

MODULE 1

LECTURE NOTE-1

A BEGINNER'S GUIDE

INTRODUCTION TO COMPUTERS

Any programming language is implemented on a computer. Right from its inception, to the present day, all computer systems (irrespective of their shape & size) perform the following 5 basic operations. It converts the raw input data into information, which is useful to the users.

- *Inputting*: It is the process of entering data & instructions to the computer system.
- *Storing*: The data & instructions are stored for either initial or additional processing, as & when required.
- *Processing*: It requires performing arithmetic or logical operation on the saved data to convert it into useful information.
- *Outputting*: It is the process of producing the output data to the end user.
- *Controlling*: The above operations have to be directed in a particular sequence to be completed.

Based on these 5 operations, we can sketch the block diagram of a computer.

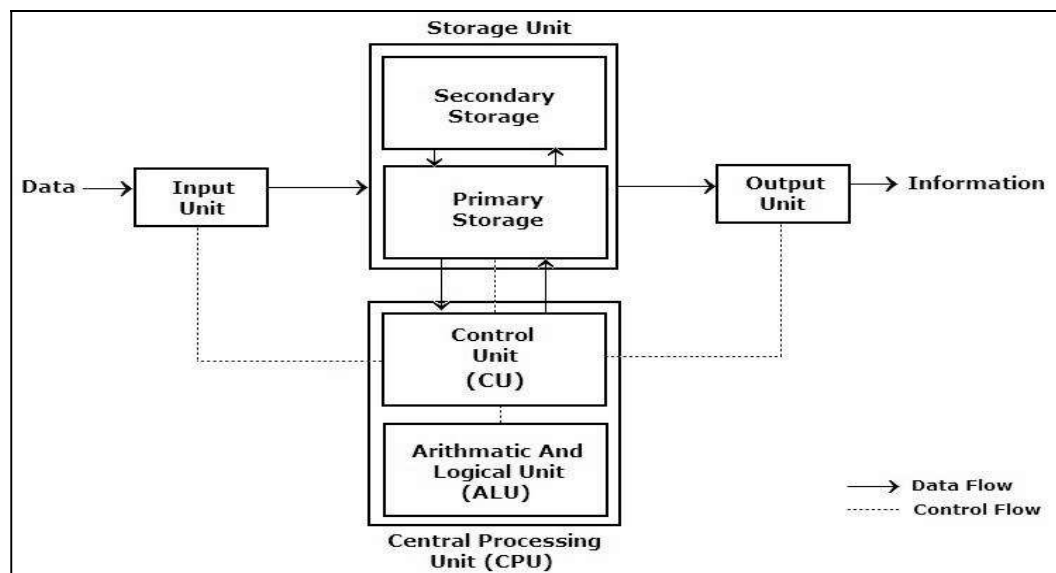


Fig 1: Block Diagram of a Computer

- *Input Unit:* We need to first enter the data & instruction in the computer system, before any computation begins. This task is accomplished by the input devices. (Eg: keyboard, mouse, scanner, digital camera etc). This device is responsible for linking the system with the external environment. The data accepted is in a human readable form. The input device converts it into a computer readable form.
- *Storage Unit:* The data & instruction that are entered have to be stored in the computer. Similarly, the end results & the intermediate results also have to be stored somewhere before being passed to the output unit. The storage unit provides solution to all these issues. This storage unit is designed to save the initial data, the intermediate result & the final result. This storage unit has 2 units: *Primary storage* & *Secondary storage*.

Primary Storage: The primary storage, also called as the *main memory*, holds the data when the computer is currently on. As soon as the system is switched off or restarted, the information held in primary storage disappears (i.e. it is volatile in nature). Moreover, the primary storage normally has a limited storage capacity, because it is very expensive as it is made up of semiconductor devices.

Secondary Storage: The secondary storage, also called as the *auxiliary storage*, handles the storage limitation & the volatile nature of the primary memory. It can retain information even when the system is off. It is basically used for holding the program instructions & data on which the computer is not working on currently, but needs to process them later.

- *Central Processing Unit:* Together the Control Unit & the Arithmetic Logic Unit are called as the Central Processing Unit (CPU). The CPU is the brain of the computer. Like in humans, the major decisions are taken by the brain itself & other body parts function as directed by the brain. Similarly in a computer system, all the major calculations & comparisons are made inside the CPU. The CPU is responsible for activating & controlling the operation of other units of the computer system.

Arithmetic Logic Unit: The actual execution of the instructions (arithmetic or logical operations) takes place over here. The data & instructions stored in the primary storage are transferred as & when required. No processing is done in the primary storage. Intermediate results that are generated in ALU are temporarily transferred back to the primary storage, until needed later. Hence, data may move from the primary storage to ALU & back again to storage, many times, before the processing is done.

Control Unit: This unit controls the operations of all parts of the computer but does not carry out any actual data processing. It is responsible for the transfer of data and instructions among other units of the computer. It manages and coordinates all the units of the system. It also communicates with Input/Output devices for transfer of data or results from the storage units.

- *Output Unit:* The job of an output unit is just the opposite of an input unit. It accepts the results produced by the computer in coded form. It converts these coded results to human readable form. Finally, it displays the converted results to the outside world with the help of output devices (Eg :monitors, printers, projectors etc..).

So when we talk about a computer, we actually mean 2 things:

- *Hardware-* This hardware is responsible for all the physical work of the computer.
- *Software-* This software commands the hardware what to do & how to do it.

Together, the hardware & software form the computer system.

This software is further classified as system software & application software.

System Software- System software are a set of programs, responsible for running the computer, controlling various operations of computer systems and management of computer resources. They act as an interface between the hardware of the computer & the application software. E.g.: Operating System

Application Software- Application software is a set of programs designed to solve a particular problem for users. It allows the end user to do something besides simply running the hardware. E.g.: Web Browser, Gaming Software, etc.