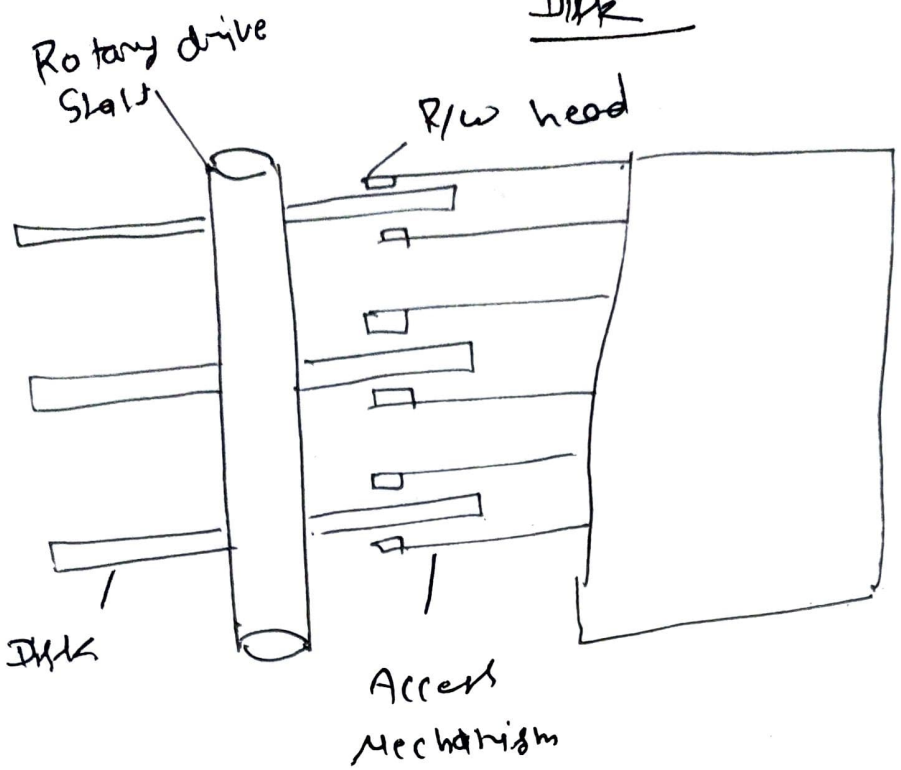
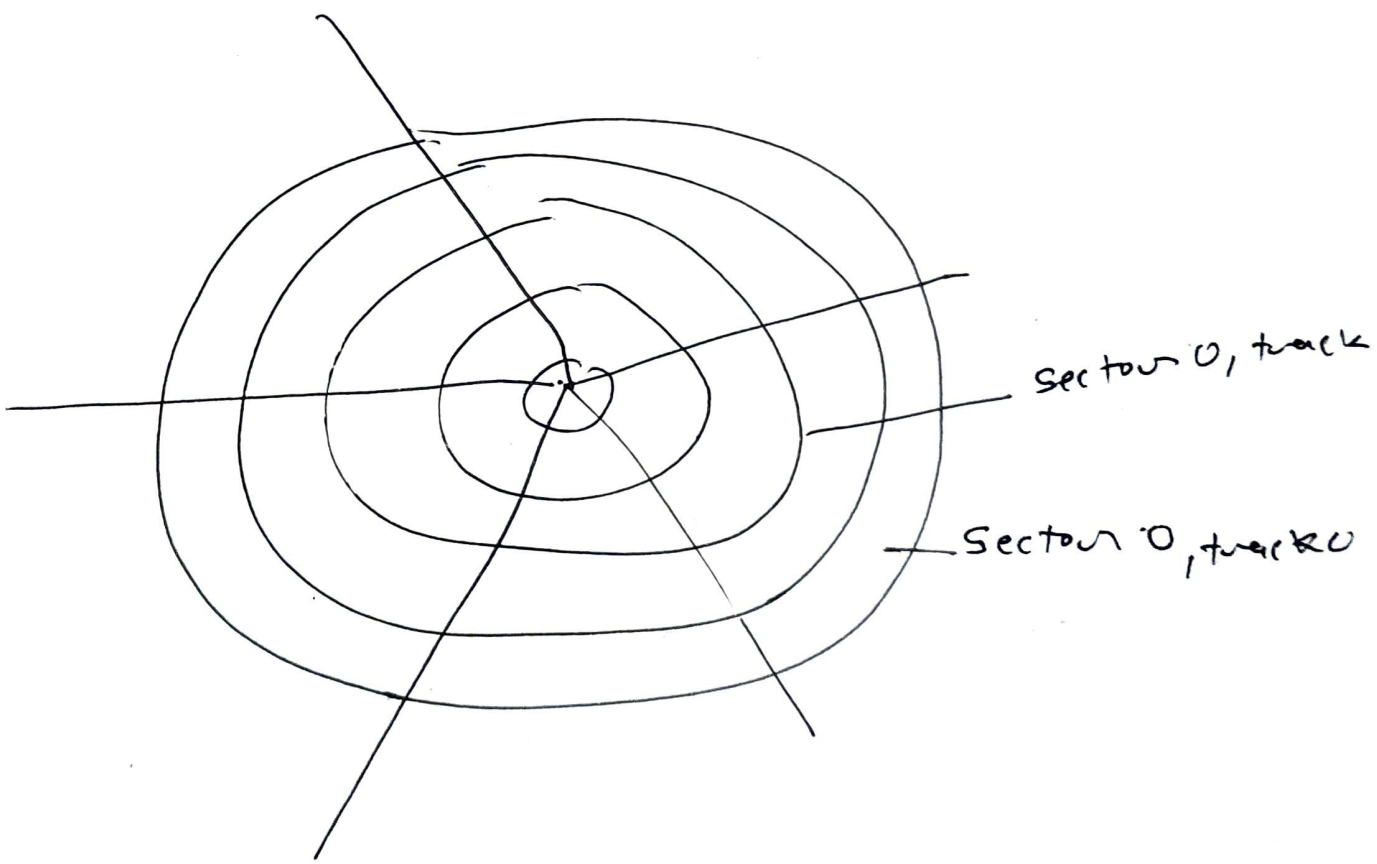
Disk


Rotary drive
Shaft
R/W head
Disk
Access
Mechanism


Sector 0, track
Sector 0, track 0

→ Each surface is divided into tracks, and each track is divided into sectors.

→ The set of corresponding tracks of all surface of all stack of disk form a logical cylinder.

→ The data on all tracks of a cylinder can be accessed without moving the R/W head.

→ The R/W operations start at sector boundary.

→ Data bits are stored serially on each track.

→ Each sector usually contain 512 byte of data.

→ Each sector have sector header (Address) and ECC (error correcting code).

→ Between two sector there is a small inter sector gap.

Access time :- There are two component

1- Seek time :- Time required to Move R/w head to a proper track.

2. Rotational delay/ latency time :- Time to reach at a desired sector of a track. On average, this is the time for half a rotation of the disk.

A.T = Seek time + Latency time.

Let suppose we have a 20 data recording surface with 15,000 tracks / surface, 400 Sectors / track and each sector contain 512 Byte

Total size = $20 \times 15{,}000 \times 400 \times 512 \approx$

→ The average seek time is 6 m.s.

→ The platters rotate at 10,000 revolution / min

10,000 takes 60 000 m.s

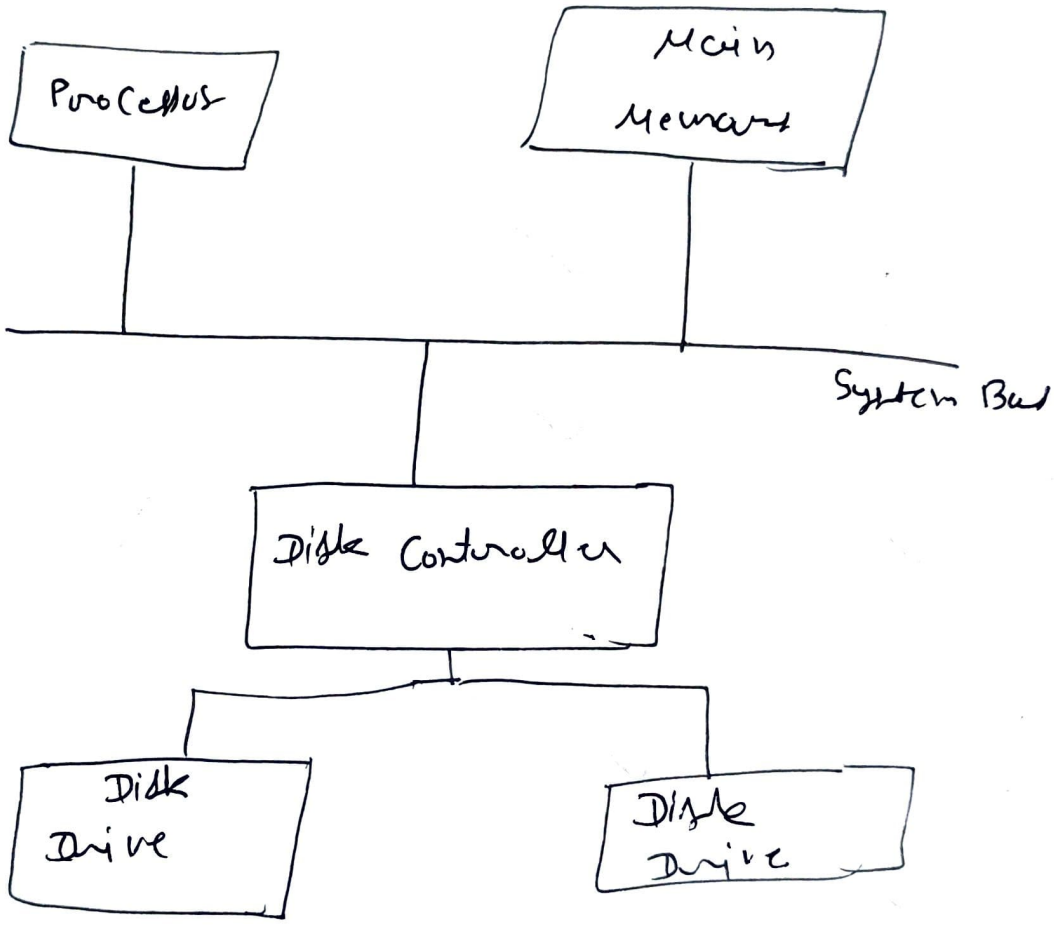
1 takes 6. 4 S

So, average would be 3 m.s

→ Internal transfer rate from track to data buffer in the disk controller is 34 M bytes/s

→ With SCSI it would be 160 M Bytes/Sec

SCSI
↓
Small Computer System Interface



Data Buffer / Cach

A disk drive is connected to the rest of computer system using some interconnection scheme.

→ In SCSI bus, data transfer rate is high ~~ter~~ than R/w rate of a disk

→ So a data buffer is included in disk to handle this data transfer speed.

Disk Controller: Operation of a disk is controlled by a disk controller.

OS generate the logical address of data transfer between M.M & Disk:-

- Main Memory Address:-
- Disk Address:-
- word count:-
- R/w signal

In disk Controller Registers.

The curves rotating physical address may be different, due to Bad sectors.

Major function of disk controller

1- Seek
2- Read:- Read data from the address stored in disk address register and placed into data buffer.

Write :- As per read

Error checking :- Computes the error checking code value for the data ~~Bit~~ Read from a given sector and compares it with the corresponding ECC value read from ~~the~~ the disk.

On case of mismatch, it corrects it, if possible; otherwise, it raises ~~an~~ an interrupt to inform about this error.

RAID Disk Array is a Reading Assignment.