# CHAPTER -2
# BASIC COMPUTER ORGANISATION

In this chapter we will discuss the basic component of the computer hardware.

## 2.1 CENTRAL PROCESSING UNIT (CPU):

A **central processing unit** (**CPU**), or sometimes simply processor**,** is the component in a digital computer that interprets computer program instructions and processes data. CPUs provide the fundamental digital computer trait of programmability, and are one of the necessary components found in computers of any era, along with primary storage and input/output facilities. A CPU that is manufactured as a single integrated circuit is usually known as a microprocessor.

The phrase "central processing unit" is a description of a certain class of logic machines that can execute computer programs. This broad definition can easily be applied to many early computers that existed long before the term "CPU" ever came into widespread usage.

## 2.2 Storage capabilities of Microprocessor :

A microprocessor chip can be of 8, 16 or 32 bit. One byte is equal to 8 bits. What is a bit ?

A **bit** (**bi**nary digi**t**) is a digit in the binary numeral system, which consists of base 2 digits (i.e., there are only two possible values for each digit, viz. 0 or 1). For example, the number 10010111 is 8 bits long. Binary digits are almost always used as the basic unit of information storage and communication in digital computing and digital information theory.

**Byte** :Abbreviation for *binary te*rm*,* a unit of storage capable of holding a single character. On almost all modern computers, a byte is equal to 8 bits. Large amounts of memory are indicated in terms of kilobytes (1,024 bytes), megabytes (1,048,576 bytes), and gigabytes (1,073,741,824 bytes).

**2.2.1 Clock Speed :** Clock speed :Also called *clock rate,* the speed at which a microprocessor executes instructions. Every computer contains an internal clock that regulates the rate at which instructions are executed and synchronizes all the various computer components. The CPU requires a fixed number of clock ticks (or *clock cycles*) to execute each instruction. The faster the clock, the more instructions the CPU can execute per second.

Clock speeds are expressed in megahertz (MHz) or gigahertz ((GHz).

**2.3 Main Components of CPU :** The Central Processing Unit (CPU) is the brain of the computer. Without the CPU, you have no computer. The CPU is composed of logic gates that accept input, process it and produce output. The complete CPU usually contains a core processor with two or more pipelines, a dedicated Arithmetic Logic Unit (ALU, also called the math co-processor), and special high-speed memory in some cases for caching program instructions from RAM. Main components of a CPU are:

   (a) Arithmetic and Logic Unit
   (b) Control Unit
   (c) Primary storage Unit

**2.3.1 Arithmetic and Logic Unit :** The ALU is that part of CPU where actual data processing occurs. All mathematical and logical operations tale place here.

**2.3.2 Control Unit :** The control unit interprets any instruction it receives from memory and directs the sequence of events necessary to execute the instructions.

**2.3.3 Computer storage**, **computer memory**, and often casually **memory** refer to computer components, devices and recording media that retain data for some interval of time. Computer storage provides one of the core functions of the modern computer, that of information retention. It is one of the fundamental components of all modern computers, and coupled with a central processing unit (CPU).

In contemporary usage, **memory** usually refers to a form of solid state storage known as random access memory (RAM). Similarly, **storage** more commonly refers to mass storage - optical discs, forms of magnetic storage like hard disks, and other types of storage which are slower than RAM, but of a more permanent nature. These contemporary distinctions are helpful, because they are also fundamental to the architecture of computers in general. As well, they reflect an important and significant technical difference between memory and mass storage devices, which has been blurred by the historical usage of the terms "**main storage**" (and sometimes "primary storage") for random access memory, and "**secondary storage**" for mass storage devices. This is explained in the following sections, in which the traditional "storage" terms are used as sub-headings for convenience.