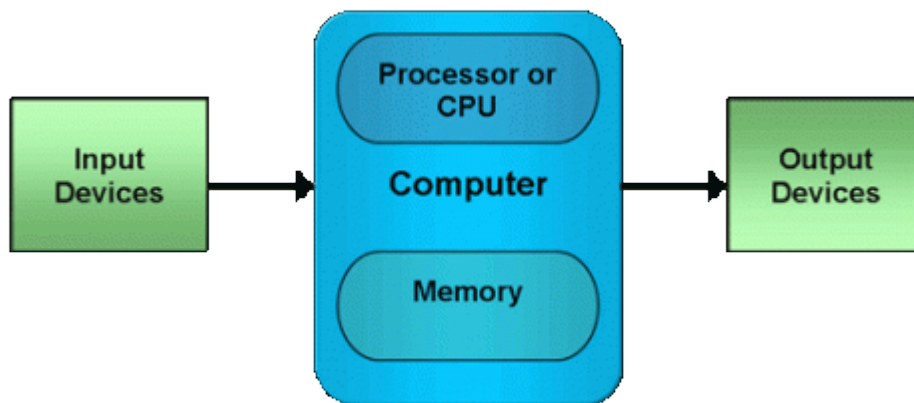


## THE COMPUTER SYSTEM

The computer system is a functional unit, consisting of one or more computers and associated software, that uses common storage for all or part of a program and also for all or part of the data necessary for the execution of the program, executes user-written or user-designated programs, and performs user-designated data manipulation, including arithmetic and logic operations. A computer system may be a stand-alone system or may consist of several interconnected systems.

## COMPONENTS OF A COMPUTER SYSTEM

The internal architectural design of computers differs from one system model to another. However, the basic organization remains the same for all computer systems. The following five units (also called "*The functional units*") correspond to the five basic operations performed by all computer systems.



### Input Unit

Data and instructions must enter the computer system before any computation can be performed on the supplied data. The input unit that links the external environment with the computer system performs this task. Data and instructions enter input units in forms that depend upon the particular device used.

In short, an input unit performs the following functions.

1. It accepts (or reads) the list of instructions and data from the outside world.
2. It converts these instructions and data in computer acceptable format.
3. It supplies the converted instructions and data to the computer system for further processing.

### Output Unit

The job of an output unit is just the reverse of that of an input unit. It supplies information and results of computation to the outside world. Thus it links the computer with the external environment. In short, the following functions are performed by an output unit.

1. It accepts the results produced by the computer which are in coded form and hence cannot be easily understood by us.
2. It converts these coded results to human acceptable (readable) form.
3. It supplied the converted results to the outside world.

## **Storage Unit**

The data and instructions that are entered into the computer system through input units have to be stored inside the computer before the actual processing starts. The **Storage Unit** or the **primary / main storage** of a computer system is designed to do all these things. It provides space for storing data and instructions, space for intermediate results and also space for the final results.

In short, the specific functions of the storage unit are to store:

1. All the data to be processed and the instruction required for processing (received from input devices).
2. Intermediate results of processing.
3. Final results of processing before these results are released to an output device.

## **Central Processing Unit (CPU)**

The main unit inside the computer is the **CPU**. This unit is responsible for all events inside the computer. It controls all internal and external devices, performs "**Arithmetic and Logical operations**". The operations a Microprocessor performs are called "**instruction set**" of this processor. The instruction set is "hard wired" in the CPU and determines the machine language for the CPU. Processors differed from one another by the instruction set. If the same program can run on two different computer brands they are said to be compatible.

The control Unit and the Arithmetic and Logic unit of a computer system are known as the Central Processing Unit (CPU). The CPU is the brain of any computer system. In a human body, all major decisions are taken by the brain and the other parts of the body function as directed by the brain. Similarly, in a computer system, all major calculations and comparisons are made inside the CPU and the CPU is also responsible for activating and controlling the operations of other units of a computer system.

## **Arithmetic and Logic Unit (ALU)**

The **arithmetic and logic unit (ALU)** of a computer system is the place where the actual execution of the instructions take place during the processing operations. All calculations are performed and all comparisons (decisions) are made in the **ALU**. The arithmetic and logic unit (ALU) is the part where actual computations take place. It consists of circuits that perform arithmetic operations (e.g. addition, subtraction, multiplication, division over data received from memory and capable to compare numbers (less than, equal to, or greater than).

All activities in the computer system are composed of thousands of individual steps. These steps should follow in some order in fixed intervals of time. These intervals are generated by the Clock Unit. Every operation within the CPU takes place at the clock pulse. But some operations required more than one clock pulse. The faster the clock runs, the faster the computer performs. The clock rate is measured in megahertz (Mhz) or Gigahertz (Ghz). Larger systems are even faster. In older

systems the clock unit is external to the microprocessor and resides on a separate chip. In most modern microprocessors the clock is usually incorporated within the CPU.

## **Control Unit**

The control unit is able to maintain order and directs the operation of the entire system. Although, it does not perform any actual processing on the data, the control unit acts as a central nervous system for the other components of the computer. It manages and coordinates the entire computer system. It obtains instructions from the program stored in main memory, interprets the instructions, and issues signals that cause other units of the system to execute them.

The control unit directs and controls the activities of the internal and external devices. It interprets the instructions fetched into the computer, determines what data, if any, are needed, where it is stored, where to store the results of the operation, and sends the control signals to the devices involved in the execution of the instructions.