**3.1 Hardware :** The tangible parts of a computer that we can touch and see are called hardware. Eg: Monitor, Keyboard, Mouse, CPU, Etc.

**3.1.1 Processors :** It is the brain of the computer and consists of three components

* Arithmetic Logic Unit(ALU) – As the name implies it performs all calculations and comparison operations.
* Control Unit(CU)- It controls over all functions of a computer
* Registers- It stores the intermediate results temporarily.

A CPU is an Integrated Circuit(IC) package contains millions of transistors and other components.
Popular Processors are Intel core i3, core i5,core i7, AMD Quadcore etc.

**Important registers inside a CPU are**

a) Accumulator : After performing an operation (arithmetic or logical) the result is stored in the accumulator
b) Memory Address Register(MAR) : It stores the **address** of memory location to which data is either read or written by the processor.
c) Memory Buffer Register (MBR) : It stores the data, either to be written to or read from the memory by the processor.
d) Instruction Register(IR) : It stores the instructions to be executed by the processor.
e) Program Counter(PC) : It stores the address of the next instruction to be executed by the processor.

### 3.1.4 Memory

Storage Unit(Memory Unit) : A computer has huge storage capacity. It is used to store data and instructions before starts the processing. Secondly it stores the intermediate results and thirdly it stores information(processed data), that is the final results before send to the output unit(Visual Display Unit, Printer, etc)

Memory measuring units are given below.

| | | |
|---|---|---|
| 1 bit | = | 1 or 0(Binary Digit) |
| 4 bits | = | 1 Nibble |
| 8 bits | = | 1 Byte |
| 1024 Bytes | = | 1 KB(Kilo Byte) |
| 1024 KB | = | 1 MB(Mega Byte) |
| 1024 MB | = | 1 GB(Giga Byte) |
| 1024 GB | = | 1 TB(Tera Byte) |
| 1024 TB | = | 1 PB(Peta Byte) |

Two Types of storage unit

i) **Primary Storage alias Main Memory :** It is further be classified into Two - Random Access Memory (RAM) and Read Only Memory(ROM). The **one and only** memory that the CPU can directly access is the main memory at a very high speed. It is expensive hence storage capacity is less.

RAM is volatile(when the power is switched off the content will be erased) in nature but ROM is non volatile(It is permanent). In ROM a "boot up" program called BIOS(Basic Input Output System) is stored to "boots up" the computer when it switched on. Some ROMs are given below.

1) PROM(Programmable ROM) : It is programmed at the time of manufacturing and cannot be erased.

2) EPROM (Erasable PROM) : It can be erased and can be reprogrammed using special electronic circuit.
3. EEPROM (Electrically EPROM) : It can be erased and rewritten electrically

Cache Memory : The processor is a very high speed memory but comparatively RAM is slower than Processor. So there is a speed mismatch between the RAM and Processor, to resolve this a high speed memory is placed in between these two this memory is called cache memory. Commonly used cache memories are Level(L1) Cache(128 KB), L2(1 MB),L3(8 MB), L4(128MB).