# Magnetic Disk Memory

A **magnetic Disk** is a type of secondary memory that is a flat disc covered with a magnetic coating to hold information. It is used to store various programs and files.

Magnetic disks are less expensive than RAM and can store large amounts of data, but the data access rate is slower than main memory because of secondary memory. Data can be modified or can be deleted easily in the magnetic disk memory. It also allows random access to data.
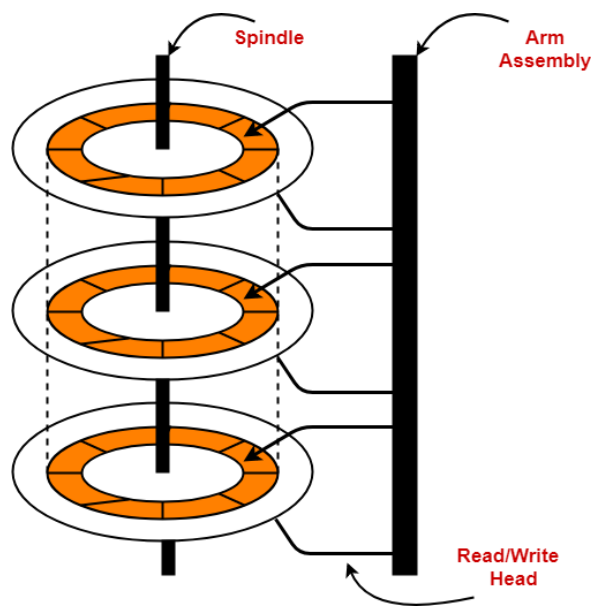

<u>Architecture</u>:

Disk divided into tracks   Track divided into sectors
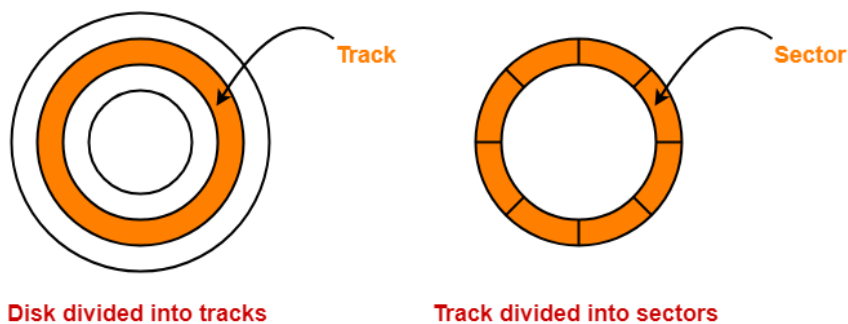
- The entire disk is divided into **platters**.
- Each platter consists of concentric circles called as **tracks**.
- These tracks are further divided into **sectors** which are the smallest divisions in the disk.
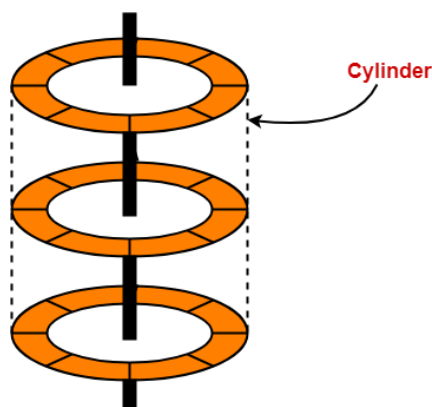
A cylinder is formed by combining the tracks at a given radius of a disk pack.

- There exists a mechanical arm called as Read / Write head.
- It is used to read from and write to the disk.
- Head has to reach at a particular track and then wait for the rotation of the platter.
- The rotation causes the required sector of the track to come under the head.
- Each platter has 2 surfaces- top and bottom and both the surfaces are used to store the data.
- Each surface has its own read / write head.

The time taken by the disk to complete an I/O request is called as **disk service time** or **disk access time**.

Components that contribute to the service time are:
1. Seek time
2. Rotational latency
3. Data transfer rate
4. Controller overhead

The time taken by the read / write head to reach the desired track is called as **seek time**.

The time taken by the desired sector to come under the read / write head is called as **rotational latency**. It depends on the rotation speed of the spindle.

The amount of data that passes under the read / write head in a given amount of time is called as data **transfer rate**.
The time taken to transfer the data is called as **transfer time**.

It depends on the following factors-
- Number of bytes to be transferred
- Rotation speed of the disk
- Density of the track
- Speed of the electronics that connects the disk to the computer

The overhead imposed by the disk controller is called as **controller overhead**.
Disk controller is a device that manages the disk.

There are various advantages and disadvantages of magnetic disk memory.

Advantages:
- These are economical memory
- Easy and direct access to data is possible.
- It can store large amounts of data.
- It has a better data transfer rate than magnetic tapes.
- It has less prone to corruption of data as compared to tapes.

Disadvantages:
- These are less expensive than RAM but more expensive than magnetic tape memories.
- It needs a clean and dust-free environment to store.
- These are not suitable for sequential access.