
# BMS INSTITUTE OF TECHNOLOGY AND MANAGEMENT

Department Of Electronics And Telecommunication

III SEMESTER

COMPUTER ORGANIZATION AND ARCHITECTURE (18EC35)

MODULE 5

# SECONDARY STORAGE

**COURSE COORDINATOR**

Dr. Sumathi M S

**PRESENTED BY**

Meghana A -1BY20ET035

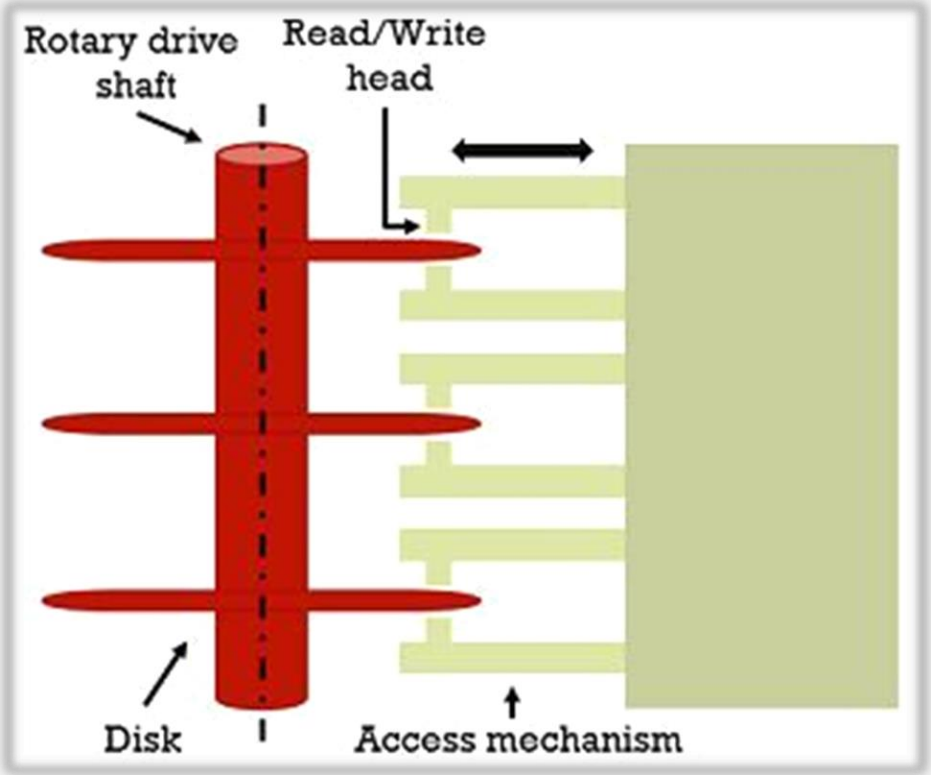
S Varsha -1BY20ET048

Sharmila S -1BY20ET053

# MAGNETIC HARD DISKS

DISK SYSTEM

- DISK : Assembly of disk platters
- DISK DRIVE : Electromechanical mechanism that spins the disk moves R/W heads
- DISK CONTROLLER : Electronic circuitry controlling operation of system




Mechanical Structure Of Magnetic Disk

One or more disks mounted on a common spindle

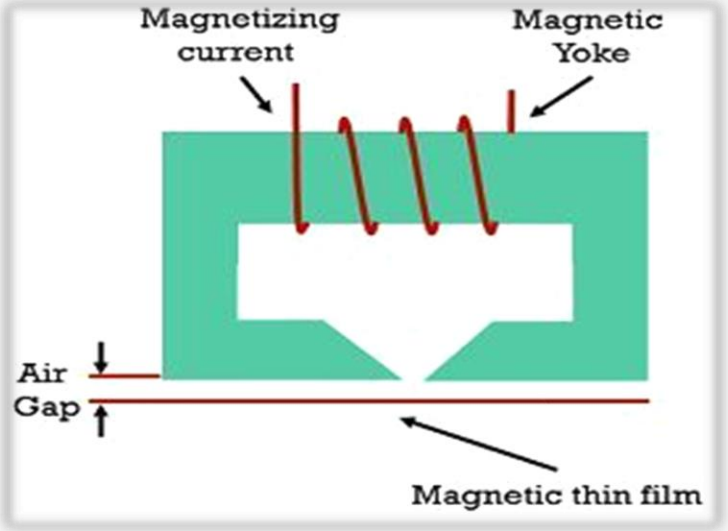
Thin magnetic film deposited on each disk

Placed in a rotary-drive

# MAGNETIC HARD DISKS

READ/WRITE HEAD

- Magnetic Yoke
- Magnetizing Coil
- Movable
- Mounted on comb-like arm which moves radially
- To R/W, arm holding heads to be positioned on that track




Read/Write Head Detail

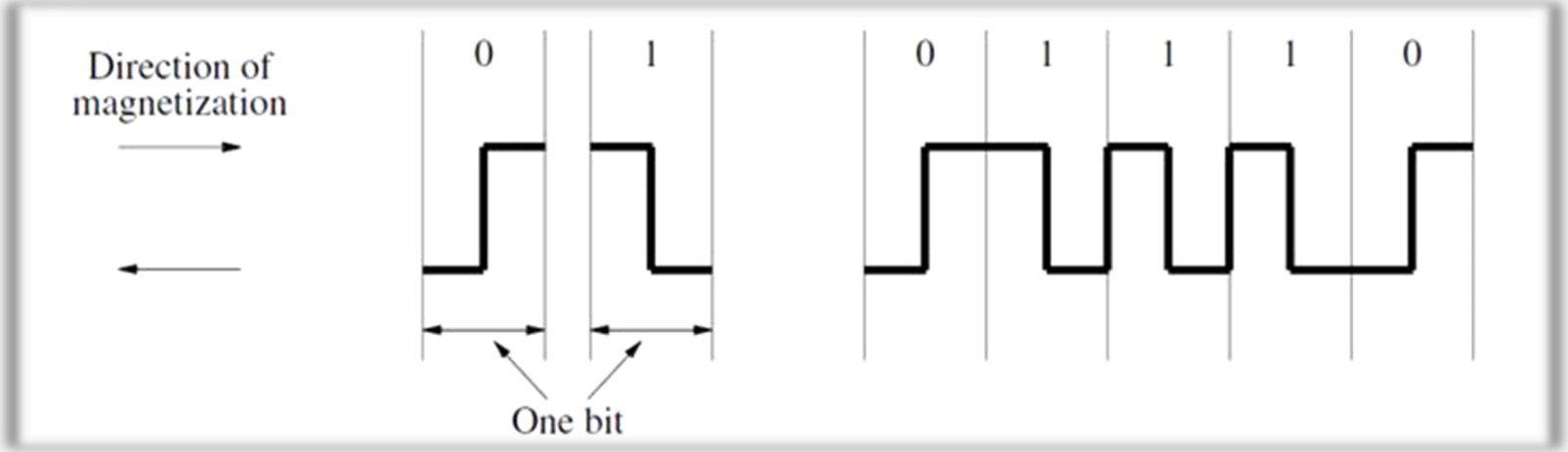
WRITE OPERATION

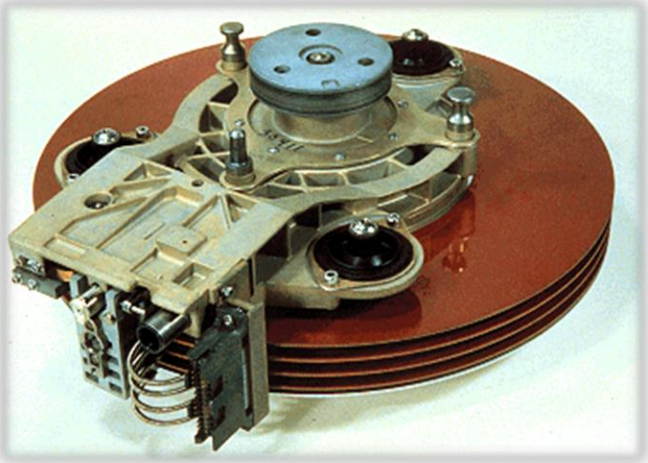
- Current pulse of suitable polarity applied to magnetizing coil
- Magnetization of film to switch to direction parallel to applied field

READ OPERATION

- Changes in magnetic field in vicinity of head due to movement of film relative to yoke induces voltage in coil (sense coil)
- Polarity of voltage is monitored by control circuitry to determine state of magnetization of film

# MAGNETIC HARD DISKS



BIT REPRESENTATION BY PHASE/MANCHESTER ENCODING
Two States Of Magnetization represented by Binary 0 &1
Voltage induced when
0 ⟶ 1
1 ⟶ 0

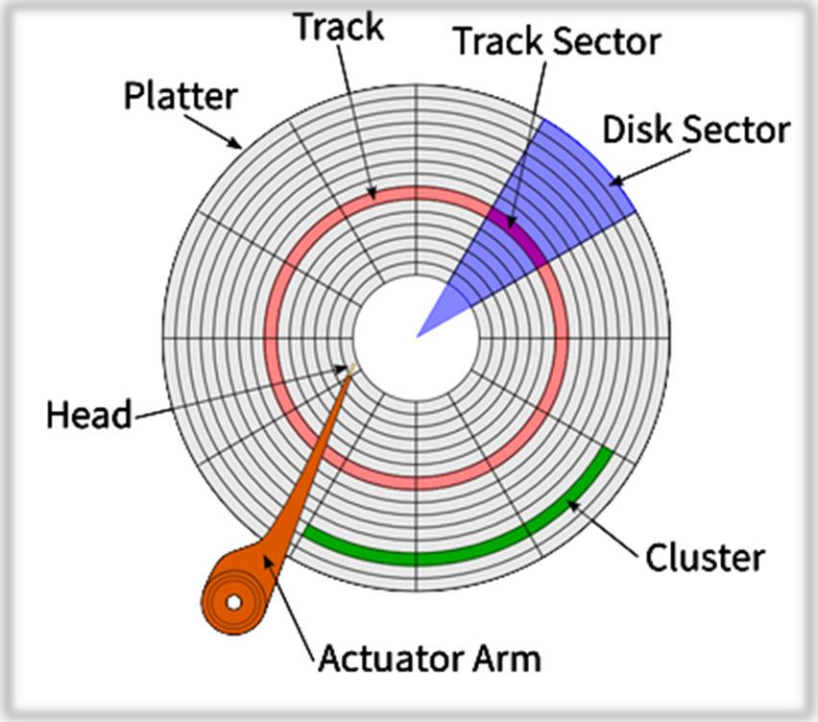
WINCHESTER DISK
Disks & R/W heads placed in sealed, air-filtered enclosure

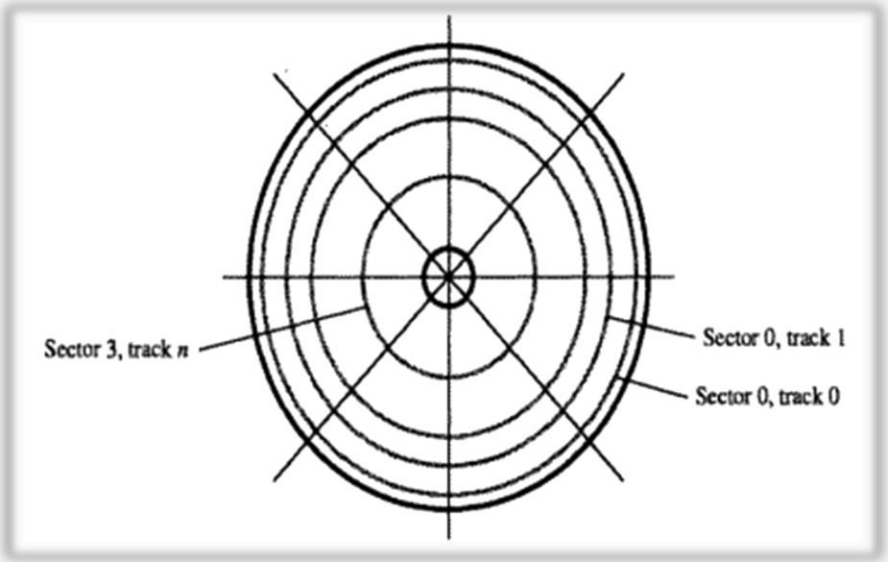
# ORGANIZATION AND ACCESSING OF DATA ON A DISK

Sector Header

Error Correcting Code (ECC)

Inter-sector Gap




Organization Of One Surface On A Disk

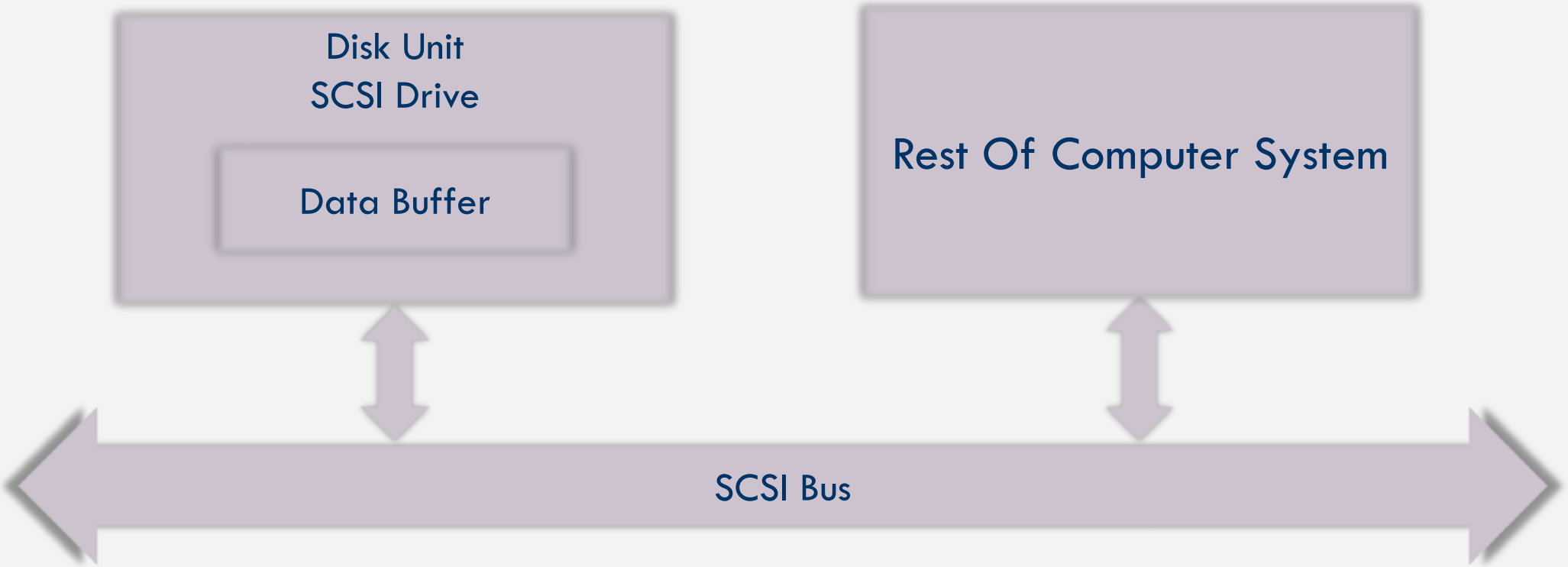
# ACCESS TIME

Disk Access Time = Seek Time + Latency Time (Or Rotational Delay)

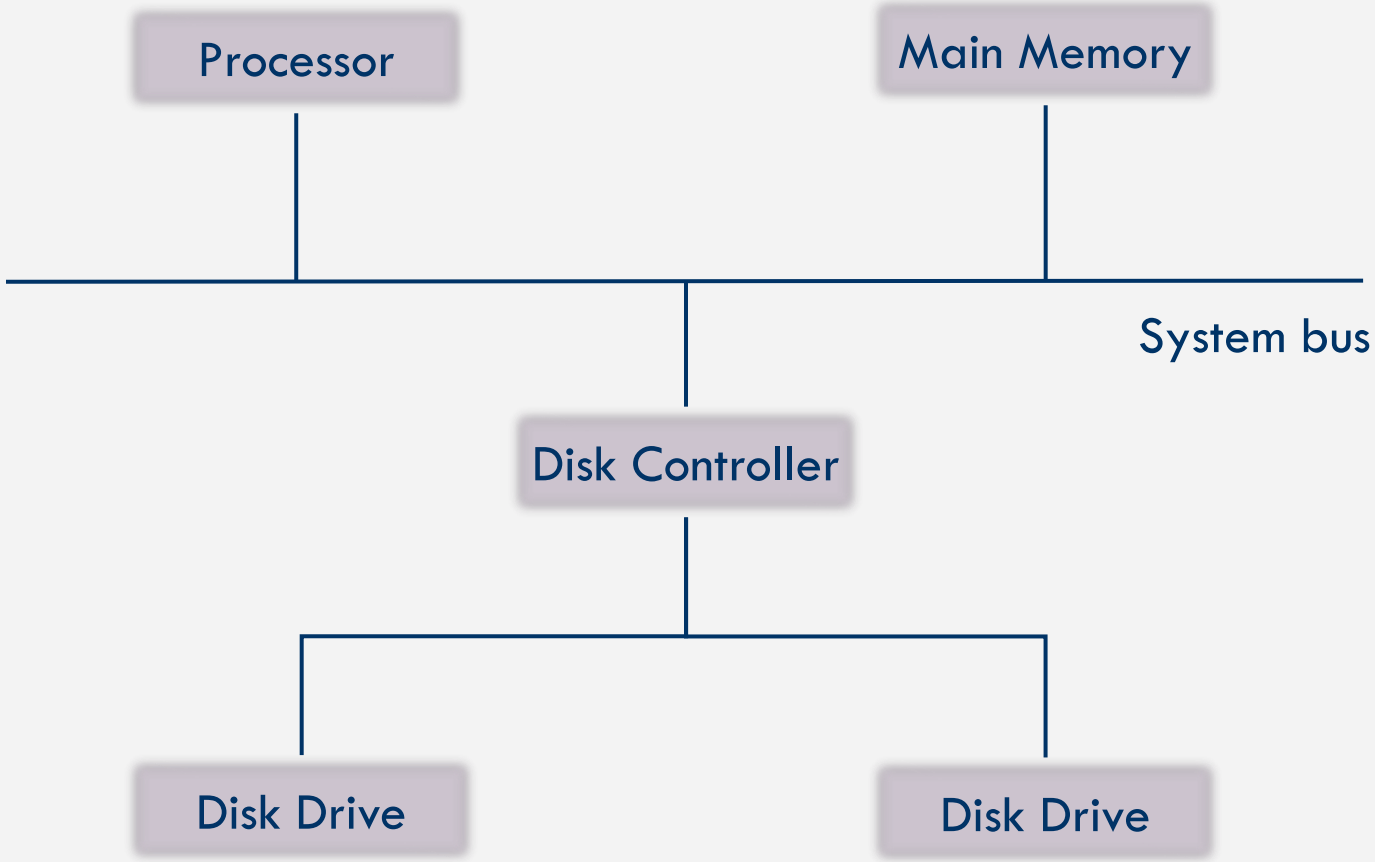
# TYPICAL DISK

Size = 3.5 Inch Diameter
Data Recording Surfaces = 20
Tracks Per Surface = 15,000
Sectors Per Track = 400
Bytes Of Data Per Sector = 512
Total Capacity = 20*15000*400*512 = 60GB
Seek Time = 6ms
Revolutions Per Minute = 10,000
Latency Time = 3ms
Internal Transfer Rate(Track To Data Buffer) = 34MB/s
External Transfer Rate (SCSI Bus) = 160MB/s

# DATA BUFFER/CACHE



# DISK CONTROLLER




Disks Connected To The System Bus

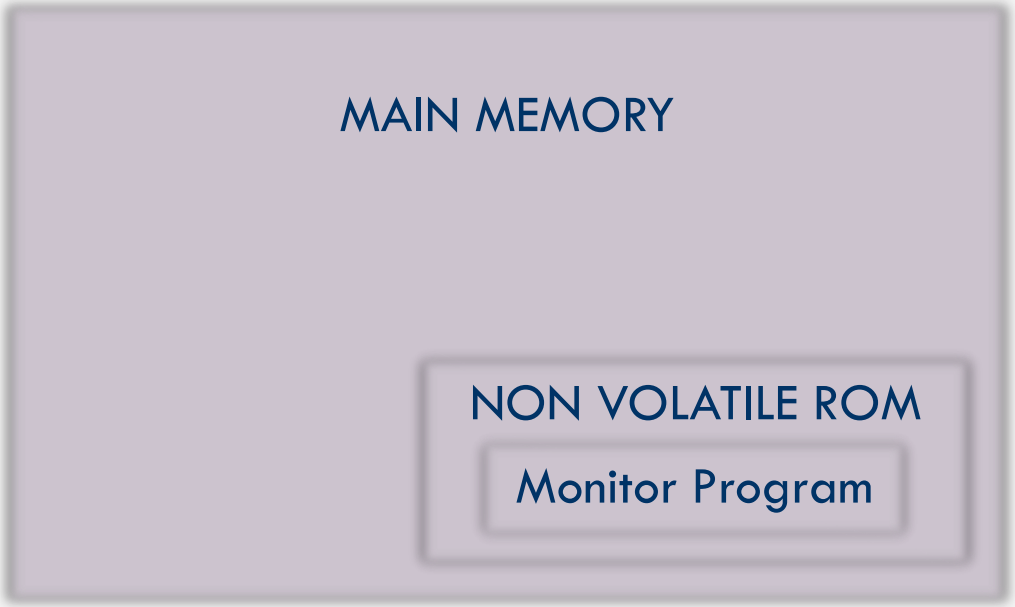
OS Side :
Main Memory Address
Disk Address
Word Count

Disk Drive Side :
Seek
Read
Write
Error Checking

# SOFTWARE AND OPERATING SYSTEM IMPLICATIONS

HOW OS LOADS INTO MAIN MEMORY

- OS stored on disk
- BOOTING
- Tiny part of main memory : non volatile ROM
- Stores MONITOR PROGRAM
- BOOT BLOCK stores LOADER PROGRAM

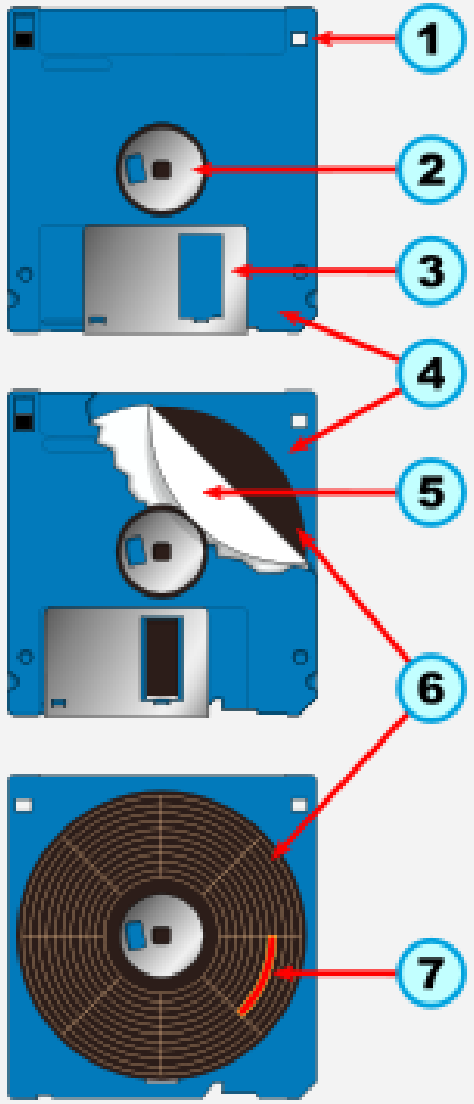


# FLOPPY DISK

- DISKETTE
- DOUBLE DENSITY

INTERNAL PARTS

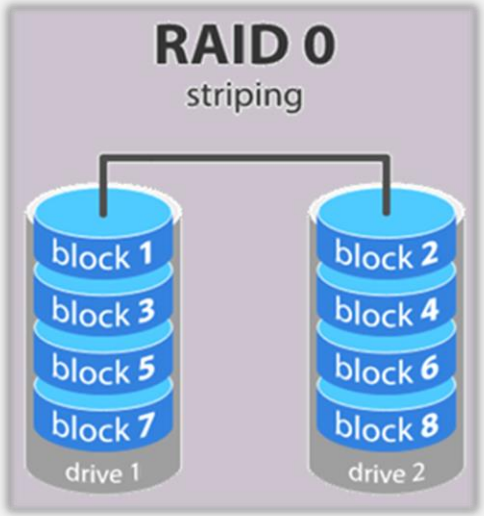
1. Hole
2. Hub
3. Shutter
4. Plastic Housing
5. Polyester Sheet
6. Magnetic Coated Plastic Diskette
7. Representation Of Sector Of Data
8. Write Protection Tab

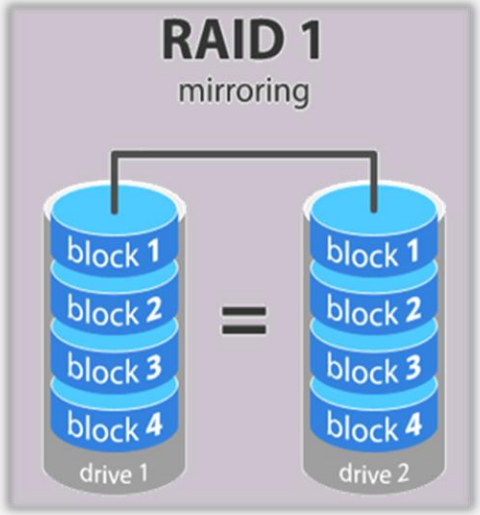


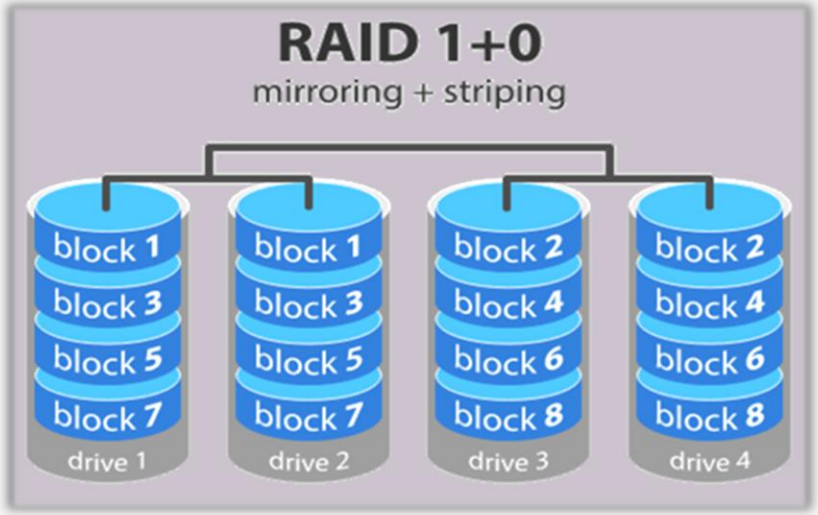

Internal Parts Of A 3.5 Inch Floppy Disk

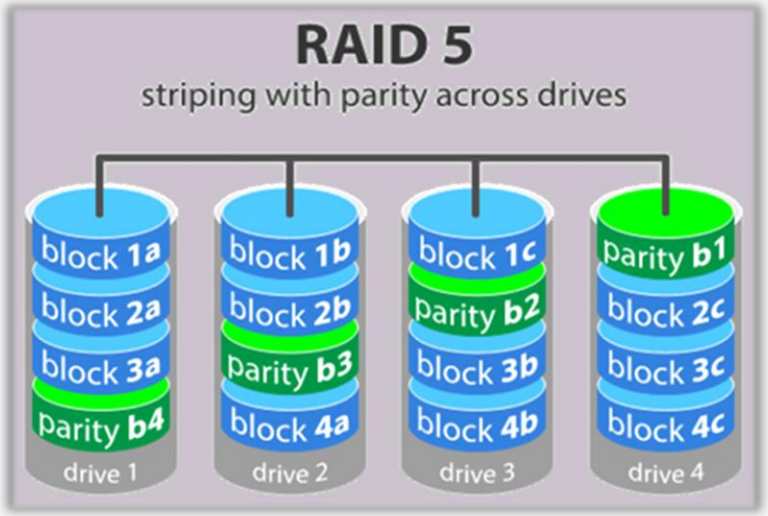
# RAID DISK ARRAYS

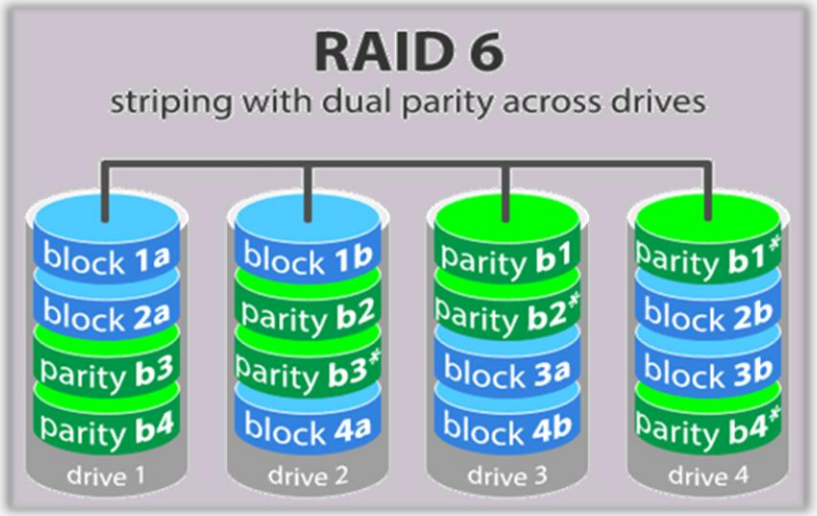
REDUNDANT ARRAY OF INDEPENDENT or INEXPENSIVE DISKS



# COMMODITY DISK CONSIDERATIONS

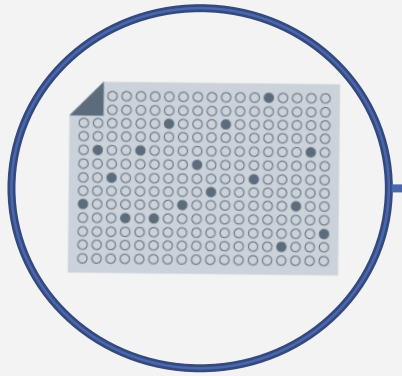
SATA

PATA

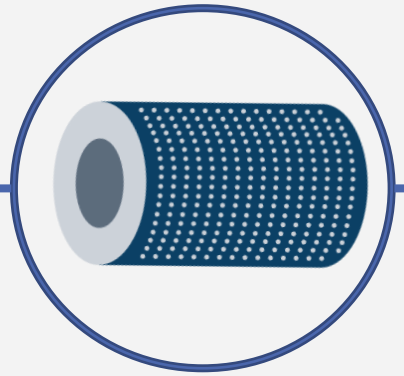
ATA/EIDE DISKS
Advanced Technology Attachment
Or
Enhanced Integrated Drive Electronics

SCSI DISKS
Small Computer System Interface

# EVOLUTION OF DATA STORAGE



PUNCH CARDS



MAGNETIC DRUM

WILLIAMS-KILBURN TUBE

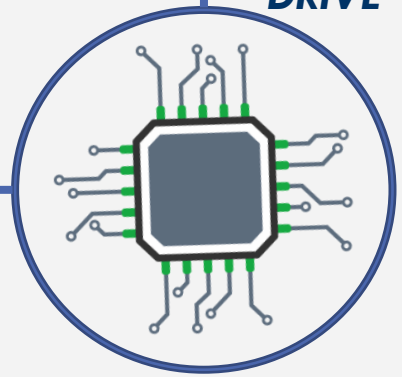
MAGNETIC TAPE DRIVE

ZIP DRIVE

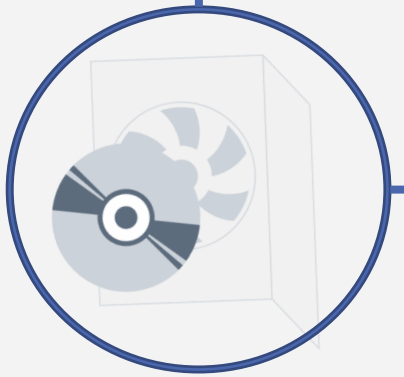
CD

FLOPPY DISK

HDD



MAGNETIC CORE



DVD

SD CARD

USB FLASH DRIVE

BLU RAY OPTICAL DISC

CLOUD

# THANK YOU