

Day - 1

PAGE NO.

DATE: / /

Date - 10/9/23

## Computer fundamentals

By Dr. Vijay D. Gokhale

कभी भी किसी कि कॉपी नहीं करना है।

\* निंदगी में सम्मान जरुरी है, कि जितना पैसा।

\* IT में इन विषयों पर काम चलता है,

1) Product development

2) Math's & Computers

3) Scientific sim (DIP)

4) Hacking / Security

5) Game Dev / Graphics

6) Mobile Development

i) Windows ii) Android iii) iOS

7) Embedded Dev / Robotics

8) Big Data / ML / AI

9) Web

i) Develop. ii) Cloud iii) Full stack

और

Passion

Patience

होना जरुरी है।

Day - 1

Computer Fundamentals by Gokhale Sir

\* Why 8?

$$\begin{array}{r} 65,536 \\ \times 32768 \\ \hline 516512 \\ 327680 \\ \hline 2147483648 \end{array}$$

To do this operation, 0.5 hour will be required.

- Ada Lovelace नाम की अस्ट्रेंट उने पार्लियर बाबेस के लिए calculation किये।

फिर भी आदमी का टाईम waste हो रहा है, वह calculator की संकल्पना आकर्षित की।

- "Mathematics is the language speakout through the universe" Dialogue in Quantact movie.

Numbers - 0 - 9 → 10

Alphabates A - Z → 26

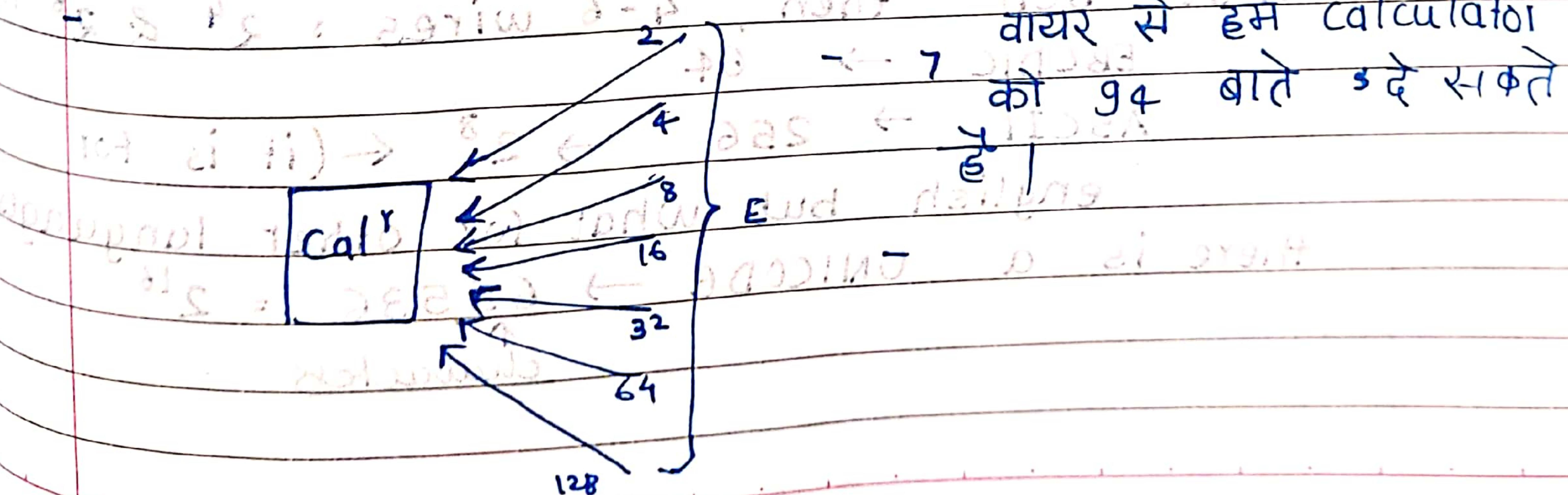
a - z → 26 and 0 to 9

Symbol (+, -, ×, ÷) → 32

94

- यह 94 बाते में calculator को कैसे, हम calculator को Electricity से दे सकते हैं। फिर हम इसको अवश्यार होती है। (ON/OFF)

- Electricity को दे सकते हैं वायर से हम calculator



# Binary coded decimal extended BCD interchange code

PAGE NO.  
DATE: 7/10/23

8 wires

1 wire

- One special wire also added in calculator for detect the wh to check mistakes of 7 wires.
- & Now 8 wires will be added to the calculator.

- Only two things are passed through the single wire i.e. ON & OFF. for these numbers are given them - 1 for ON & 0 for OFF.

- Bits are made up of using binary digits name Binary Digits → Bits.

Bit = means wire.

- Current
- Data को Transfer करने वाली wire को Data bus कहते हैं। I - O
  - Data bus is nothing but bunch of wires
  - -13.6 mv energy travels in our body through neurons using NaCl

- Amount of energy passed by the wire is denotes the what information/ data passed through the wire.

- first BCD then, 4-6 wires :  $2^4 \& 2^6 = 16$   
EBCDIC → 64
- ASCII → 256 →  $2^8$  ← (it is for english but what for other languages there is a UNICODE →  $65,536 = 2^{16}$  characters)

8 bit = 1 byte

1024 KB = 1 Kilobyte (kb)

1024 KB = 1 MB

Giga, tera, peta, exa, zetta, yotta,  
brontyo, Geop (Geb)

1) 1 KB = 10 wires

2) 1 MB = 20 wires

3) 1 GB = 30 wires

4) 1 TB = 40 wires

5) 1 PB = 50 wires

6) 1 EB = 60 wires

7) 1 ZB = 70 wires

8) 1 YB = 80 wires

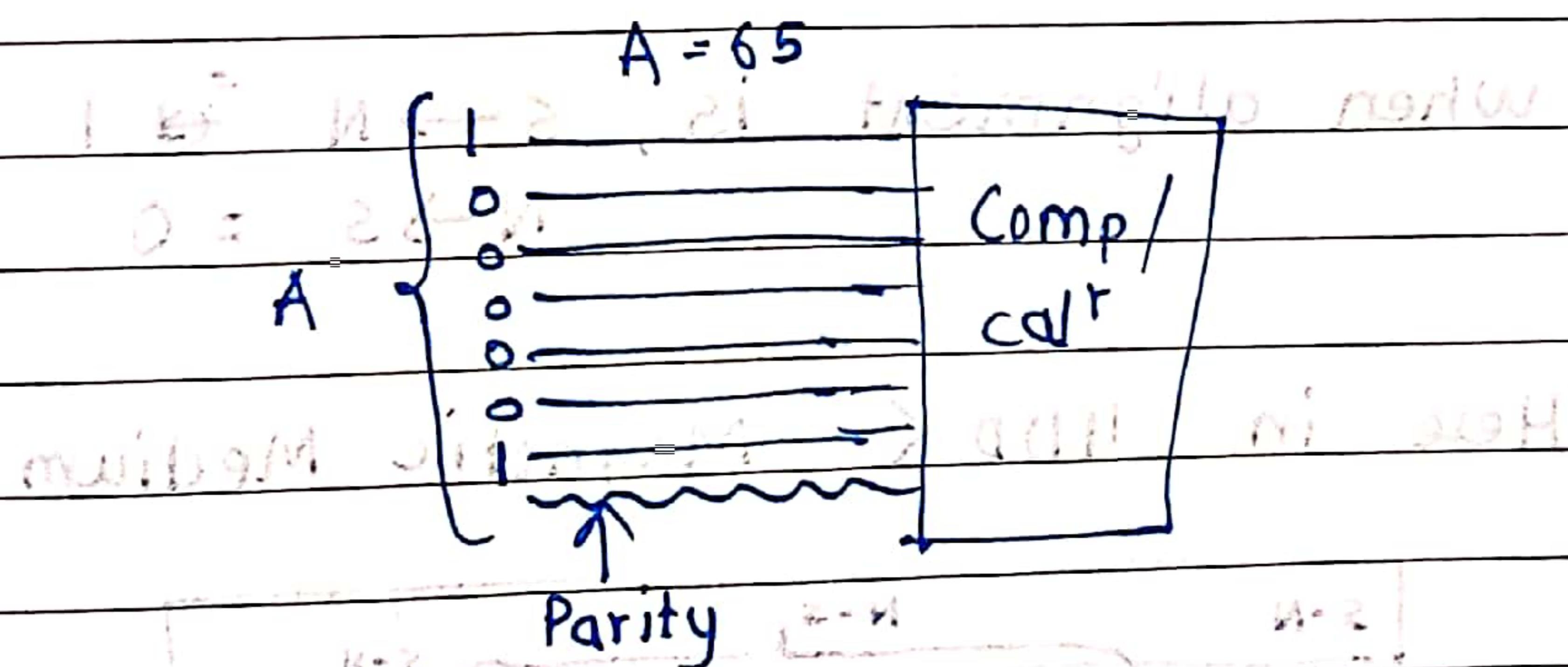
9) 1 BB = 90 wires

10) 1 Geb = 100 wires

How 'A' will be transferred through wires.

ASCII Value of A is 65.

Binary of 65 is 01000001.



How we can check an error in wires.

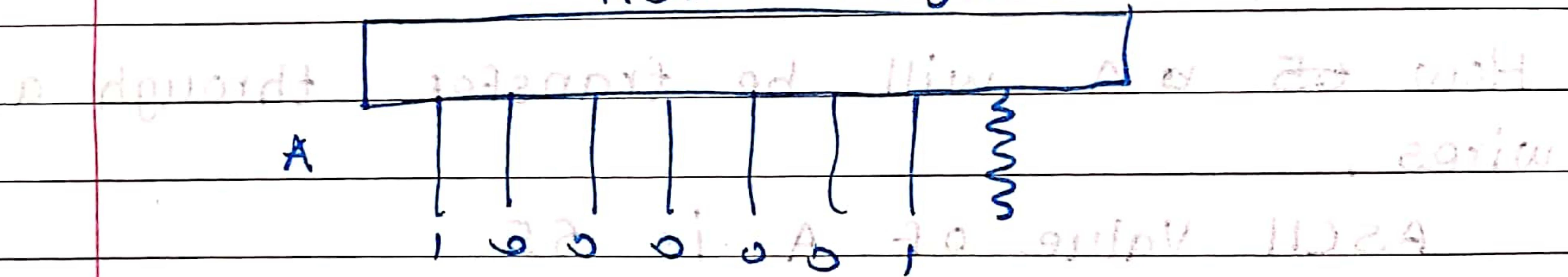
using parity check we check.

if error occurs in more than 1 wire  
then we check it using ECC (Error correction  
check)

Gauss theorem

Non volatile memory express - NVMe

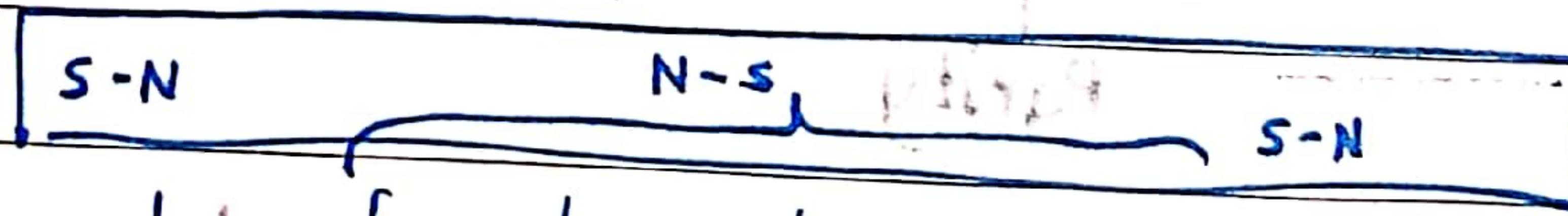
- RAM - free electronic space
- How 'A' goes in the memory if HD is electronic medium
- NVMe - flash is made up of NAND gate value is passing through the wires in a electronic medium the resultant current value is stored data.
- domain theory

HDD  $\leftarrow$  Magnetic Medium

Magnetic dipole's are arranged in

When alignment is,  $S \rightarrow N = 1$ 

$$N \rightarrow S = 0$$

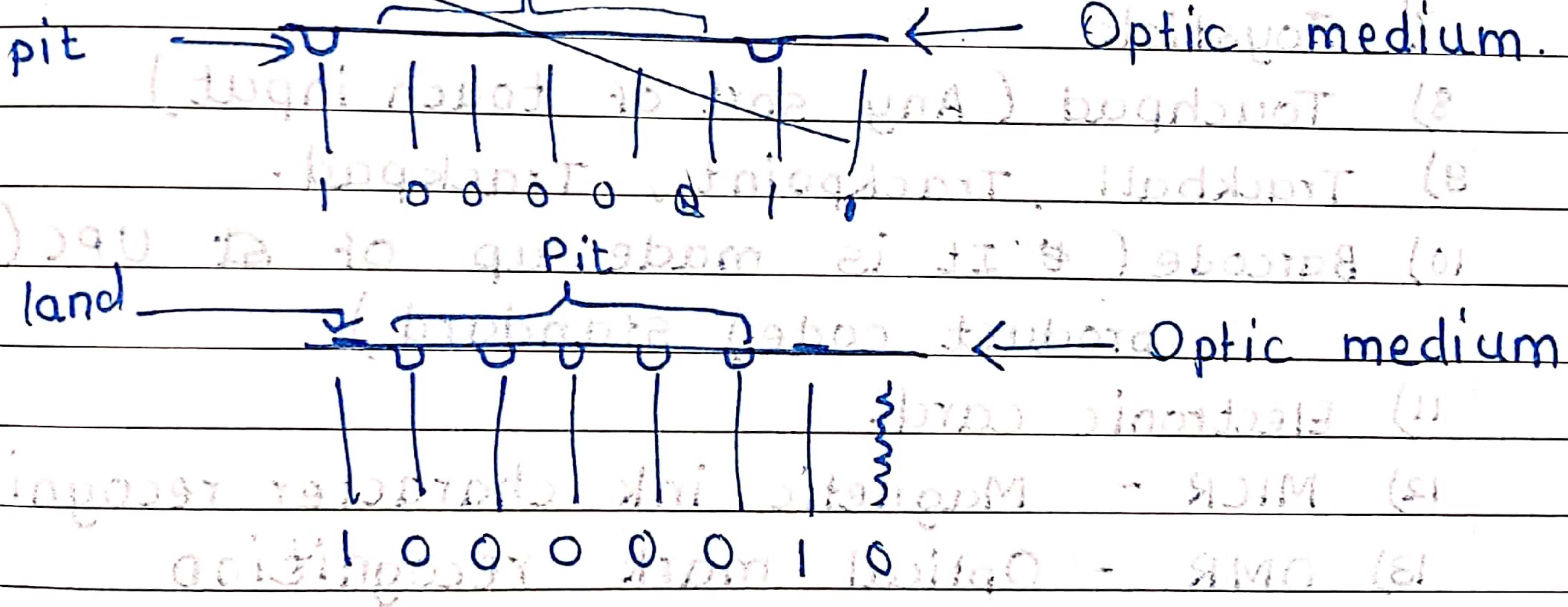
Here in HDD  $\leftarrow$  Magnetic Medium

positive in same direction in same field and also with same 1 and 0 in same direction in same field

negative in same direction in same field

## How to write 'A' on CD-DVD (Optical medium)

- On CD there is a chemically layered film of poly carbonate. (thin) (i) pit (hole → 0) (land → 1) (non-hole → 1) recorded information (0)
- pit (hole → 0) (land → 1) recorded information (0)



- We assume A means 0.65 - 0.75  
हमने मान लिया है A यानी 0.65 - 0.75

विज्ञान - ज्ञान के रूपकों की विशेष ज्ञान (शाखा)  
ज्ञान विज्ञान से बड़ा है।

विज्ञान विज्ञान ज्ञान = 0.65 - 0.75

विज्ञान ज्ञान = 0.65 - 0.75

विज्ञान विज्ञान ज्ञान = 0.65 - 0.75

विज्ञान विज्ञान ज्ञान = 0.65 - 0.75

8.10.23

(\*) Input devices (no 'A' at the end)

- 1) Keyboard
- 2) Mouse
- 3) Image scanner
- i) Flat bed
- ii) Hand held
- 4) Web camera (vision system)
- 5) Microphone (voice system)
- 6) Biometric Sensors (Iris, fingerprint, face recognition)
- 7) Joystick
- 8) Touchpad (Any sort of touch input)
- 9) Trackball, Trackpoint, Trackpad.
- 10) Barcode (It is made up of UPC (universal product code) standard)
- 11) Electronic card.
- 12) MICR - Magnetic ink character recognition
- 13) OMR - Optical mark recognition

Sensors

RFID - Radio frequency identifier

QR - Quick response code

IR - Infrared

NFC - Near field communication.

14) OCR - Optical character recognition

Two types A = American fonts

B = British fonts

15) Electronic pen / stylus / Lightpen

16) Digitizer (All circuits of digitizer are ADC)

## \* Output Devices

- 1) Monitor
- 2) Printer
- 3) Speaker (voice OLP System)
- 4) Plotter (Graphic plotter)
- 5) Projector
- 6)

### Types of Monitor

- 1) CRT - Cathode ray tube
- 2) TFT - Thin film transistor
- 3) LCD - liquid crystal display
- 4) Plasma
- 5) LED - Light emitting diode
- 6) IPS - In plane switching display

### Types of Printer

- 1) Dot matrix
- 2) Ink jet (Desk jet)
- 3) LASER Jet
- 4) 3D printer (Zuko min material is used in 3D printer)

### Types of projector

- 1) OHP - Over head projector
- 2) DLP - Dynamic / Digital light projector
- 3) DLNA - Digital leaving network alliance  
(which is made up of MHL - Mobile highdefinition link)
- 4) Microfilm -

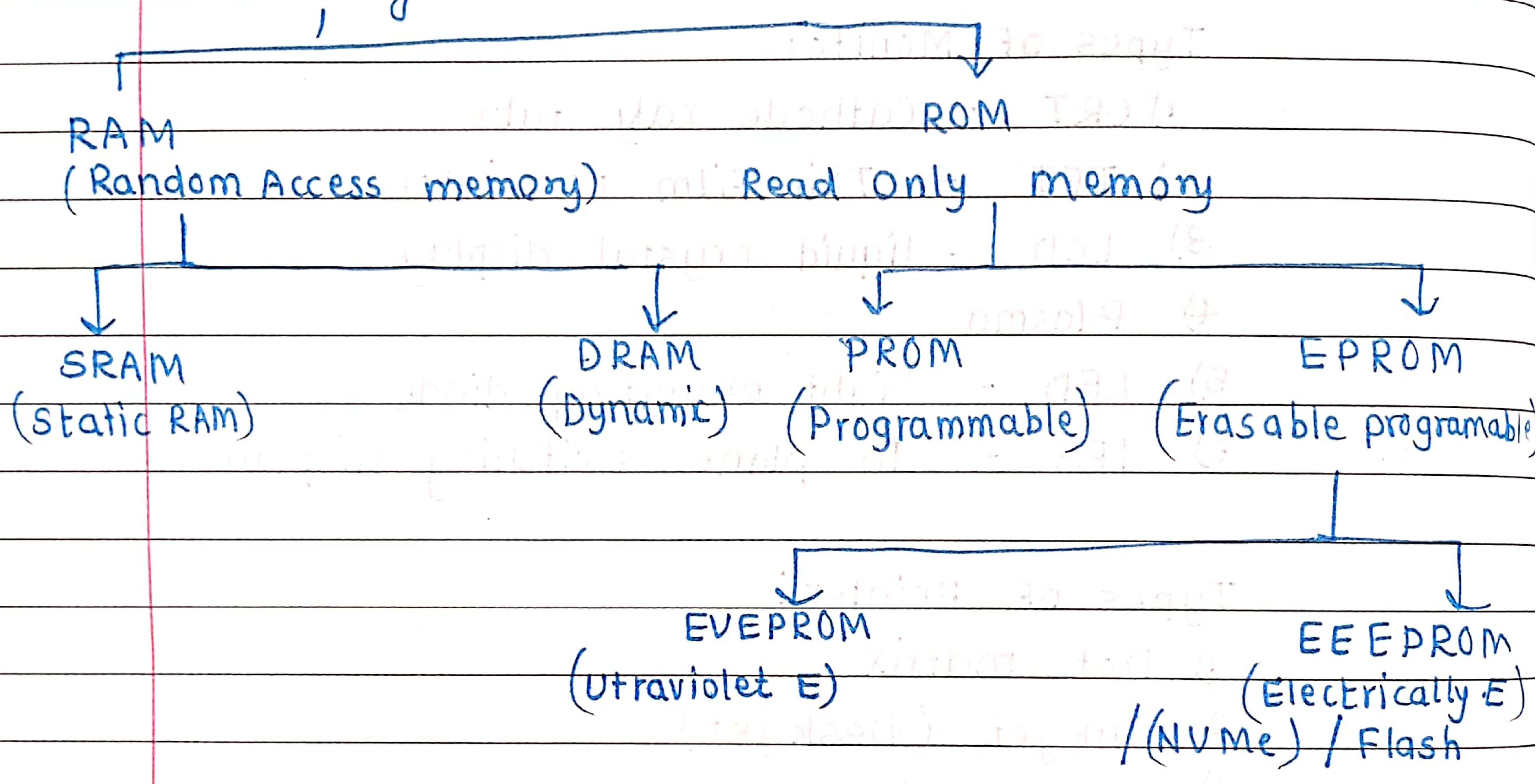
## \* Storage devices

// Data जहां पहुँचे M जायेगा

at Primary memory

Primary storage // Primary memory से  
devices जहां जायेगा वह Secondary  
memory.

### - Memory



i) Primary memory always transient/volatile  
(rotating or in form

ii) Transferring to computer  
category broad four - 1. RAM  
2. ROM 3. Hard Disk 4. Floppy

iii) Limited physical storage - A.D.D.E

iv) Large capacity of data

v) fast reading/writing

Redundant array of inexpensive disk

SCSI - Small computer System interface.

NAS Network access storage.

PAGE NO. 33

DATE: 7/10/23

II Secondary memory is comparatively permanent  
among secondary storage devices

Sequential access devices  
(eg. Tape)

Direct access devices /  
Random access devices

Magnetic  
Electronic  
(Memory)

Magnetic

Flopy  
(1.4 MB  
1.44 MB)

Optic

Harddisk

Zip disc / Bernoulli  
(Mainly used  
for store archive)

Winchester  
Disk

(Domestic Disk)

Mask Storage  
disk / Raid

SCSI /

NAS (if it is  
connected to NW)

CD Disk / DVD

optic

LD  
(Laser Disk)

BRD

(Blue ray disk)

PATA - Parallel Advanced Technology Attachment  
SATA - Serial ATA  
eSATA - enhanced SATA  
GPU - Graphic processing unit

PAGE NO.  
DATE:

Date - 8/09/23

Day - 2

Computer fundamentals by Gokhale sir

GPU

\* Architecture of NVIDIA

- 1) Fermi
- 2) Maxwell
- 3) Kepler
- 4) Pascal
- 5) Volta
- 6) Turing
- 7) Ampere
- 8) Ada
- 9) Hopper (Coming Soon)

\* GPU

Harddisk -

- Harddisk is a secondary storage device
- How HD is connected to computer
  - 1) PATA - पहले comp. को इससे HDD connect
  - 2) SATA / AHCI -
  - 3) eSATA -
  - 4) SSD - NVMe / flash
  - 5) SSHD - Hybrid disk
  - 6) Flash

- PATA को Bios की भाषा में IDE कहते हैं  
(industrial drive electronics)
- PATA, SATA, eSATA तीनों मिलकर HD (Harddisk) b बनती है।
- SSD is expensive than HD

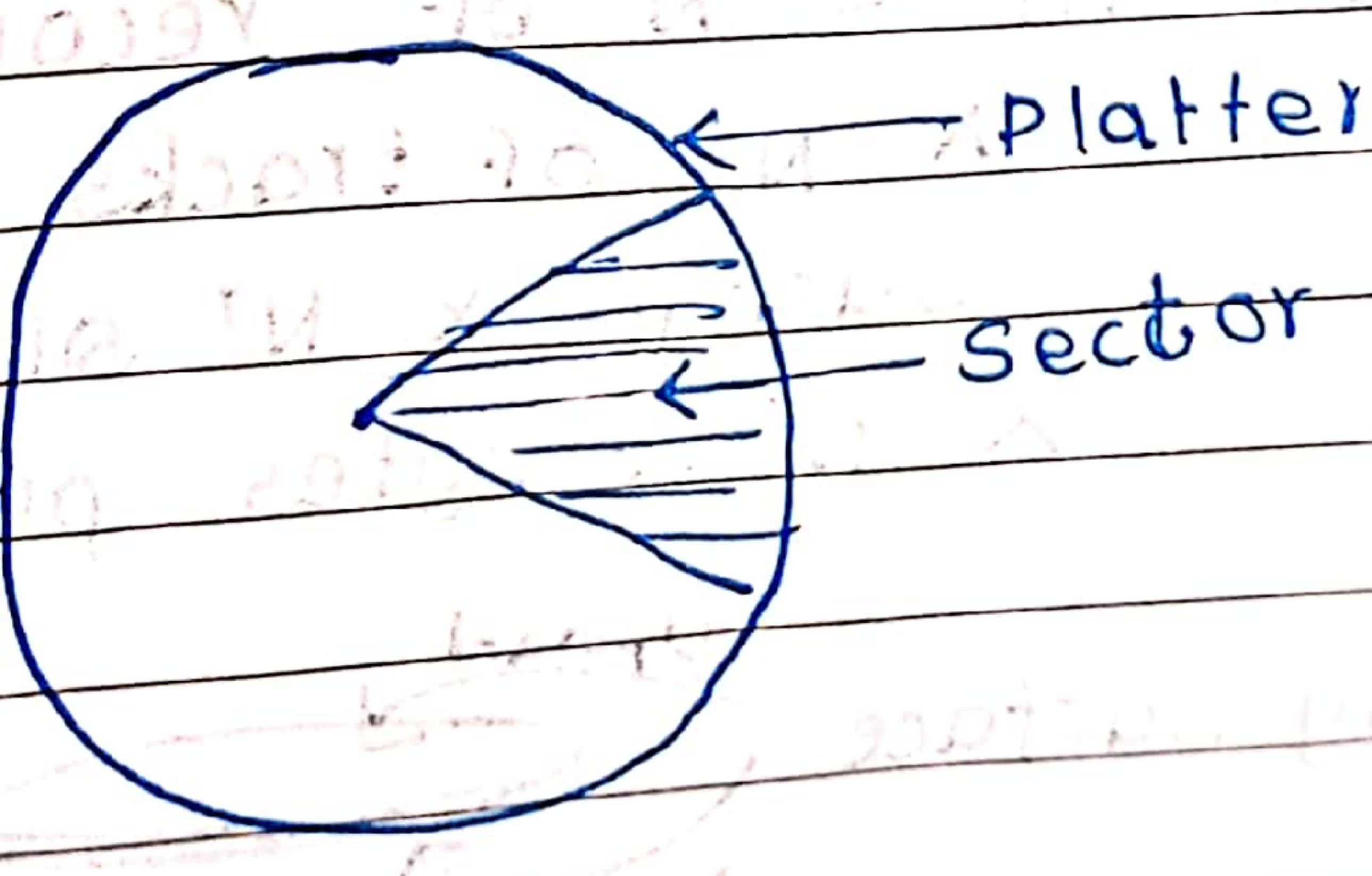
SSHD = Solid state plus hardisk

LBA = Logical block address

PAGE NO.

DATE: 8/10/23

- PATA, SATA & eSATA are magnetic
- किसी भी Hardware को operate करने के लिए Operating System कि जरूरत होती है।
- देह Hardware है, तो संस्कार OS है।
- Arrangement of files is called file system.
- Anything storage device called file. - by Dennis Ritchie
- Device को \$ Drive करनेवाले प्रोग्राम को Device driver कहते हैं।
- Hardware is controlled by OS via device driver.
- Platter, cylinder, head, sector तीन बातों से Platter बनता है,
  - Multiple sectors का head बनता है।
  - Multiple heads का cylinder बनता है।
  - Multiple cylinders का platter बनता है।
  - Multiple platters की HD बनती है।
- (बाजार) से आनेवाली HD हमारे घर CHS से आती है।



- To write "INDIA IS MY COUNTRY" in HD Device driver RUNS the equation,

$$LBA = ((C * HPC) + H) * SPT + S - 1;$$

→ instruction device driver run करता है,

OS ने कहता है।

Here

$C = \text{Cylinder}$

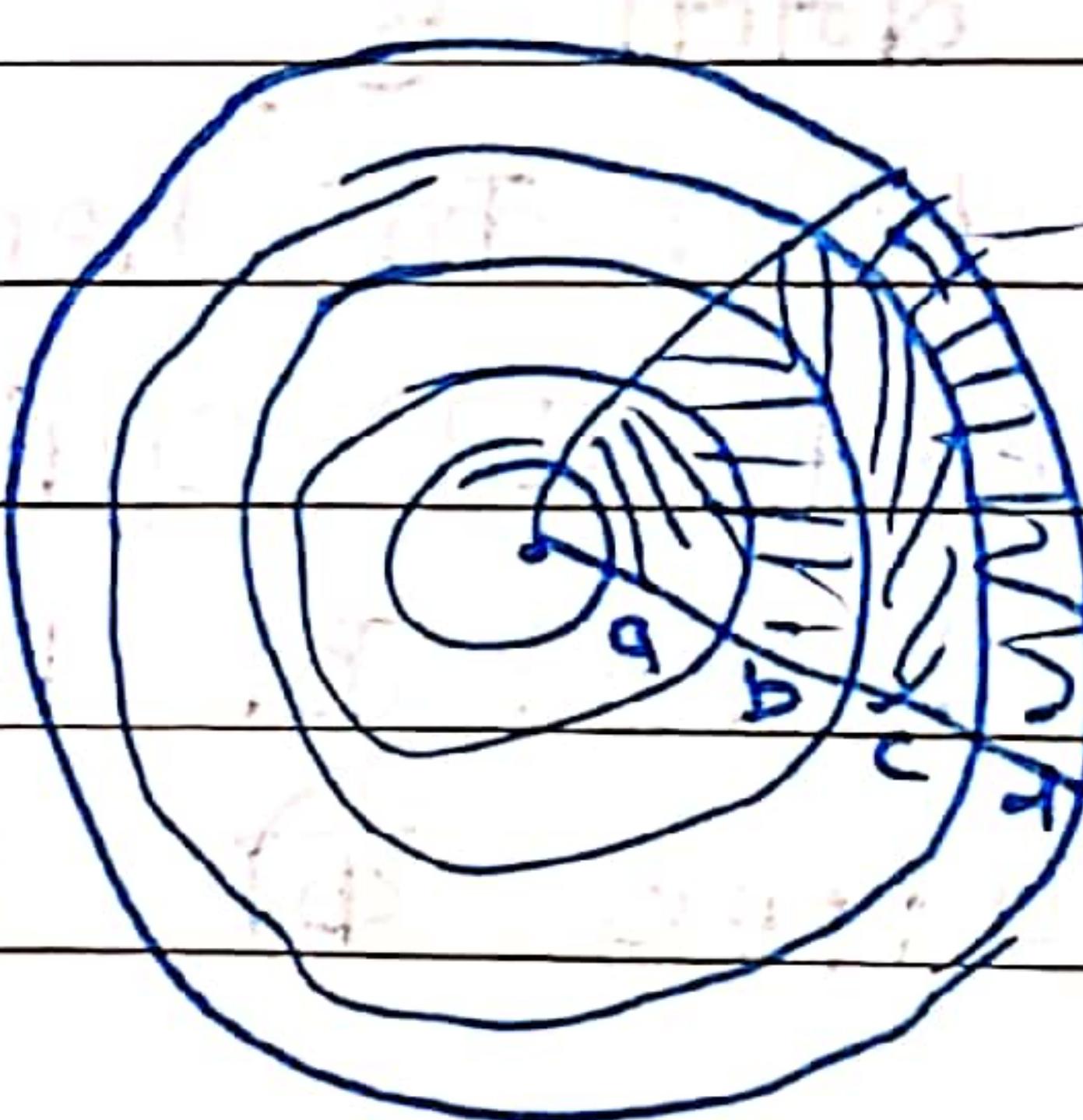
HPC = Heads per cylinder

SPT = Sectors per track

H = Head

S = Sector

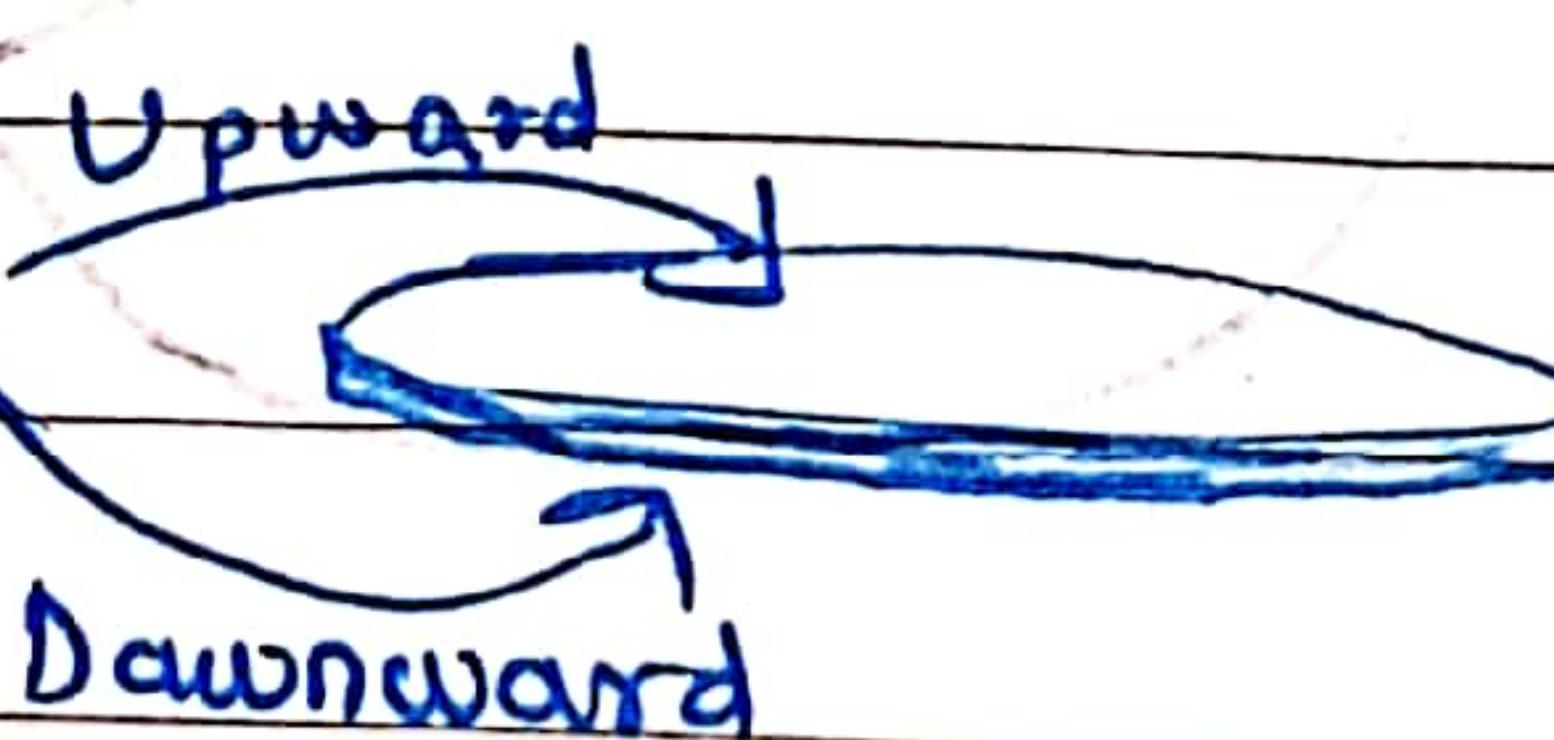
- CHS = cylinder head sector
- Driver LBA को CHS में convert करता है।
- Platter are divided into multiple tracks
- tracks are the multiple concentric circles on platter.



Data write अंदर से बाहर होता है। (a → d)

- Capacity of HD = Nr of recording surfaces  
Nr of tracks per recording surface  
Nr of sectors per track  
Nr of bytes per sector

- Recording Surface



All in 2 Recording Surface on 1 disc.

SI = Standard international

JEDDEC = Joint electron device engineering council

IEC = International

PAGE NO.

DATE: 8/10/23

\* Why size of the connected HD is lesser than the market size?

→ ① बाजार से आनेवाला HD unit SI unit होता है।

② SI unit is in thousands means units of 10's

जिसका और computer detect करती है, JEDEC / IEC

अपने Unit से. (1024)

2) Every file system has its own data structure to give the same space to the data structures. Hence size becomes reduced.

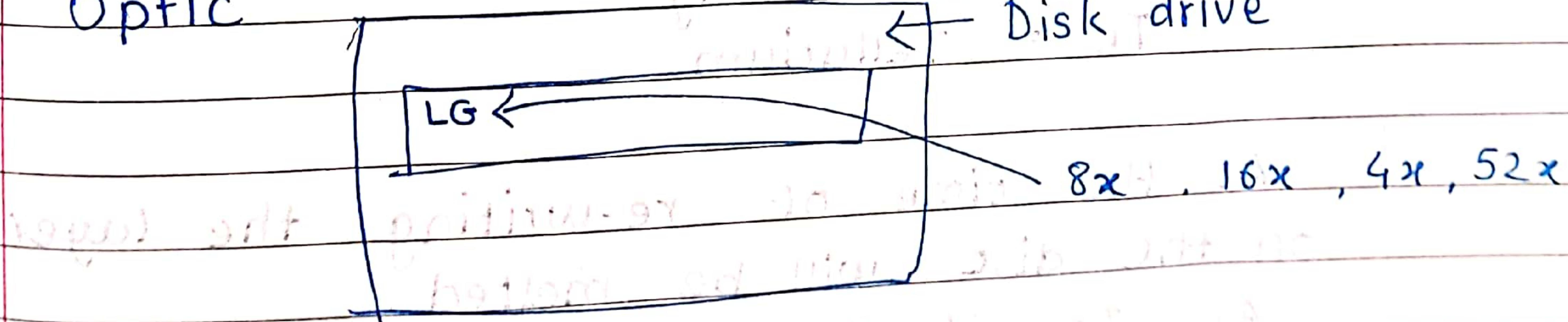
3) Due to rounding off of CHS to LBA

- Density of disk =  $(N^r \text{ of sectors per track} \times N^r \text{ of bytes per sector}) / \pi * D$

Here,  $N^r$  = Number of sectors per track

$D$  = Diameter of platter

\* Optic



where  $x$  on disk denotes the rotation speed of disk in drive.

Speed of CD = 150 Kb/sec

DVD = 1.38 Mb/sec

Blu ray disk = 36 - 576 Mb/sec

It is a speed of Reading & Writing.

- Names of file systems for CD | DVD | BRD

1) CDFS = Compact disc file system

2) ISO 9660 = India nation standard organisation.

JOLIET

- Capacity of CD = 650 - 700 MB

DVD → single Layer = 4.7 GB

Double layer = 8.5 GB

BRD = 35 - 52 Gb

All discs are coated by polycarbonate  
but re-writeable disc is coated by  
special alloy (AgInSbTe)

Here, Ag = Argentum is silver

In = Indium

Sb = Antimony

Te = Tellurium

At the time of re-writing the layer  
on the disc will be melted.

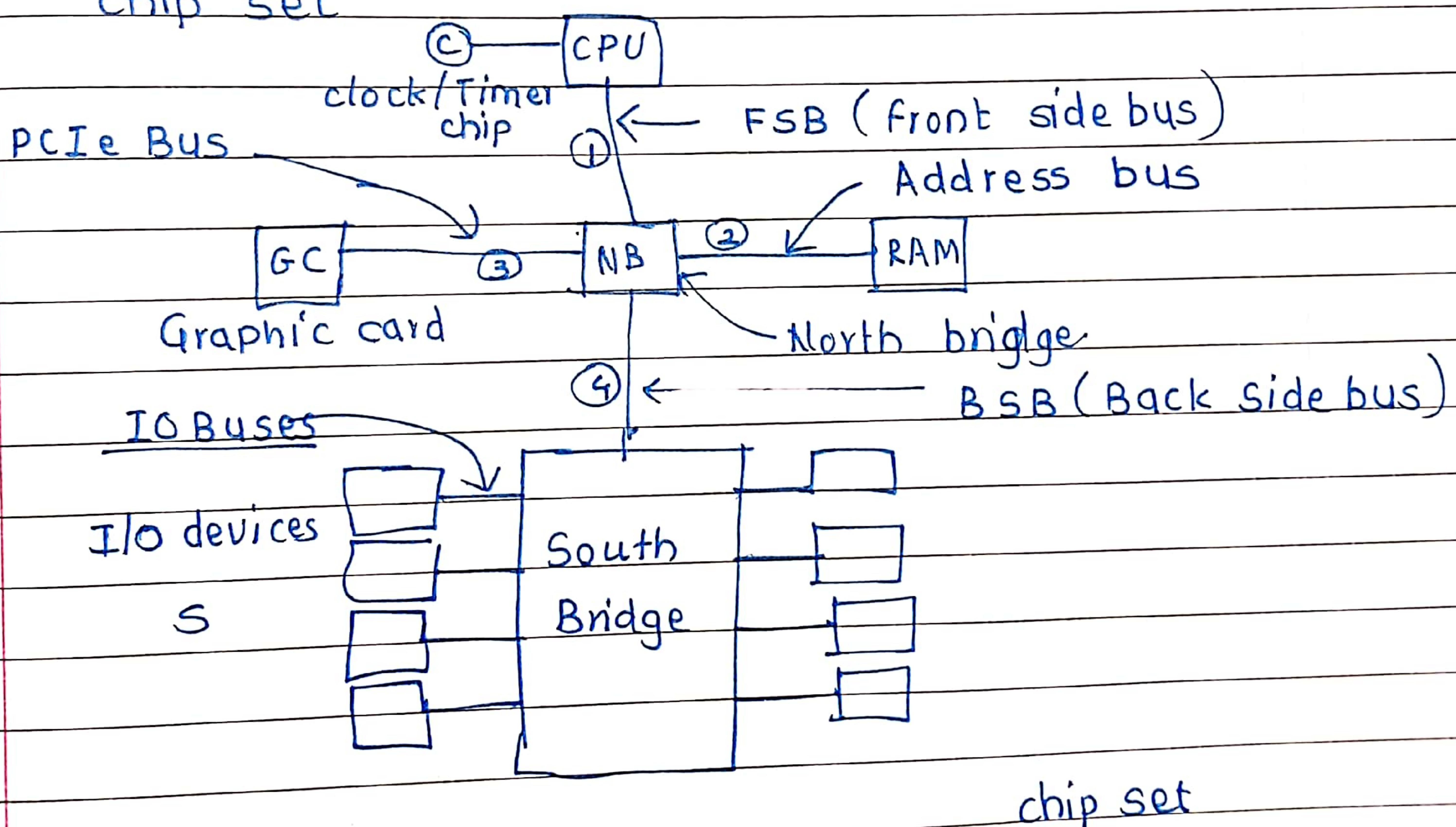
Ag, In, Sb, Te if we heat them  
due to their amorphous nature it  
will be melted & all pits are  
destroyed.

# Peripheral component interconnect express.

PAGE NO.

DATE: 9/10/23

- for re-writable disc have a limit cycle to erased cycle.
- Erase cycle limit is the limit given to storage media to erase maximum number of storage cycles.
- All the hardware components are plugged on motherboard which together called as chip set



- Speed of 1 is more than 2 then 3 then 4.
- Crowding is at 10 devices at south bridge.
- ICH (IHA) - Intel ने south bridge का crowding manage करने के लिए ICH / IHA बनाया (intel hub architecture). इसके लिए intel ने chip बनायी → ICH ( IO internet hub ).

- ICH split in 6 chips - crowding in 6
  - 1) UHCI - Universal host controller interface
  - 2) OHCI - Open host controller interface
  - 3) AHCI - Advanced host controller interface
  - 4) EHCI - Enhanced host controller interface
  - 5) xHCI - Extended host controller interface
  - 6) WHCI - wireless host controller interface