TYPES OF MEMORY

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Types of Memory

Used to store data andinstructions

Memory is the storage space incomputer

Most fundamental component of acomputer

Also referred as "*working area"* ofcomputer

Memory is primarily of threetypes

1. Cache Memory
2. Primary Memory/Main Memory
3. Secondary Memory

CacheMemory

- It is Small sized type of volatile memory
- Provides high-speed data access to a processor.
- Can speed up CPU
- Acts as a buffer
  - Between the CPU and main memory.
- Hold data and program frequently

CacheMemory

Advantages

1. Faster than mainmemory.
2. Consumes less access time as compared tomain memory.
3. Stores the program that can be executed within a short period of time.
4. Stores data for temporary use.

Disadvantages

1. Has limited capacity.
2. Very expensive.

Primary/MainMemory

- Holds data andinstructions
  - Computer is currently working
- Has limited capacity
- Data is lost when power is switchedoff
- memories are not as fast asregisters
- It is divided into two subcategories
  1. RAM
  2. ROM.

Primary/MainMemory

- **CharacteristicsofMainMemory**
  - These are semiconductor memories
  - It is known as mainmemory.
  - Usually volatile memory.
    - Data is lost in case power is switched off.
  - It is working memory of the computer.
  - Faster than secondary memories.
  - Acomputer cannot run without primary memory.

Secondary Memory(BackingStorage)

- Also known as external memory ornon-volatile
- Slower than mainmemory
- Used for storing data/Informationpermanently
- CPUdirectly does not access thesememories
  - Contents of secondary memories are first transferredto main memory, and then CPUcan accessit.
- For example: Hard Disk, CD-ROM,DVDetc.

Secondary Memory

Characteristics of Secondary Memory

- These are magnetic and opticalmemories
- It is known as backupmemory.
- It is non-volatile memory.
- Data is permanently stored even if power is switched off.
- It is used for storage of data in a computer.
- Computer may run without secondarymemory.
- Slower than primary memories.

RAM

- RAM stands for **Random Access Memory**. It is also called as **"Temporary memory" "main memory"** and **"volatile memory"**.
- The internal memory
- Used for storing data, program and program result.
- It is read/write memory
  - Stores data until the machine is working. As soon as the machine is switched off, data is erased.
- Access time in RAM is independent of the address
  - Each storage location inside the memory is as easy to reach as other locations and takes the same amount of time.
- RAM is small
  - In terms of its physical
  - In the amount of data it can hold.

RAM(contd..)

Working of the RAM is as follows:

- RAM plays very important role in data processing.
- The program and the data must be loaded into RAM before running the program to process the data.
- The storage capacity is measured in bytes.
- The large RAM size increases the accessing speed of the computer.
- CPU can performs two operations on RAM (read/write).

Types of RAM

- RAM is of two types:
  1. Static RAM(SRAM)
  2. Dynamic RAM(DRAM)

SRAM (Static RAM)

- Memory retains its contents

  As long as power is being supplied. However, data is lost when the power gets down due to volatile nature.

- SRAM need not have to be refreshed on a regularbasis.

- CPU does not need to wait to access data from SRAM during processing.

- That's why its faster memory.

SRAM (Static RAM)

Characteristic of the Static RAM

- It has long life
- There is no need to refresh
- Faster
- Used as cachememory
- Expensive
- High power consumption

DRAM (Dynamic RAM)

DRAM is recharged or refreshed again and again to maintain its data.

Characteristics of the Dynamic RAM

- It has short data lifetime
- Need to be refreshed continuously
- Slower as compared to SRAM
- Less expensive
- Less power consumption

ROM

- ROMstands for read only memory
- Memory from which we can only read but cannot write on it
- This type of memory is non-volatile
- Information is stored permanently
- Stores such instructions that are required to start a computer
- This operation is referred to as bootstrap.
- Romchips are not only used in the computer
  - But also in other electronic items like washing machineand microwave oven.

ROM(contd..)

Working of the ROMis asfollows:

- The instructions are written into the ROMat thetime of its manufacturing.
- When the computer is switched on, the instructions in the ROMare automatically loaded into the memory of the computer.
- These instructions prepare the computer forhuman users.

Types of ROM

- Following are the various types of ROM
  1. PROM
  2. EPROM
  3. EEPROM

Types of ROM

1.PROM(Programmable Read Only Memory)

- This form of ROM is initially blank.
- The user or manufacturer can write data and programs on it by using special devices.
- The user can write data and instructions on it only once.
- If there is any error in writing instructions the error can not be removed from PROM.

Types of ROM

2.EPROM(Erasable Programmable Read Only Memory)

- The data and program written on it can be erased.
- Exposing it to ultra-violet light.
- The ultraviolet light clears its contents, making it possible to

  reprogram the memory.
- The user then can write new program on it.

Types of ROM

3. EEPROM(Electrically Erasable and Programmable Read Only Memory)

- Reprogrammed and erased.
- It can be erased by exposing it to an electrical charge.
- The content of EEPROM can be modified easily.

Difference b/w RAMandROM

ROM	RAM
Read-only memory	Read and write memory
Permanent memory	Temporary memory
Non-volatile memory	Volatile memory
Small storage capacity	Large storage capacity
Instructions are written at time of manufacturing	Users can read and write at any location at any time
Special devices are used	Electrical devices are used

Other Storage Devices

Floppy Disk

- Created in 1967 by IBM
- Slower to access than harddisks
- Less storage capacity
- Less expensive
- Portable
- Size 3.5”, 5.25”, 8”

Other Storage Devices

Memory Card

- Also called Flashcard
- Commonly used storage media
- Used in electronic devices
  - Laptop, Mobile phone, PDAs etc.
- Most of these can be diminutive, re-recordable and can retain data without power
- Types
  - Micro SD, MMC, SD Card

Input Devices

Mouse 

Keyboard 

Joystick 

Light Pen 

Touch Pad 

Microphone 

Track Ball 

Scanner 

Digital Camera 


CRT
LCD
Monitor
Printer
Plotter
Speaker