1. What is Memory?

Memory is the part of a computer where data, instructions, and results are stored **temporarily or permanently** so the computer can use them.

Memory is essential because:

- It stores data and programs
- It helps the CPU process information quickly
- It allows saving information for future use

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2. Difference Between Memory and Storage

Memory	Storage
Mostly temporary	Mostly permanent
Faster	Slower than memory
Data is lost when power is off (mostly)	Data remains even after power is off
Example: RAM	Example: Hard Disk, Pen Drive

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3. Types of Memory

A. Primary Memory (Main Memory)

Primary memory is directly accessed by the CPU.

1. RAM (Random Access Memory)

- Volatile memory (data is lost when power is off)
- Used to store running programs and data
- Faster than secondary storage

Types of RAM:

- DRAM (Dynamic RAM)
- SRAM (Static RAM)

2. ROM (Read Only Memory)

- Non-volatile memory
- Stores permanent instructions like booting
- Data cannot be easily changed

Types of ROM:

- PROM
- EPROM
- EEPROM

B. Secondary Memory (Storage Devices)

Secondary memory is used to store data permanently.

Examples:

- Hard Disk (HDD)
- Solid State Drive (SSD)
- Pen Drive
- CD/DVD
- Memory Card

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4. Storage Devices

1. Magnetic Storage Devices

- Hard Disk Drive (HDD)
- Magnetic Tape

Features:

- Large storage capacity
- Cheaper
- Slower than SSD

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2. Optical Storage Devices

- CD (Compact Disc)
- DVD (Digital Versatile Disc)
- Blu-ray Disc

Features:

- Uses laser technology
- Portable
- Less storage compared to HDD/SSD

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3. Solid-State Storage Devices

- SSD (Solid State Drive)
- Pen Drive
- Memory Card

Features:

- Very fast
- No moving parts
- More durable

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5. Units of Data Storage

Computers store data in **binary form (0 and 1)**.

Smallest Units

Unit	Meaning
Bit	Smallest unit of data (0 or 1)
Nibble	4 bits
Byte	8 bits

Larger Units of Storage

Unit	Value
1 Byte (B)	8 bits
1 Kilobyte (KB)	1024 Bytes
1 Megabyte (MB)	1024 KB
1 Gigabyte (GB)	1024 MB
1 Terabyte (TB)	1024 GB
1 Petabyte (PB)	1024 TB
1 Exabyte (EB)	1024 PB
1 Zettabyte (ZB)	1024 EB
1 Yottabyte (YB)	1024 ZB

Easy Example

- A text document → few KB
- A song → few MB
- A movie → few GB
- Large servers & cloud data → TB to ZB

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6. Cache Memory

- Very fast memory
- Located between CPU and RAM
- Stores frequently used data
- Improves computer speed

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7. Volatile vs Non-Volatile Memory

Volatile Memory	Non-Volatile Memory
Data lost when power is off	Data remains stored
RAM	ROM, HDD, SSD

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8. Summary

- Memory stores data for processing
- Storage devices store data permanently
- Data is measured from **bit → byte → KB → MB → GB → TB → PB**
- RAM is fast but temporary
- Secondary storage is permanent but slower