVAILABLE IN COMPUTERISED SYSTEM

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### For Data Capture

Data capture is the identification of new data to be input. It is always best to capture the data as soon as possible after it is originated.

The commonly used input device is a keyboard. Mouse, joystick, light pen, touch screen, and trackball are some of the devices which do not require typing of input information.

### **On-line Mode**

Following devices are used to capture data on-line.

#### **Keyboard**

- A computer keyboard is a sophisticated electromechanical component designed to create special standardized electronic codes when a key is pressed.
- The codes are transmitted along the cable that connects the keyboard to the computer system unit or terminal, where the incoming code is analyzed and converted into the appropriate computer usable code.

#### **Light Pen**

- It is a pointing device, used to select a displayed menu option on the CRT. Light pens are frequently used by graphics designers, illustrators, and drafting engineers.
- It is capable of sensing a position on the CRT screen when its tip touches the screen.
- A user can draw directly on the CRT screen with the light pen if the computer system is provided with Computer Aided Design (CAD) packages such as AutoCad 14.

#### **Mouse**

- A mouse is also a pointing device.
- As the mouse is rolled across the desktop, the cursor moves across the screen.
- The user can select menu or command by pushing a button on the mouse once or twice.

#### **Scanners**

Scanners are a kind of input device. They are capable of entering information directly into the computer.

The main advantage of direct entry of information is that users do not have to key in the information.

This provides faster and more accurate data

entry. Important types of scanners are:

- (i) Optical scanners
- (ii) Magnetic ink character readers

#### **Optical Scanners**

The following are the commonly used optical scanners:

- Optical Character Readers (OCR)
- Optical Mark Readers (OMR)
- Optical Bar-Code Readers

#### **Terminals**

Terminals can be "dumb", "smart", or "intelligent", and are used mainly by those who do their work on mini or mainframe computers (or supercomputers).

A variety of computer terminals are used to enter data, including the following popular types:

- Point-of-Sale (POS) terminals
- Financial transaction terminals



- Executiveworkstations
- Portableterminals
- Microcomputersusedasterminals

### **SmartCards**

- Itcontainsabuild-inmicrocomputerchip.
- Incaseofsmartcards,therearelesschancesoffraud.
- How much cash a customer has to his credit is stored in the chip before it is issued to him.
- When the customer uses the card to make purchases, the required amount is deducted fromthebalancebyaspecialelectronicmachineusedbymerchants.
- The electronic machine used by merchants communicates with the card issuing company's computer from time to time for money transactions. Thus, a card holder has the facility of keeping electronic money with him.
- When his electronic money is used up, he can replenish electronic money by depositing moneyatautomatedbankingmachineofcard-issuingcompany.
- Arecordofpurchasesmadebythecustomercanalsobestoredinasmartcard.

### **Off-lineMode**

Off-linedataentryinvolvesdevicesthroughwhichdataarerecordedonsomemediaand then into the computer later.

In almost 90% of the applications, data entry is done off-line. This saves the preciouscomputer processing time.

Thefollowingdevicesareusedtocapturedataoff-line.

#### **Key-to-tape**

A Key-to-tapedevice,alsoknownasmagnetictapeencoder,isdesignedtorecordkeyed data directly onto magnetic tape.

#### **Key-to-floppy**

Thesedataentrymachinesareusedtostoredatadirectlyonflexibledisks,calleddiskettes or floppies.

#### **Key-to-disk**

Usedasdatarecordingstationsinsystemswheredatafromdifferentpointshastobe recordedforprocessingatonepoint.

### **ForDataValidation**

The accuracy of input data should either be verified manually or by a computer program.Someofthetechniquesusedforthispurposearedescribedbelow:

#### **UsingControlTotals**

Inthistechnique,theverificationprogramverifiesthetotal.

When business transaction occurs, it is noted down and calculated at the point of transaction (by clerk) and the same transaction data is entered by the computer operator in the computer system.

The data entered by the operator are totalled by the computer. If the two entries do not match, then it is a clear indication that there is a mistake.



In this manner only correct data will be passed to the machine before processing is done.

### Using Built-in Checks by the Computer Program

There are two basic categories of computer-produced output: output for immediate use by people, and output that is stored in computer-usable form for later use by the computer. Output can be in either hardcopy or softcopy form.

For example, the salary cheques for a particular organization may not exceed Rs. 20,000.

If so, then if a cheque is made for an amount more than Rs. 20,000, then computer

will point an error.

## For Storage and Retrieval

Once the valid data has been entered in the system, it is essential that this data is stored securely for future use.

Major types of external storage devices used in computerised systems are:

- Magnetic tapes or cartridge
- Hard disks
- Floppy disks
- Compact Disk (CD)

## For Output

There are two basic categories of computer-produced output:

- Output for immediate use by people, and
- Output that is stored in computer-usable form for later use by the computer. Output can be in either hardcopy or softcopy form.

### (a) Hardcopy Output Devices

The commonly used hardcopy output devices are:

- (i) Printers
- (ii) Plotter
- (iii) Microfilm/microfiche

#### Printers

These are the most popular commonly used output devices.

- Capable of printing characters, symbols, and sometimes graphics on paper.
- Printers are categorized according to whether the image produced is formed by physical contact (impact printers) or not (non-impact printers) of the print mechanism with the paper.

#### Plotters

- A plotter is a specialized output device designed to produce high-quality graphics in a variety of colors.
- There are two basic types of plotters: those that use pens and those that do not. Drum plotters and flatbed plotters both use pens. Electrostatic plotters do not.

#### Microfilm and Microfiche

- In this technique the output from the computer is recorded on a microfilm as microscopic film images. The information recorded on the microfilm can be read with the help of a microfilm reader.
- A microfiche (pronounced as fish, French word, which means card) is a 4 x 6 inch film sheet.
- It can store up to 270 pages of information.
- It is easier to read a microfiche as compared to a microfilm.

### (b) Softcopy Output Devices

#### Cathode Ray Tube (CRT)

- Probably, the most popular softcopy output device.

- Used with terminals connected to large computer systems and as a monitor for microcomputer system.
- The CRT's screen display is made up of small picture elements, called pixels for short. The smaller the pixels, the better the image clarity, or resolution.

### **Voice Output Systems**

- Relatively new and can be used in some situations where traditional display screen softcopy output is inappropriate.
- Two different approaches to voice output have evolved, speech coding and speech synthesis.
- Used in applications such as automobiles, toys, and games.

### **For Transmission**

The most exciting developments in data processing today is data communication.

Communications, the transfer of information is the basis of office automation.

Some examples of everyday data communication are:

#### **Airline Reservation**

Computer is usually located far from the agent; data communication must be used to relay data from the terminal to the computer and back.

#### **Automated Banking**

ATMs are now widely used in most banks for better customer services. The user can make deposits and withdrawals, check balances, and even pay utility bills through the machines.

#### **Point-of-Sale Terminals**

Used in retail stores, instead of cash registers. These terminals send records of sales to a central computer, which maintains accounting and inventory records.

Data communication takes on several forms. These are given below:

- (a) Data can be transferred between two geographically distant personal computers by using modems, the dial-up telephone system, and a communications program in each computer.
- (b) Data can be transferred between two side-by-side computers by hooking up a cable from one computer's serial port to the other computer's serial port.
- (c) PC can act like a remote terminal to a mini or mainframe computer.
- (d) PC can be part of a local area network, in which software and hardware resources can be shared among many users.

#### **Student Activity 4**

1. What are the characteristics of a computer?
2. What do you mean by data capture?
3. List some commonly used input devices.
4. Define scanners.
5. Define smart cards.
6. Define plotters.
7. What are softcopy output devices? Give examples.
8. Define printers.
9. How are computers useful for Airline Reservation and Automated Banking?

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## **1.9 INDIAN COMPUTING ENVIRONMENT**

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Office work includes many administrative and management activities. The preparation, distribution, processing and review of documents are the common activities of an organization. Prior to the advent of computers, these office activities were either performed manually or with the help of mechanical and electrical machines. During the past few decades,



the basic nature of office e has changed remarkably. Office automation deals in application of latest technologies in improving the overall proficiency of the office. We define office automation as follows: Offi

ce automation does not mean just to install computers and communication devices in an office, but it is much more than that. We will discuss in later part of this unit, how an office can be automated in a real sense.

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## **1.10 OFFICE AUTOMATION**

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### **Needs for Office Automation**

Although all the work of a small or big office can be performed manually, but it is very difficult or even impossible today for an organization to compete in the market without office automation. There are many essential requirements of today's office environment, which are listed below:

- To reduce cost of administrative overhead;
- To increase the efficiency of office tasks;
- To provide better service to the customers;
- To provide accurate information to the management;
- To provide best and fastest way of communication.

The above requirements cannot be achieved without using latest technologies and therefore, office automation is needed for an organization.

### **Office Functions Needed to be Automated**

Many types of functions are performed in an office. The basic functions, which are needed to be automated in any office are

1. **Document Generation:** In all offices, many documents are needed to be prepared, typed and printed. Typewriters, computers and printers are widely used in automating this routine task of offices.
2. **Document Processing:** Documents are also needed to be processed in order to extract useful information required for MIS and other official purposes. Many office automation tools like word processing, desktop publishing etc. are used to perform this task.
3. **Document Distribution:** All offices require an electronic distribution system for transferring documents and data within and outside the organization. The main office automation tools for distribution of documents are Photocopiers, Teletax and Fax machines.
4. **Archival Storage:** The office documents are also needed to be stored for a long period, so that they can be retrieved when required. This task is achieved by the use of different storage devices like tapes, disk setc.

### **Office Automation Systems**

For achieving the basic functions of an office, different types of office automation systems are used. These systems can be broadly classified into following four types:

1. **Document Management Systems:** These systems include computerised tools for generation, storage, processing and distribution of documents.
2. **Communication Systems:** These systems are used for sending messages, documents and data within and outside the organization.
3. **Teleconferencing Systems:** An electronic means of communication for conducting seminars and training programmes in an organization is achieved through various teleconferencing systems.

<p><b>Definition</b></p> <p>Office automation is the application of computer and related technologies like communication and networking to integrate the general office tasks so that the efficiency of office work is improved.</p>
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4. **Support Systems:** Besides the above major office automation systems, certain support systems for managing the activities of work groups are also used in some offices.

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## **1.11 COMPONENTS OF A COMPUTER SYSTEM**

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Computer components can be broadly divided into two categories - Hardware and Software. Hardware refers to any physical component of a computer. For example, CPU, Monitor, Keyboard, Hard Disk, Floppy Disk etc. are physical components and thus, are hardware. Software refers to the programmes which are required to operate the computer. For example, DOS (Disk Operating System), BASIC, COBOL, dBASE, An Accounting Software etc. are all software. An analogy of hardware can be the book which you are reading and then software would be the text written on this book. Another analogy could be - 'brain' is a hardware but 'memory stored in brain' is a software.

Both hardware and software are dependent on each other. CPU, Memory Unit, Hard Disk etc. are useless until they are provided instructions and data for storage and processing. Similarly, BASIC or COBOL language has no use until it is stored and processed by hardware components of computer.

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## **1.12 HARDWARE COMPONENTS OF MICRO COMPUTER**

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In today's computer industry, a wide variety of hardware components are available for microcomputers. Managers must be aware of the working and uses of different hardware components, so that they can make good decisions about purchase of computer systems.

The hardware components of microcomputer can be classified into following types:

- (A) Motherboard
- (B) Input Devices
- (C) Output Devices
- (D) Storage Devices
- (E) Cards
- (F) Ports and Cords
- (G) Power Supply

All these hardware devices except motherboard are called peripheral devices, as they are connected to the motherboard.

### **Motherboard**

Motherboard, also called as System Board, is the most important hardware component of a microcomputer. Motherboard is so called as all the other boards (printed circuit boards having chips or other electronic components) of the computer are connected to this board, hence it is like mother of all other boards.

#### **Notes**

##### **Components of Motherboard**

A motherboard contains the CPU chip, Memory chip (ROM and RAM chips), I/O interface, expansion slots and many other logic circuits. It may also contain a math coprocessor chip. CPU or processor chip is the main component of motherboard. The types of CPU chip (8088/80286/80386/80486 etc.) vary from one model of PC to another. The function of math coprocessor chip (8088/80287 etc.) is to support the CPU chip in processing of mathematical calculations.

Memory chips are physically installed on the motherboard by different packing methods. There are three different types of packing of RAM chips DIP, SIMM and SIPP. DIP (Dual In Line Package) is the most common packing, having a small rectangular box with leads on both sides. SIMM (Single In Line Memory Module) packing contains a number of chips soldered on an expansion board having an edge connector. SIPP (Single In Line Pin Package) is similar to SIMM, but uses pins rather than an edge connector. Expansion slots are connectors on motherboard where expansion cards like display card, hard disk controller card etc. can be connected. I/O interface is the channel between the CPU and peripheral devices (keyboard, monitor etc.).

## Input Devices

Input devices are used to input data, information and instructions into the RAM. The common input devices of a PC are described below and shown in Figure 1.4.

**Keyboard:** Keyboard (similar to a typewriter) is the main input device of a computer. It contains 3 types of keys - alphanumeric keys, special keys and function keys. When a key is pressed, an electronic signal is produced. This signal is detected by a keyboard encoder that sends a binary code corresponding to the key pressed to the CPU. There are many types of keyboards but 101 Keys Keyboard is the most popular one.

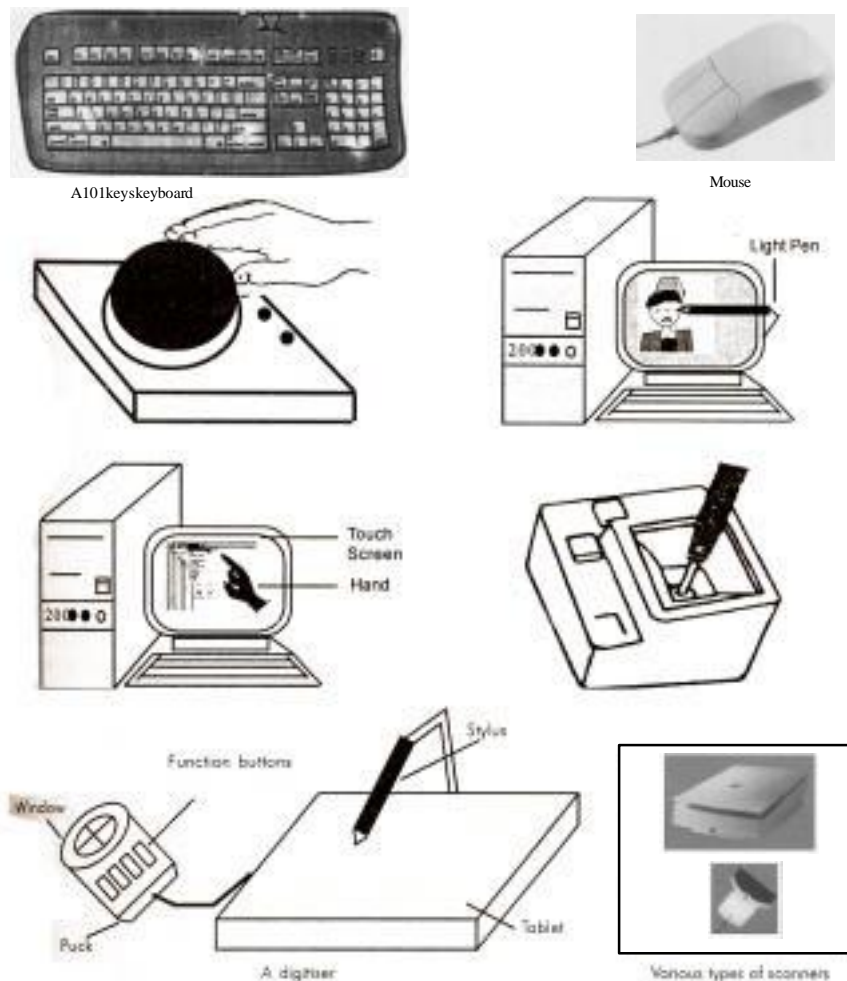
**Mouse:** Mouse (similar to a mouse) is another important input device. It is a pointing device used to move cursor, draw sketches/diagrams, selecting a text/object/menu item etc. on monitor screen while working on windows (graphics based operating environment of computer). Mouse is a small, palm size box containing 3 buttons and a ball underneath, which senses the movement of the mouse and sends the corresponding signals to CPU on pressing the buttons.

**Trackball:** A trackball looks like a mouse, as the roller is on the top with selection buttons on the side. It is again a pointing device used to move the cursor and works like a mouse.

**Light Pen:** Light pen (similar to a pen) is a pointing device which is used to select a displayed menu item or draw pictures on the monitor screen. It consists of a photocell and an optical system placed in a small tube. When its tip is moved over the monitor screen and pen button is pressed, its photocell sensing element detects the screen location and sends the corresponding signal to the CPU.

**Touch Screen:** Touch screen is sensitive to human fingers. Using this device, the user can point to a selection on the screen instead of pressing keys.

**Joystick:** Joystick is also a pointing device which is used to move cursor position on a monitor screen. It is mainly used in Computer Aided Designing (CAD) and playing computer games.





**Figure1.4: CommonInputDevicesofaPC**

**Digitiser:** Digitiser is used to create drawings and pictures using a digitiser tablet by a process called digitising. Digitising is a process by which graphic representations are converted into digital data. The user makes contact with the flat digitiser tablet with a pen-like stylus. As the stylus is connected to the tablet by a wire, the traced image is stored in RAM and displayed on monitor.

**Scanner:** Scanner is mainly used in Desktop Publishing (DTP) applications. Scanner is used for digitising images such as photographs, forms, documents etc. into computer memory. Some scanners can also read text by converting them to digital code. These scanners are very useful for converting the typed pages into word-processing files. Graphics scanners convert a printed image into video image without converting it to digital code.

**Optical Mark Reader (OMR):** It is a special type of optical scanner used to recognize the type of mark made by pen or pencil. It is used where one out of a few alternatives is to be selected and marked. It is specially used for checking the answer sheets of examination having multiple choice questions.

**Optical Character Reader (OCR):** It is also an optical scanner, which is capable of detecting alphanumeric characters typed or printed on paper using an OCR font. OCR devices are used for large volume applications like reading of passenger tickets, computer printed bills of credit card companies and reading of ZIP codes in postal services.

**Bar Code Reader:** This device is an optical scanner used for reading bar-coded data (data in form of light and dark lines). Bar-coded data is generally used in labelling goods, numbering the books or encoding ID or A/c numbers.

**Magnetic Ink Character Recognition (MICR):** MICR is used to recognize the magnetically-charged characters, mainly found on bank cheques. MICR is used by the banking industry for the processing of cheques. A special equipment is used to encode, decode and process the cheques.

**Voice-Input Devices:** These devices can recognize the human voice. They seem to be very useful but are not popular due to storage of limited vocabularies and variations in way of pronouncing words by different persons.

### Student Activity 5

1. What do you mean by office automation?
2. List various office functions needed to be automated.
3. Describe Teleconferencing Systems.
4. Define hardware and software.
5. Define: (a) Motherboard (b) Input device (c) Output device.
6. Describe any five input devices.
7. What is a Digitiser?
8. Define OMR and OCR.

### Output Devices

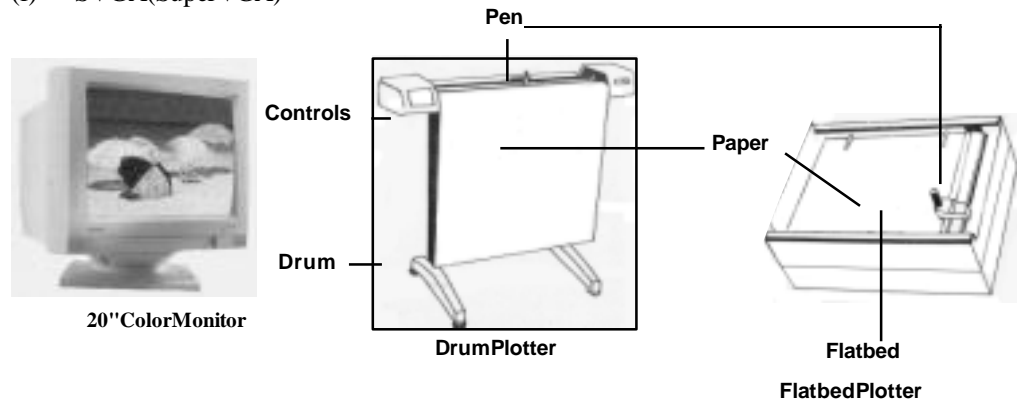
Output devices are hardware components which are used to display or print the processed information. The common output devices are described below and shown in Figure 1.5.

**Monitor:** Visual Display Unit (VDU), commonly called as monitor is the main output device of computer. It consists of a Cathode Ray Tube (CRT), which displays characters as an output. It forms images from tiny dots, called pixels, that are arranged in a rectangular form. The sharpness of the image (screen resolution) depends upon the number of the pixels.

**Types of Monitors:** There are different kinds of monitors depending upon the number of pixels. Depending upon the resolution, monitors can be classified as follows:

- (a) CGA (Color Graphics Adapter).
- (b) MDA (Monochrome Display Adapter).

- (c) HGA(HerculesGraphicsAdapter)
- (d) EGA(EnhancedGraphicsAdapter)
- (e) VGA(VideoGraphicsAdapter)
- (f) SVGA(SuperVGA)



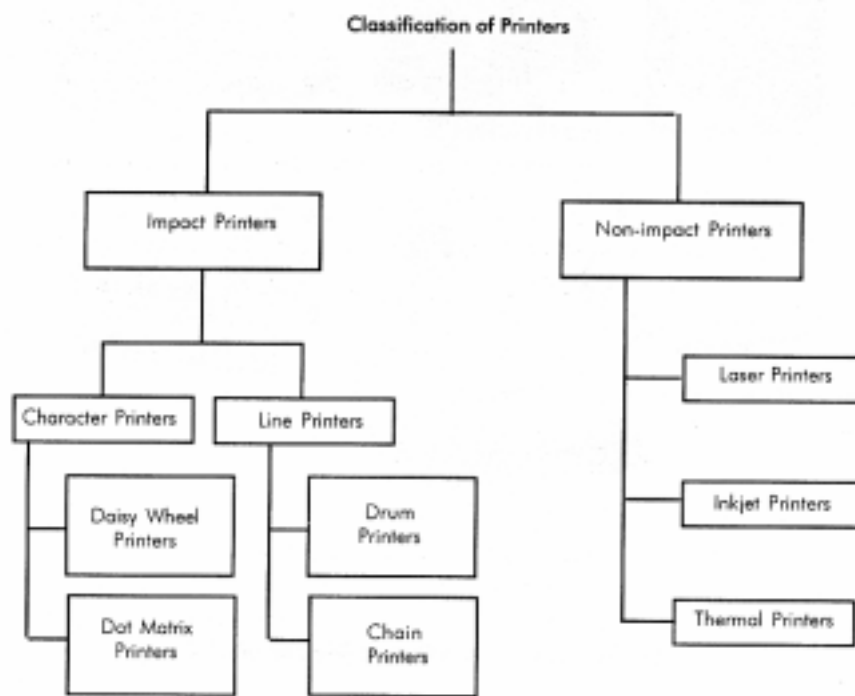
**Figure1.5: CommonOutputDevicesofaPC**

Depending upon color of display, monitors can be classified as Monochrome (with single color black/white display) and Color (with all colors display) Monitors.

**Printer:** Printer is the most important output device, which is used to print information on papers. Printers are essential for getting output of any computer based application.

**Types of Printers:** There are many types of printers which are classified on various criteria as illustrated in Figure 1.5. Printers can be broadly categorized into two types.

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**Figure1.6: Classification of Printers**

- (a) **Impact Printers:** The printers that print the characters by striking against the ribbon and onto the paper, are called Impact Printers. These printers are of two types
- (i) **Character Printers:** These printers print one character at a time. These printers are again of two types Daisy Wheel and Dot Matrix Printers. Daisy Wheel Printers these printers print the characters by a mechanism that uses a plastic or metal hub with spokes, called daisy wheel. The characters are embossed on the radiating spokes and printed by striking these spokes against the ribbon and paper. Daisy Wheel printers give a good quality but they are expensive than Dot Matrix printers. Dot Matrix Printers these printers print the characters by putting dots onto the paper. They do not give better printing quality than daisy wheel printers, but are faster in speed. The printing speed of a dot matrix printer can be up to 360 cps (characters per second). They are widely used with microcomputers in most of the offices.
  - (ii) **Line Printers:** These printers print one line at a time. Their printing speed is much more than character printers. They are again of two types Drum Printers and Chain Printers. Drum Printers these printers print the line by a rotating drum having a ring of characters for each print position. The hammers strike each character of the drum simultaneously, so that entire line is printed for one full rotation of the drum. These printers are also called as Barrel Printers. The printouts obtained from these printers, have even character spacing but uneven line height. Chain Printers these printers print the line by a rotating chain having ring characters for each print position. Their printing mechanism is similar to drum printers. The printouts obtained from these printers, have uneven character spacing but even line height.
- (b) **Non-Impact Printers:** The printer that prints the characters without striking against the ribbon and onto the paper, are called Non-Impact Printers. These printers print a complete page at a time, therefore, also called as Page Printers. Page printers are of three types
- (i) **Laser Printers:** These printers look and work like photocopiers. They are based on laser technology, which is the latest development in high speed and best quality printing. In these printers, a laser beam is used to write the image on a paper. First, the image is formed by electrically charged thousands of dots on a paper by laser beam. Then, the paper is sprayed with a toner having the opposite



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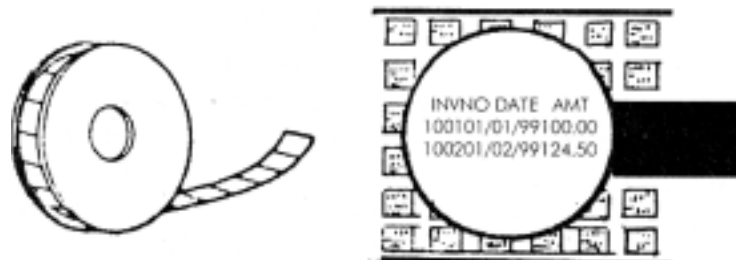
ge permanent. Laser printers are very popular and have become an essential part of DeskTop Publishing (DTP). Although laser printers are costlier than dot matrix, they are generally preferred in all offices due to their best quality of printing. There are many models of laser printers depending upon the speed and number of dots printed. The latest model of laser printer is 1200 DPI (Dots Per Inch), which can print 10 pages/minute. Some high speed laser printers give a speed of up to 100 pages/minute.

- (ii) **Inkjet Printers:** These printers print the characters by spraying the paper with electrically charged ink. These printers give better quality than character printers but not better than laser printers. They are cheaper than laser printers, hence used widely in many offices. They also offer an option of using color cartridges for multi-color printing.
- (iii) **Thermal Printers:** These printers print the characters by melting a wax based ink off a ribbon onto a special heat sensitive paper. They give letter-quality printing but are relatively expensive in maintenance than other printers.

**Plotter:** Plotter is an important output device, used to print high quality graphics and drawings. Although the graphics can be printed on printers, the resolution of such printing is limited on printers. Plotters are generally used for printing/drawing graphical images such as charts, drawings, maps etc. of engineering and scientific applications. Some important types of plotters are discussed below:

- (i) **Flatbed Plotters:** These plotters print the graphical images by moving the pen on stationary flat surface material. They produce very accurate drawings.
- (ii) **Drum Plotters:** These plotters print the graphical images by moving both the pen and the drum having paper. They do not produce as accurate drawings as printed by flat bed plotters.
- (iii) **Inkjet Plotters:** These plotters use ink jets in place of pens. They are faster than flat bed plotters and can print multi-colored large drawings.

**Computer Output Microfilm:** Computer Output Microfilm (COM) is a technique to produce output on a microfilm media (microfilm reel or microfiche card) as illustrated in Figure 1.7. A microfilm is a continuous film strip that can store several thousands miniaturized document pages. A microfiche card is a 4 by 6 inch film sheet, which can store several hundred pages.



**Figure 1.7: Computer Output/Microfilm**

The process of producing microfilm or microfiche takes place on a special COM unit. The information recorded on the microfilm is read with the help of a microfilm viewing system. It is generally easier to read a microfiche than microfilm. Computer Output Microfilm is particularly useful for organizations which need to store and manipulate large amount of data. It helps them in tremendous savings in paper and document handling costs.

#### **Student Activity 6**

1. What are output devices? Give examples.
2. Write the full form of the following:  
(a) CGA (b) MDA (c) HGA (d) EGA (e) VGA (f) SVGA
3. What is the difference between character printers and line printers?
4. Describe laser printer.
5. What are plotters? Describe its various types.

## Storage Devices

In preceding part of this unit, we have discussed about the primary memory of computer. Primary memory (especially RAM) stores the data, instructions and information temporarily during processing by CPU. When computer is switched off, this memory gets erased. How does a computer store the data, information and software permanently, so that they can be retrieved whenever required? Certainly, there must be some storage devices in computer. Now, we will discuss about different Storage Devices, sometimes also called as Secondary Memory Devices.

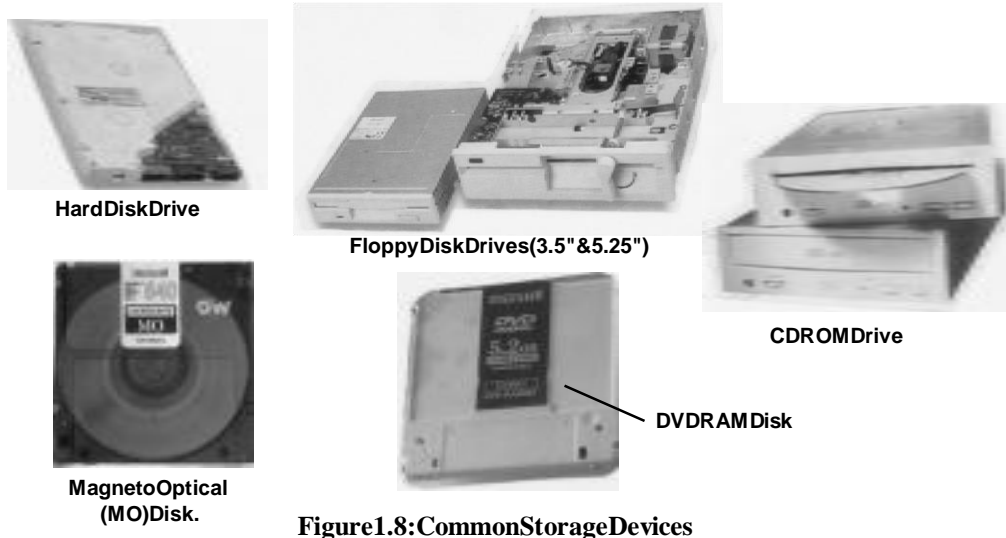


Figure 1.8: Common Storage Devices

There are many storage devices used with microcomputers. Some of the common storage devices are explained below and shown in Figure 1.8.

- (i) **Winchester Disk (Hard Disk):** Winchester Disk is the most common storage device of present day microcomputers. It is popularly called as Hard Disk Drive (HDD) or sometimes as Fixed Disk Drive. It is fixed inside the computer and is not easily removable. It is used for storing the software and data inside computer. It is known as 'Winchester Disk', probably because this drive was first made by IBM at Hursley Laboratory, located near Winchester in England.

Winchester Disk consists of one or more disk platters, an access mechanism and read/write heads which are sealed in a case. Hard disk size depends upon the disk platter's diameter. There are many different platter sizes (such as 5 1/2, 3 1/2, 2 1/2 inch etc.). The 3 1/2 inch size platter is common with PCs and 2 1/2 inch with laptop/portable computers. Read/write head is used to write any information on the disk surface or to read it back.

There are different types of hard disks depending upon their storage capacities. Storage capacities of hard disks range from 10 MB to 6.3 GB, but 4.3 GB are nowadays a common part of Pentium computers

- (ii) **Floppy Disk:** Floppy Disk (FD) is another common storage device which is small, flexible and easily removable. It is made of a plastic disk coated with magnetic material, which is sealed inside a square plastic jacket. It is called as 'Floppy' because it is soft having flexible physical property. Data can be written on or read from this floppy by a drive, called Floppy Disk Drive (FDD), which is fixed inside the computer.

Table 1.3: Comparison among Different Types of Floppies

Type of Floppy	Size	Density	Sectors	Tracks	Storage Capacity
DSDD*	5.25 inch	Double	9	40	360K
DSL D*	3.5 inch	Low	9	80	720K
DSHD*Big	5.25 inch	High	15	80	1.2MB
DSHD Small	3.5 inch	High	18	80	1.44MB

\*DS stands for Double Sided, LD for Low Density and HD for High Density





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es and storage capacities as illustrated in Table 1.3. The original floppy, developed by IBM, is an 8" floppy, but the most popular sizes available for present day PCs are 5 1/4" and 3 1/2". The storage capacity of floppies vary from 360 KB to 1.44 MB. The floppies can store data on both sides (Double-sided Floppies) or on single side (Single-sided Floppies) depending upon the floppy drive. Double sided floppy drives are most frequently used in present day PCs. The latest floppy drive, that packs two high density floppy drives (5.25 & 3.5 inch) into a single package, is known as Combo Drive.

- (iii) **Compact Disk:** Compact Disk (CD) is the latest storage device, used to store data, information and software, which can be read only and not be changed or erased. It is an optical read only memory, made up of a resin. Therefore, it is actually called as Compact Disk Read Only Memory (CD-ROM). However, the information is stored on CDs by using an expensive drive, called CD-ROM drive.

Nowadays compact disks are very popular storage devices for microcomputers because a large number of software including multimedia, audio and graphics software are available only on these disks. Compact Disks can store a large volume of data (upto 680 MB), which is almost same a storage capacity of 630 MB Hard Disk.

WORM (Write Once Read Many) is a type of compact disk which can be recorded only once and not erased. It can store more data than CD-ROM, generally measured in gigabytes.

- (iv) **Magnetic Tape:** Magnetic tape is the oldest storage device available for microcomputers. It is generally used to store a large volume of data that is needed to be sequentially accessed and processed. The tape is made up of a plastic ribbon coated with an iron-oxide material, which can be magnetized. The data stored on tape can be read as well as erased and written again.

Magnetic tape is a sequential access storage device, hence it is not possible to read the data randomly or directly. Therefore, magnetic tapes are suitable only for storing data for backups and batch mode applications and not for on-line applications. On the other hand, magnetic disks (floppy and hard disks), which are discussed above, are considered best storage devices for on-line applications.

- (v) **Video Disk:** Video disk is used to store text, video and audio data. It is widely used for training applications as it can be played like a phonograph record.
- (vi) **Magneto Optical Drive:** Magneto Optical (MO) drive is the latest of all storage devices. This drive uses both a laser and an electromagnet to record data on a removable cartridge. The surface of the cartridge contains tiny embedded magnets. The unique feature of MO drive is that it has a very high storage capacity. Although MO drive is costlier and slower than HDD, it has a long life and is more reliable.
- (vii) **DVD ROM/RAM Disk:** DVD ROM and DVD RAM disks are optical disks having a storage capacity of 4.7 GB and 5.2 GB respectively. These disks are becoming the next generation's new standard for higher capacity removable media. They are ideal for storage of huge amount of information required for multimedia applications. One can put 133 minutes of high quality of video with digital sound on a DVD RAM Disk.

## Cards

Cards are the printed circuit boards used to hold the chips (integrated circuits). There are many types of cards used in PC, the important ones are Video Card, Sound Card, I/O Card, Controller Card and Memory Card. Video card (Display Card) generates the text and graphic images for monitor while sound card generates the sound. Pentium computers, generally, use a PCI (Peripheral Component Interconnect) video card to speed up graphics. I/O Card provides a place for connecting mouse and printer. Cables of hard disk and floppy disk are connected to controller cards. Memory Card provides a place for memory chips.

## Ports and Cords

Beside the important hardware discussed above, the computer has several components which are used as pathway for flow of data. The rear of a PC has many empty holes or external sockets called ports or connectors. There are many types of ports in a PC, the most

important ones are Serial Port, Parallel Port, Game Port and Video Port. Serial Port is used to connect a mouse, modem or scanner. Parallel Port is generally used to connect a printer. Game Port is used to connect the joystick while Video Port is a connector for monitor.

Cords are the cables used to plug into the ports. There are different types of cables for connecting different types of input, output and storage devices. The important cords used in a PC are keyboard cords, power cords, monitor cords and printer cords.

## Power Supply

Power supply is considered as the 'Heart' of a PC. Computer requires a clean and steady power source for working properly. Power supply is that important hardware, which provides the power source to a computer. It provides a voltage range of 4.95 to 5.25 volts for the highest performance of the system. Power supplies vary in size and power (in watt).

**Notes:** An Uninterrupted Power Supply (UPS) keeps the computer running for few minutes even when the electricity supply goes off. UPS is not a part of computer and is purchased separately. It is optional but mostly preferred to CVT (Constant Voltage Transformer) and is always recommended for computerised applications like MIS.

### Student Activity 7

1. Define Winchester Disk.
2. Define floppy disk.
3. Define CD-ROM and WORM.
4. What is the function of magnetic tape?
5. What is a magneto optical drive?
6. Define cards.

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## 1.13 CLASSIFICATION OF SOFTWARE

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Software are broadly classified into following two types:

- (a) System Software
- (b) Application Software

### System Software

Software, which are required to control the working of hardware and aid in effective execution of a general user's applications are called system software. These software perform a variety of functions like file editing, storage management, resource accounting, I/O management, database management, etc. Some of the examples of system software are DOS (Disk Operating System), Windows, BASIC, COBOL and PCTOOLS. These software are developed by System Programmers.

#### Types of System Software

System software can be further categorized into following three types:

- (i) System Management Software  
(Operating Systems, DBMS, Operating Environments)
- (ii) System Development Software  
(Language Translators, Application Generators, CASE Tools)
- (iii) System Software Utilities

### Application Software

Software which are required for general and special purpose applications like database management, word processing, accounting etc. are called as application software. Some of the examples of application software are dBASE, Word Star, Tally etc. Application software are developed using system software by Application Programmers.



- (i) General Purpose Application Software  
(Database Management Packages, Word Processors, Spreadsheets, Office Automation Packages)
- (ii) Special Purpose Application Software  
(Desktop Publishing, Multimedia, Business Applications)

