

**Memory devices**- Memory is just like human brain which is used to store data and instructions. Computer memory has a storage space in computer where data is to be processed and instructions are required for processing are stored. Therefore digital system require memory facilities for temporary as well as permanent storage of data to perform their functions.

The memories divided into large number of small parts. Each part is called a cell. Each location or cell has unique address.

**Example-** If computer has 64K words then this memory unit has  $64 \times 1024 = 65536$  memory locations and address these locations from 0 to 65536.

Memory can be of two types-

1. Internal Memory: like- Register, main memory and secondary memory
2. External Memory: like- DVD, CD, Pendrive, Optical Disc etc.

Other categories of memory are:-

1. Volatile and Non Volatile
2. Sequentially access memory and RAM
3. Static and dynamic memory
4. Magnetic and semiconductor memory
5. Read Only Memory

1. **Register , main memory and secondary memory:-** On the basis of location and uses of device memories can be register, main and secondary.

- Register are available within the CPU to store data temporarily during the arithmetic and logical operations like addition, subtraction, AND, OR etc. They have very low access time.
- Main memory of computer is semiconductor type to store program and data during the execution of RAM. In the main memory each memory location is identified by an unique address and is accessed for read/write operations in a small speed then for register.
- To increase the storage capacity of main memory, secondary memories are added. This secondary memory operates at a lesser speed as compared to register and main memory. These memories are magnetic memory type and used to store large quantities of data.

## 2. **Volatile and Non- volatile-**

- Volatile memory is such a memory which losses its store data when power of the memory circuit becomes OFF.
- Non- Volatile memory is such a memory which retains stored data permanently even after the power supply of memory is turned OFF.

## 3. **Sequentially access memory and RAM-**

- Based on the access method memory devices can be classified as sequential access as SAM and RAM.
- SAM is one in which a particular memory location is accessed sequentially.

**Example-**  $i^{\text{th}}$  memory location is accessed only after accessing  $(i-1)$  memory location.

It is also a magnetic type memory. The time of accessing is depending on the location to be accessed.

- RAM is one in which any location can be accessed in a random manner and therefore it has equal access time for all memory locations.

Example: RAM is semiconductor type

It constitute internal memory of the device for storing data, program. It is read/write memory. RAM is a volatile and small in size. It may be static memory or dynamic memory.

#### **4. Static and dynamic memory-**

- In static memory the content doesn't change with time. Static memory devices require no refreshing and hold data as long as DC power is applied.
- In Dynamic memory it's content changes with time. Dynamic memory cells use the capacitance of transistor as the storage device only one bit of information. The capacitor must be refreshed periodically without being discharged in order to prevent loss of information.

**5. Magnetic and Semiconductor memory-** On the basis of material used for construction in memory these memories are classified as magnetic memory and semiconductor memory-

- Magnetic memories are constructed using magnetic material.

**For ex-** Floppy , Magnetic Tape and compact disc.

Magnetic recording is the process of storing data magnetically on the surface of the tape or disc. Magnetic tape in a storage medium using the surface of magnetic tape to hold data .

- Semiconductor memories are constructed by semiconductor material using large scale integration(LSI) and very large scale integration(VLSI) technologies. It may be of RAM or ROM.
- 6. Read only memory (ROM)** - It is a semiconductor memory device used to store the information permanently. It performs only read operation and does not have write operation.