

Paper: MD-MTH-3.1 (Basics of Computer)
UNIT-I

+ What is a computer?

A computer is an electronic data processing device, which accepts and stores data input, processes the data input, generates the output in a required format and store the information for future use.

+ Main Functionalities of a computer:

Any digital computer carries out five functions in gross terms:

1. Takes data as inputs.
2. Stores data or informations in its memory and uses when required.
3. Processes the datas and convert them to the useful informations.
4. Generates the output in a userfrinedly manner.
5. Controls all of the above four functions.

+ Components of a Computer System:

Basic Components of a computer System are:

1. Input Unit.
2. Central Processing Unit (CPU).
3. Output Unit.

The Input Unit:

Input devices are the devices which are used to feed programs and data to the computer. The input system connects the external environment with the computer system. The input devices are the means of communication between the user and the computer system.

Thus the main functions of the input unit are:

- ☐ accept information (data) and programs.
- ☐ convert the data in a form which the computer can accept.
- ☐ provide this converted data to the computer for further processing.

Examples of Input devices are: Keyboard, floppy disks, mouse, microphone, light pen, joy stick, magnetic tapes etc.

The Central Processing Unit (CPU):

A CPU is brain of a computer. It is responsible for all functions and processes. Regarding computing power, the CPU is the most important element of a computer system.

The CPU is comprised of three main parts:

* **Arithmetic Logic Unit (ALU):** It executes all arithmetic and logical operations. Arithmetic calculations like as addition, subtraction, multiplication and division. Logical operation like compare numbers, letters, or special characters.

* **Control Unit (CU):** It controls and co-ordinates computer components.

1. Read the code for the next instruction to be executed.
2. Increment the program counter so it points to the next instruction.
3. Read whatever data the instruction requires from cells in memory.
4. Provide the necessary data to an ALU or register.
5. If the instruction requires an ALU or specialized hardware to complete, instruct the hardware to perform the requested operation.

* **The Primary Storage Unit:** This is also called as **Main Memory**.

Before the actual processing starts the data and the instructions fed to the computer through the input units are stored in this primary storage unit. Similarly, the data which is to be output from the computer system is also temporarily stored in the primary memory. It is also the area where intermediate results of calculations are stored. The main memory has the storage section that holds the computer programs during execution. Thus the primary unit:

- ☐ Stores data and programs during actual processing
- ☐ Stores temporary results of intermediate processing
- ☐ Stores results of execution temporarily

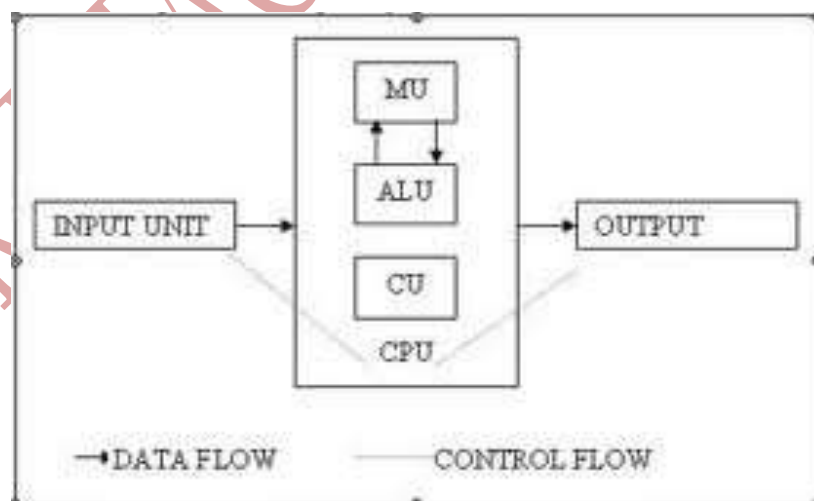


Figure 1.1: Block Diagram of Computer System.

Output devices:

An output device is any piece of computer hardware equipment used to communicate the results of data processing carried out by an information processing system (such as a computer) which converts the electronically generated information into human-readable form. **Examples of some output devices are:** printers, plotters, display screens, magnetic tape drives etc.

Storage Unit:

A **storage unit** is that part of the computer system which is used to store the data and instructions to be processed.

Characteristics of Storage units:

The storage units have special characteristics which decide:

- ☐ Speed of operation of the computer,
- ☐ It's efficiency,
- ☐ Cost and
- ☐ Amount of the data which the computer can store.

There are two types of storage:

- 1) Primary storage
- 2) Secondary storage.

Primary Storage: Primary memory is also known as **internal memory**. This is a section of the CPU which holds program instructions, input data and intermediate results. Primary memory is also known as **main memory**. Primary storage is characterized by faster access time, less storage capacity and higher costs as compared to secondary storage units. Primary storage or main memory is that part of the computer system which stores the programs, data and intermediate results during the program execution.

The primary storage is volatile. Whenever the power is turned off the data is lost. Primary storage is also called **Random Access Memory (RAM)**. RAM means it is possible to randomly select and use any storage location for storage and retrieval of data. RAM is also called a **read/write** memory because data can both be read from and written onto these units. When the power is switched off the data stored in the RAM is lost. **Therefore, RAM is called volatile memory.**

Secondary Storage: Secondary storage is a memory that is stored external to the computer. It is used mainly for permanent and long term storage of programs and data. **Examples of some secondary storage are:** Hard Disk (Local Disk), Optical Disks, CD-R, CD-RW, DVD-R, DVD-RW, Pen Drive, Floppy Disks, Memory Cards, External Hard Disk, Blu Ray Disk etc.

Advantages of secondary memory are:

- It stores data and programs permanently.
- It retained after the power is turned off.

 Software:

Software is a set of instructions to acquire inputs and to manipulate them to produce the desired outputs in terms of functions and performances as determined by the user of the software.

Importance of software:

The computer software acts as a bridge between the hardware of a computer system and the users of a computer. They enable computer users to obtain what they want from the computer. Further, they make the computer to work towards giving the output in the manner that the users need, such that output on a screen, makes printouts, sound effects, send emails etc. Thus software enables the users to interact with the computer system.

There are two types of software:

1. System Software.
2. Application Software.

System Software: System software is responsible for controlling, integrating, and managing the individual hardware components of a computer system so that other software and the users of the system see it as a functional unit without having to be concerned with the low-level details such as transferring data from memory to disk, or rendering text onto a display. This software includes operating system and all utilities that enable the computer to function. Through this software the computer system runs and is capable of executing all application software. **Examples of some system software are:** Operating System, Compilers, Assemblers, Loaders, Linker etc.

Application software: Application software is used to accomplish specific tasks other than just running the computer system. Application software may consist of a single program, such as an image viewer; a small collection of programs (often called a software package) that work closely together to accomplish a task, such as a spread sheet or text processing system; a larger collection (often called a software suite) of related but independent programs and packages that have a common user interface or shared data format, such as Microsoft Office, which consists of closely integrated word processor, spread sheet, database, etc.; or a software system, such as a database management system, which is a collection of fundamental programs that may provide some service to a variety of other independent applications.

Examples of some application software are: Word processor (MS Office), Spread Sheets (MS Excel), MS power point etc.

Operating System:

It is a software component of a computer system that is responsible for the management of various activities of a computer and the sharing of computer resources. Users interact with operating systems through command line interfaces (CLI) or Graphical User Interfaces (GUI). **Examples of some operating systems which are usually used by the users are:** Windows, MS-DOS, UNIX, MAC/OS X etc.

Need of Operating System:

We need operating system

- (i) To execute user programmes and make the solution of user problem easier.
- (ii) To make the computer systems convenient to use.
- (iii) To use the computer hardware in an efficient manner.
- (iv) To manage processor, memory and device in such a way that it can be conveniently used by the users.