Al-Mustaqbal University
College of Sciences
Medical Biotechnology Department

جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

كلية العلوم
قسم علوم التقانة الاحيائية الطبية

Lecture: (2)

Types of Computer Memory

Subject: Computer Skill I
Level: First
Lecturer: Dr. Maytham N. Meqdad

Types of Computer Memory

computer memory is vital for storing data and running programs on a computer. There are several different types of computer memory that serve different purposes. Understanding the different types of memory can help you better understand how your computer works. This article provides an overview of the most common types of computer memory.

What is Memory?

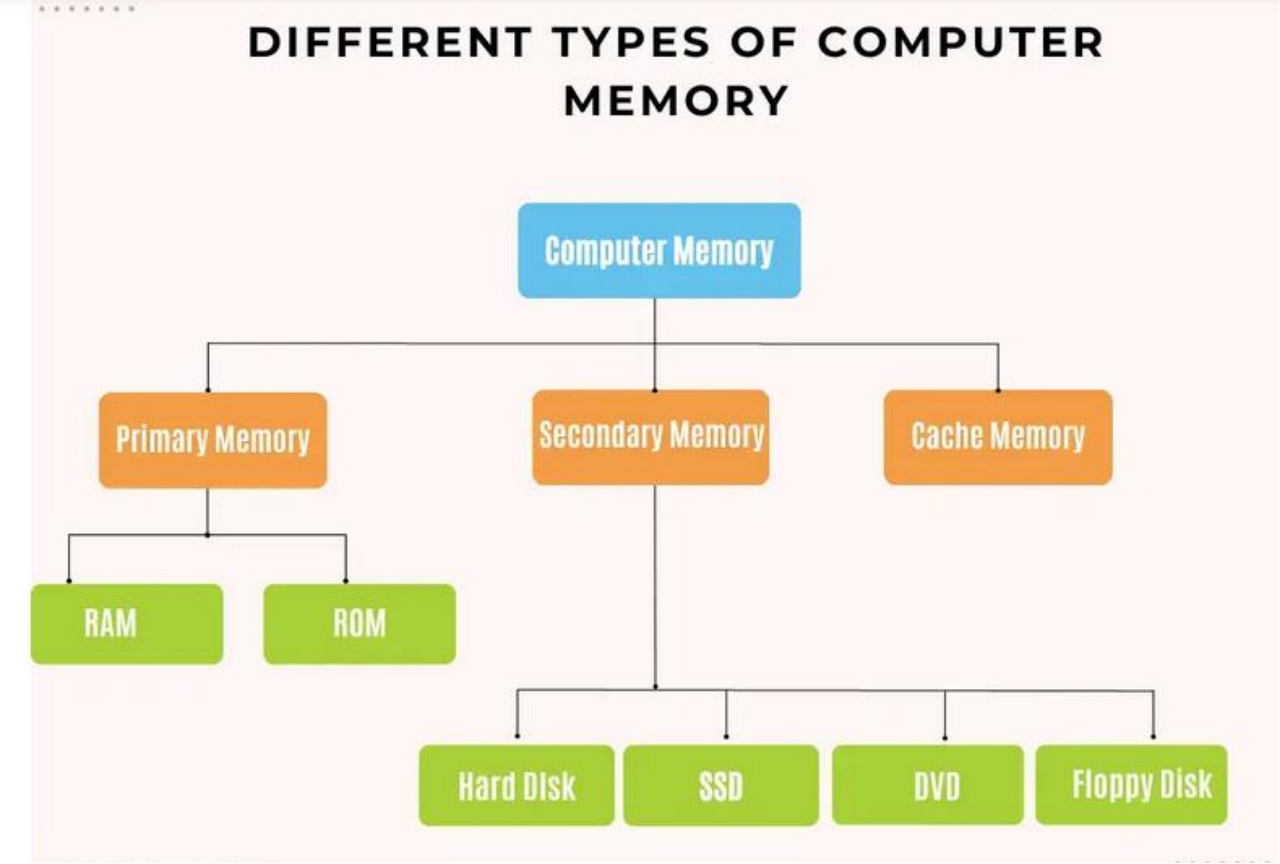
Memory refers to computer components and recording media that retain digital data used in **Computing** for some interval of time. Computer memory operates at a high speed, for example random access memory (RAM), unlike storage that provides slow-to-access data storage but offers higher capacities.

How Does Memory Work?

Computer memory stores data temporarily or permanently by using electronic circuits consisting of semiconductor devices. Data remains in volatile memory as long as the computer has power, while nonvolatile memory retains data even when the computer is turned off. When a program needs to access stored data, it sends a request to the memory controller, which retrieves the data and transfers it to the processor for use.

Different Types of Computer Memory

There are two main types of computer memory: random access memory (RAM) and read-only memory (ROM). **RAM and ROM** memory different in terms of how data is stored, accessed and retained. There are also different variations of these two main types of memory.



What is RAM (random access memory)?

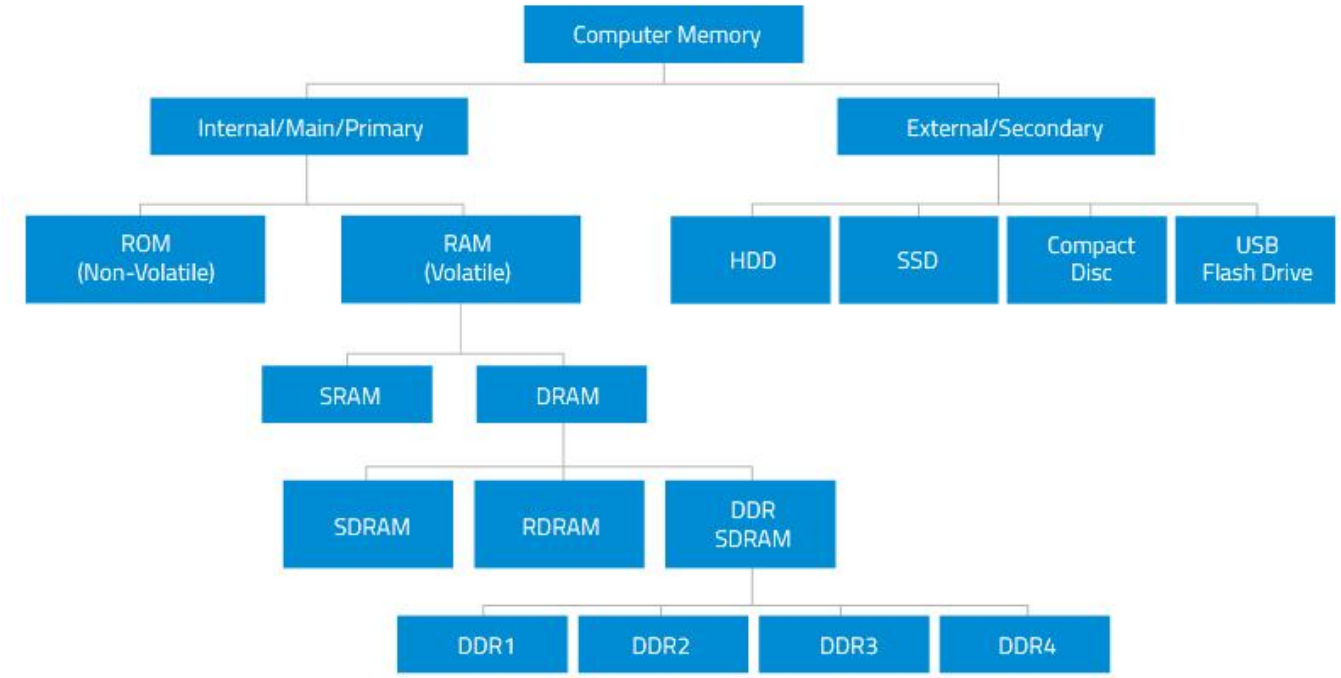
Random access memory (RAM) is the hardware in a computing device that provides temporary storage for the operating system (OS), software programs and any other data in current use so they're quickly available to the device's processor. RAM is often referred to as a computer's main memory, as opposed to the processor cache or other memory types.

Random access memory is considered part of a computer's primary memory. It is much faster to read from and write to than secondary storage, such as hard disk drives (HDDs), solid-state drives (SSDs) or optical drives. However, RAM is volatile; it retains data only as long as the computer is on. If power is lost, so is the data. When the computer is rebooted, the OS and other files must be reloaded into RAM, usually from an HDD or SSD.

What are the types of RAM?

There are two main types of RAM: Dynamic RAM (DRAM) and Static RAM (SRAM).

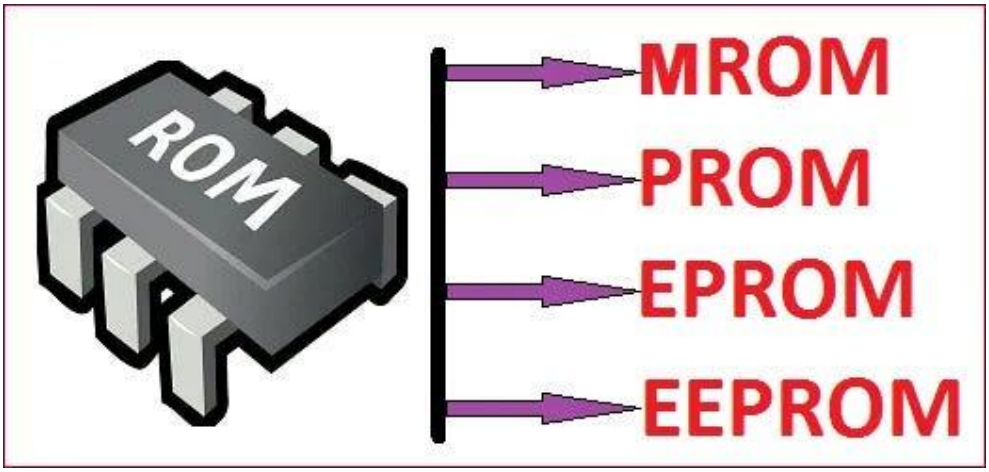
- **DRAM** (pronounced DEE-RAM), is widely used as a computer's main memory. Each DRAM memory cell is made up of a transistor and a capacitor within an integrated circuit, and a data bit is stored in the capacitor. Since transistors always leak a small amount, the capacitors will slowly discharge, causing information stored in it to drain; hence, DRAM has to be refreshed (given a new electronic charge) every few milliseconds to retain data.
-
- **SRAM** (pronounced ES-RAM) is made up of four to six transistors. It keeps data in the memory as long as power is supplied to the system unlike DRAM, which has to be refreshed periodically. As such, SRAM is faster but also more expensive, making DRAM the more prevalent memory in computer systems.



What is Read-Only Memory (ROM)?

ROM stands for Read-Only Memory. It is a non-volatile memory that is used to store important information which is used to operate the system. As its name refers to read-only memory, we can only read the programs and data stored on it. It is also a primary memory unit of the computer system. It contains some electronic fuses that can be programmed for a piece of specific information. The information is stored in the ROM in binary format. It is also known as permanent memory.

Read-Only Memory (ROM)

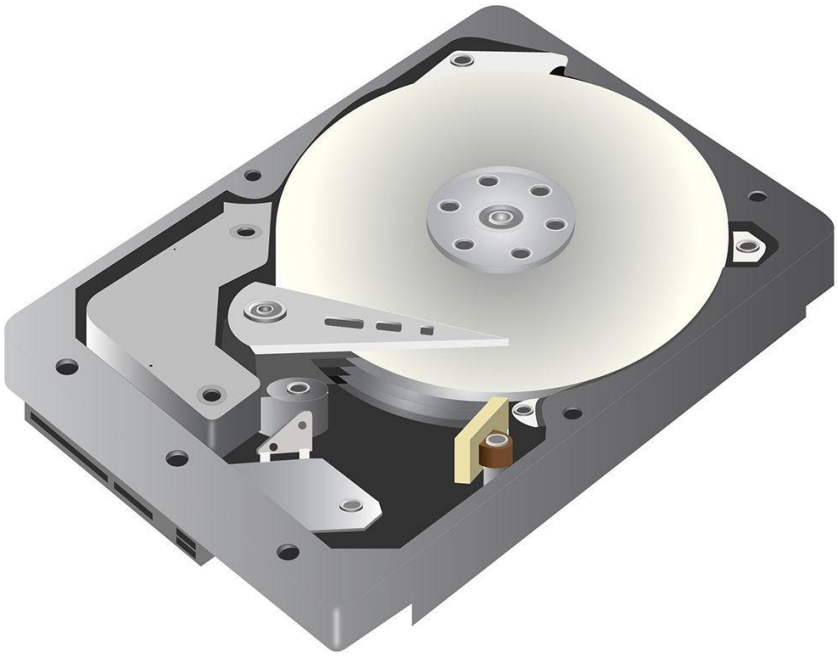


Different Types of ROM

Difference between RAM and ROM

N.	ROM	RAM
1	ROM stands for Read Only Memory.	RAM stands for Random Access Memory.
2	Data in ROM cannot modified or erased, you can only read data of ROM.	You can modify , edit or erase data in RAM.
3	ROM is a non-volatile memory that retian data even after the power is turned off.	RAM is a volatile memory that stores data as long as power supply is given.
4	ROM is slower than RAM.	Speed of RAM is more than speed of ROM.
5	ROM is cheap as compared to RAM.	RAM is costly as compared to ROM.
6	A ROM chip can store multiple megabytes (MB) of data.	A RAM chip can store only a few gigabytes (GB) of data.
7	CPU cannot easily access data stored in ROM.	CPU can easily access data stored in RAM.
8	ROM is used to store firmware, BIOS, and other data that needs to be retained.	RAM is used for the temporary storage of data currently being processed by the CPU.

A hard disk drive (HDD) is an internal or external computer component that stores data, such as the operating system, applications, and user files. HDDs are "non-volatile" storage devices, meaning they retain stored data even when power isn't being supplied



How does a hard drive work?

An HDD includes two main elements; a spinning platter and an actuator arm.

- The **platter** is a circular magnetic disk containing tracks and sectors that retain data.
- The **actuator arm** moves across the platter to read and write data.

About Capacity

Hard Disk Vendors (decimal arithmetic)	Operating System (binary arithmetic)
80GB	≈ 74GB
120GB	≈ 111GB
160GB	≈ 149GB
250GB	≈ 232GB
320GB	≈ 298GB
500GB	≈ 465GB
640GB	≈ 596GB
750GB	≈ 698GB
1TB	≈ 930GB
2TB	≈ 1860GB

- Hard disk vendors are using decimal arithmetic: 1TB = 1000GB, 1GB = 1000MB, 1MB = 1000KB
- But Operating System is using binary arithmetic: 1TB = 1024GB, 1GB = 1024MB, 1MB = 1024KB
- So there are some differences between display capacity and nominal capacity of hard disk products.

What are flash drives used for?

What is a USB Drive? A USB drive, also referred to as a flash drive or memory stick, is a small, portable device that plugs into the USB port on your computer. USB drives are commonly used for storage, data backup, and transferring files between devices.