FUNDAMENTAL STUDY NOTES-03

3. Storage Devices:-

❑ Primary Storage Devices

RAM (Volatile Memory)

It is a volatile memory. It means it does not store data or instructions permanently. When you switch on the computer the data and instructions from the hard disk are stored in RAM.

CPU utilizes this data to perform the required tasks. As soon as you shut down the computer the RAM loses all the data.

Static RAM

Static RAM is the full form of SRAM. In this type of RAM, data is stored using the state of a six transistor memory cell. Static RAM is mostly used as a cache memory for the processor (CPU).

Dynamic RAM

DRAM stands for Dynamic Random Access Memory. It is a type of RAM which allows you to stores each bit of data in a separate capacitor within a specific integrated circuit. Dynamic RAM is a standard computer memory of the many modern desktop

computers.This type of RAM is a volatile memory that needs to be refreshed with voltage regularly. Else it loses the information stored on it.

ROM (Non-volatile Memory)

It is a non-volatile memory. It means it does not lose its data or programs that are written on it at the time of manufacture. So it is a permanent memory that contains all important data and instructions needed to perform important tasks like the boot process.

Types of Read Only Memory (ROM) –

1. **PROM (Programmable read-only memory)** – It can be programmed by user. Once programmed, the data and instructions in it cannot be changed.

2. **EPROM (Erasable Programmable read only memory)** – It can be reprogrammed. To erase data from it, expose it to ultra violet light. To reprogram it, erase all the previous data.

3. **EEPROM (Electrically erasable programmable read only memory)** – The data can be erased by applying electric field, no need of ultra violet

RANDOM ACCESS MEMORY	READ ONLY MEMORY
It is possible to both read data from memory and write data into memory.	Only reading of data from memory is possible.
RAM is volatile (if the power supply is interrupted then the data is lost).	ROM is non-volatile (the data is maintained even if the power supply is lost).
It is mainly of two types Dynamic-RAM and Static RAM (Cache memory).	It is mainly of the following types:-Programmable ROM, Erasable PROM and Electrically Erasable PROM.
It is used for temporary data storage as it is volatile.	It is used for permanent data storage as it is non-volatile.

light. We can erase only portions of the chip.

Cache Memory

Cache Memory is a special very high-speed memory. It is used to speed up and synchronizing with high-speed CPU. Cache memory is costlier than main memory or disk memory but economical than CPU registers. Cache memory is an extremely fast memory type that acts as a buffer between RAM and the CPU. It holds frequently requested data and instructions so that they are immediately available to the CPU when needed.

Cache memory is used to reduce the average time to access data from the Main memory. The cache is a smaller and faster memory which stores copies of the data from frequently used main memory locations. There are various different independent caches in a CPU, which store instructions and data.

❑ Secondary Storage Devices

Hard Disk:

It is a rigid magnetic disc that is used to store data. It permanently stores data and is located within a drive unit. The hard disk is also known as a hard drive. It is a rigid magnetic disc that stores data permanently, as it is a non-volatile storage device. The hard disk is located within a drive unit on the computer's motherboard and comprises one or more platters packed in an air-sealed casing. The data is written on the platters by

moving a magnetic head over the platters as they spin. The data stored on a computer's hard drive generally includes the operating system, installed software, and the user's files and programs, including pictures, music, videos, text documents, etc.

Components of Hard Drive:

The main components of a hard drive include a head actuator, read/write actuator arm, read/write head, platter, and spindle. A circuit board, which is called the disk controller or interface board, is present on the back of a hard drive. It allows the hard drive to communicate with the computer.

Compact Disk (CD):

A standard CD is around 5 inches in diameter and 0.05 inches in thickness. It is made of a clear polycarbonate plastic substrate, a reflective metallic layer, and a clear coating of acrylic plastic. These thin circular layers are attached one on top of another as described below:

- A polycarbonate disc layer at the bottom has the data encoded by creating lands and pits.
- The polycarbonate disc layer is coated with a thin aluminium layer that reflects the laser.
- The reflective aluminium layer is coated with a lacquer layer to prevent oxidation in order to protect the below layers. It is generally spin coated directly on the top of the reflective layer.
- The label print is applied on the lacquer layer, or artwork is screen printed on the top of the disc on the lacquer layer by offset printing or screen printing.

DVD

DVD is short for digital versatile disc or digital video disc. It is a type of optical media used for storing optical data. Although it has the same size as a CD, its storage capacity is much more than a CD.

So, it is widely used for storing and viewing movies and to distribute software programs as they are too large to fit on a CD. DVD was co-developed by Sony, Panasonic, Philips, and Toshiba in 1995.

Types of DVDs:

DVDs can be divided into three main categories which are as follows:

- **DVD-ROM (Read-Only):** These types of DVDs come with media already recorded on them, such as movie dvds. As the name suggests, data on these discs cannot be erased or added, so these discs are known as a read-only or non-writable DVD.
- **DVD-R (Writable):** It allows you to record or write information to the DVD. However, you can write information only once as it becomes a read-only DVD once it is full.
- **DVD-RW (Rewritable or Erasable):** This type of discs can be erased, written, or recorded multiple times.

Floppy Disk

The **floppy disk** (or a 3 1/2 floppy for today's standard) is a removable magnetic storage medium. Floppy disks are used for moving information between computers, laptops or other devices. Some early digital cameras, electronic music instruments and older computer game consoles use floppy disks. Floppy disks are inserted in to a **floppy disk drive** or simply **floppy drive** to allow data to be read or stored.

Floppy disks store much less data than a CD-ROM disk or USB flash drive. A normal 3½ inch disk can store 1.44 megabytes of data. This is usually enough for simple text documents.

A special type of floppy disk was made in the late 1980s. It could store 2.88 MB of data. They did not become popular. Larger size floppy disks became available in the 1990s. The two most popular were the Zip drive and the Jaz drive, both made by Iomega.

Floppy disk technology has been around since the early 1970s (the 8-inch floppy was the first). Today, floppy disks have been replaced by other storage media, like USB flash drives. Floppy disks and drives are no longer manufactured, but are still widely-available as new old stock.

Pen drive:

Pen drive is a compact secondary storage device. It is also known as a USB flash drive, thumb drive or a jump drive. It connects to a computer via a USB port. It is commonly used to store and transfer data between computers. For example, you can

write a report using a computer and then copy or transfer it in the pen drive. Later, you can connect this pen drive to a computer to see or edit your report. You can also store your important documents and pictures, music, videos in the pen drive and keep it at a safe place.

Pen drive does not have movable parts; it comprises an integrated circuit memory chip that stores the data. This chip is housed inside a plastic or aluminium casing. The data storage capacity of the pen drive generally ranges from 2 GB to 128 GB. Furthermore, it is a plug and play device as you don't need additional drives, software, or hardware to use it.

SD Card:

SD Card stands for Secure Digital Card. It is most often used in portable and mobile devices such as smartphones and digital cameras. You can remove it from your device and see the things stored in it using a computer with a card reader.

There are many memory chips inside the SD card that store the data; it does not have moving parts. SD cards are not created equal, so they may differ from each other in terms of speed, physical sizes, and capacity. For example, standard SD cards, mini SD cards, and micro SD cards.