Introduction to Information Technology

CSC109

2019

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3.7 Secondary Memory

- Also called as?
- In comparison to the primary memory, the secondary memory stores much larger amounts of data and information
- How does the data and instructions stored in secondary memory processing by CPU?

R.7

3.8 Access Types Of Storage Devices

- **Sequential;** eg Magnetic tapes
  - data is retrieved sequence
  - Slow
- **Direct Access;** eg: Magnetic disk , Optical disk, Magneto optical disk
  - data is retrieved in a non-sequential manner
  - Address
  - No predefined order in which one can read and write data from a direct access device

R.7 Power On Self Test (POST)

Rajivparaj ., 12/2/2019

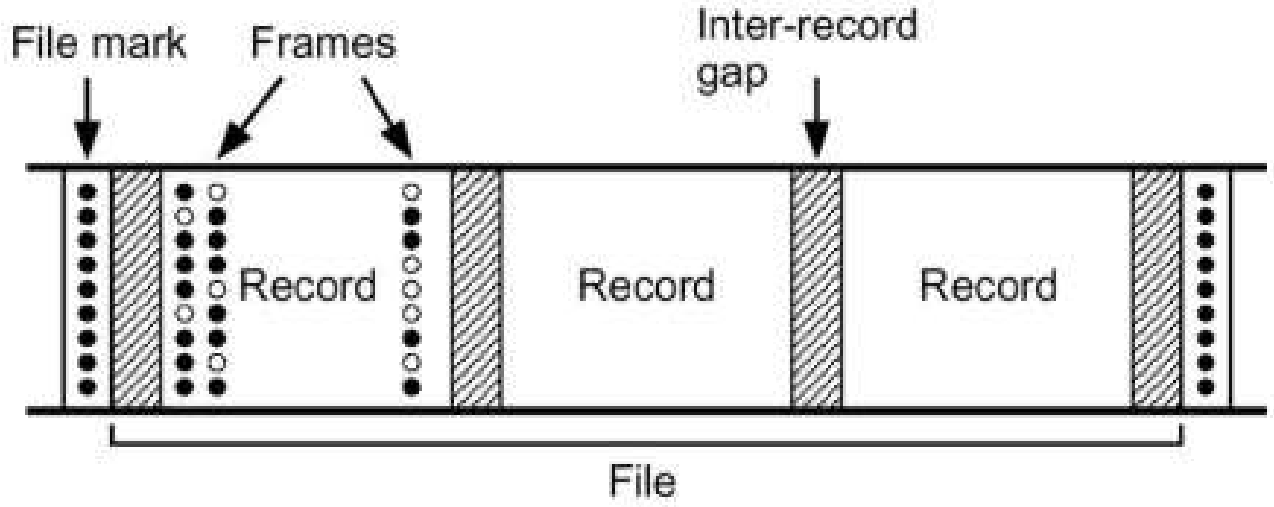
3.9 Magnetic Tape

- It is a plastic tape with magnetic coating
- Cheaper
- Durable, written, erased and rewritten
- Sequential Access
- Not suitable for data files that need to be updated often
- Used to store data that are not frequently use

Features

- Inexpensive
- Store Large amount of data
- Easy to carry
- Not suitable for random access
- Slow access device
- Need dust prevention
- Suitable for backup
- categorized based on their width - ¼ inch, ½ inch, etc
- A 110 inch dia reel of tape can store upto 180 million characters

working of magnetic tape

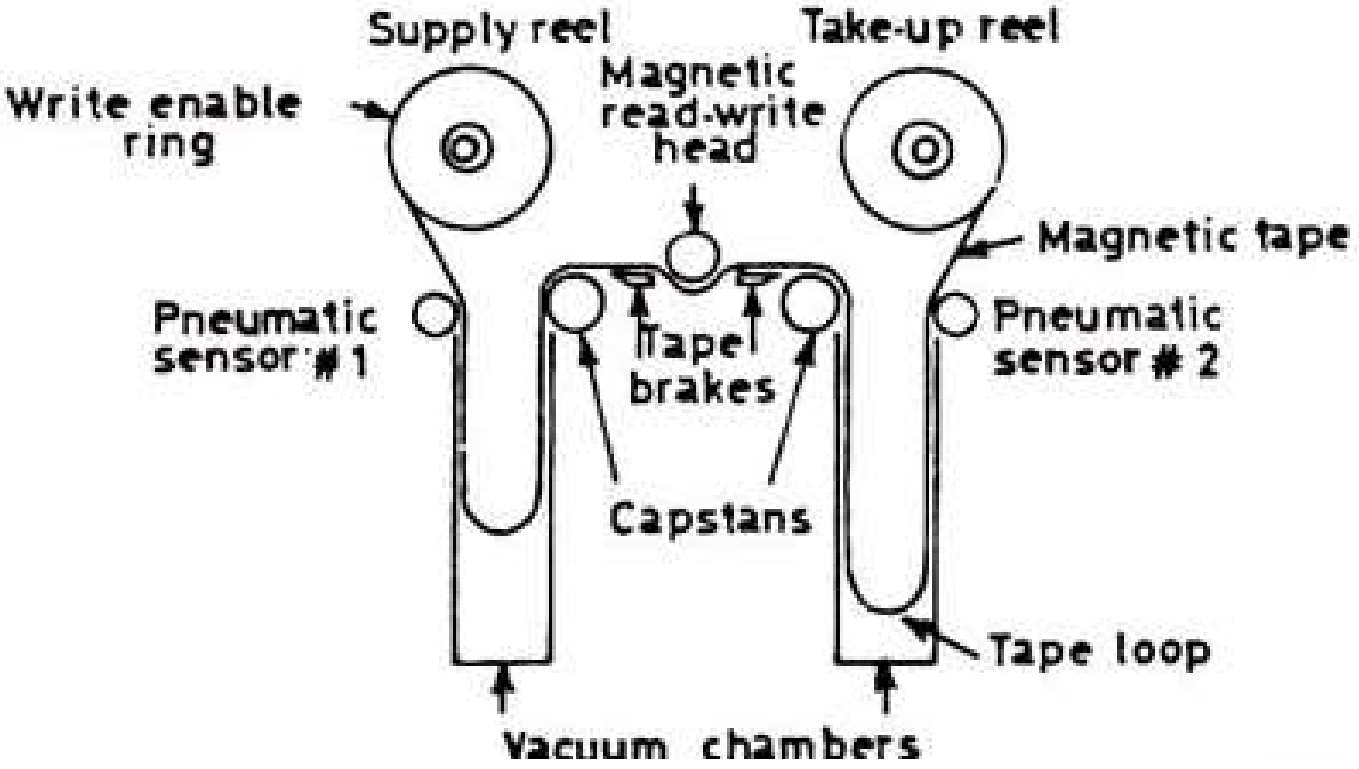


Horizontal - Tracks

Vertical – Frame

Data is recorded on tape in the form of blocks- RECORDS

Each block read continually


Supply reel
Take-up reel
Write enable ring
Magnetic read-write head
Magnetic tape
Pneumatic sensor # 1
Tape brakes
Pneumatic sensor # 2
Capstans
Tape loop
Vacuum chambers

3.10 Magnetic Disk

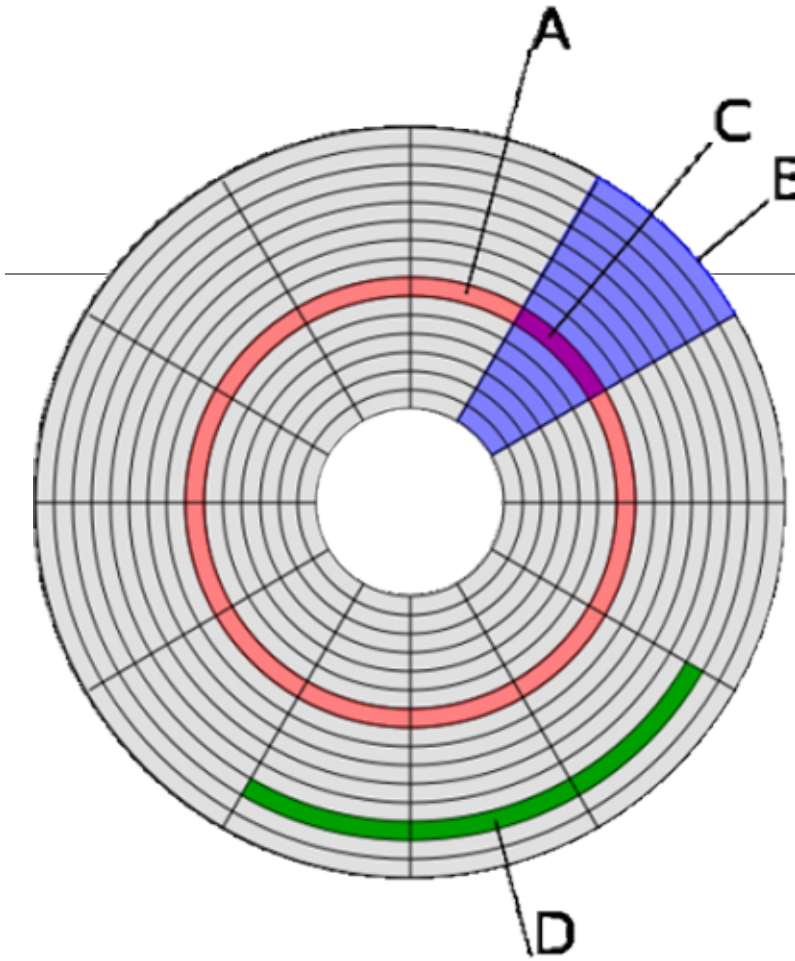
- It is a thin plastic or metallic circular plate coated with magnetic oxide
- The presence of magnetized spot represent the bit 1
- Absence – bit 0

Features

- Cheap
- Can store large amount of data
- Easy to carry or transport
- Suitable for frequently read/write data
- Fast access device
- More reliable storage device
- To be prevented from dust, as read/write head flies over the disk

Working

- Tracks- The surface of disk is divided into concentric circles
- The outermost track is numbered 0 and innermost track is the last one
- Sector- division of tracks, it is a pie slice that cuts across all tracks
- The data on disk is stored in sectors



Hard Drive Structure:

A = track
B = sector
C = sector of a track
D = cluster

storage capacity of disk drive is measured in gigabytes (GB).

double-sided disk- have tracks and sectors on both sides

Cylinder ?

Accessing data on the disk requires following

The time Taken to move the read/write head to the desired track is called **Seek time**

Once the read/write head is at the right track, then the head waits for right sector to come under it (disk is moving at high speed)

The time taken for desired sector of the track to come under read/write head is called **latency time**

Once the read/write head is positioned at the right track and sector, the data has to be written to disk or read from the disk

The rate at which data is written to disk or read from disk is called **data transfer rate**

The sum of seek time, latency time and data transfer is the **access time of the disk**

Formatting?

Windows: FAT 16, FAT 32, exFAT, NTFS

Linux: FAT12, FAT16, FAT32, exFAT, NTFS, ext2, ext3, ext4, reiserfs, btrfs, BSD UFS/FFS

Mac:

Four areas are created when a disk is formatted using FAT

Boot Sector

File Allocation Table

Root Directory

Data Area

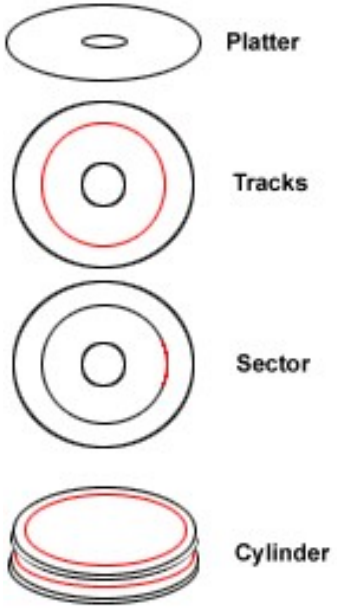
Self Study

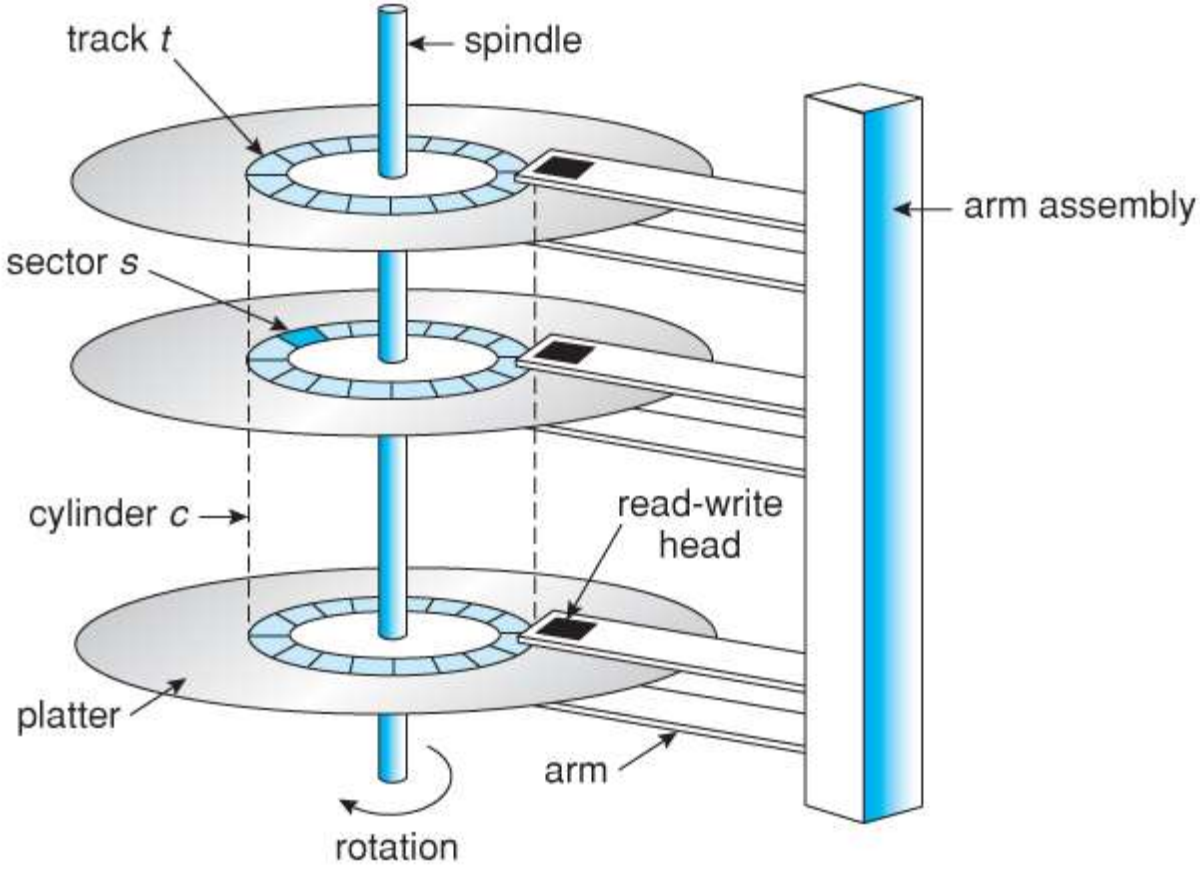
- Floppy Disk
- Zip Drive
- **Hard Disk**
- Optical Disk CD-ROM(CD-R, CD-RW), DVD-ROM (DVD-R, DVD-RW)
- Magneto Optical Disk
- **Other Secondary Storage ;Solid-State Storage**

3.10.2 Hard Disk

- consists o f one or more platters divided into concentric tracks and sectors
- mounted on a central spindle, like a stack.
- can be read by a read/write head
- The data is stored on the platters covered with magnetic coating.


PLATTER
SPINDLE
HEAD
HEAD ACTUATOR ARM
ACTUATOR AXIS
& PIVOT SCREW
POWER CONNECTOR
VOICE COIL
ACTUATOR
JUMPER BLOCK
IDE CONNECTOR ON PRINTED
CIRCUIT BOARD (INTERFACE)


Platter
Tracks
Sector
Cylinder
ComputerHope.com


track t
spindle
arm assembly
sector s
cylinder c
read-write
head
platter
arm
rotation

3.10.2 Hard Disk

- Hard disk is a fixed disk. The disk is not removable from the drive
- The hard disk and Hard Disk Drive (HDD) is a single unit.
- The data can store on both sides o f each platter
- the read/write head o f hard disk does not touch the disk during accessing.
- can store up to 500 GB o f data