Different Types of Memory in Computer

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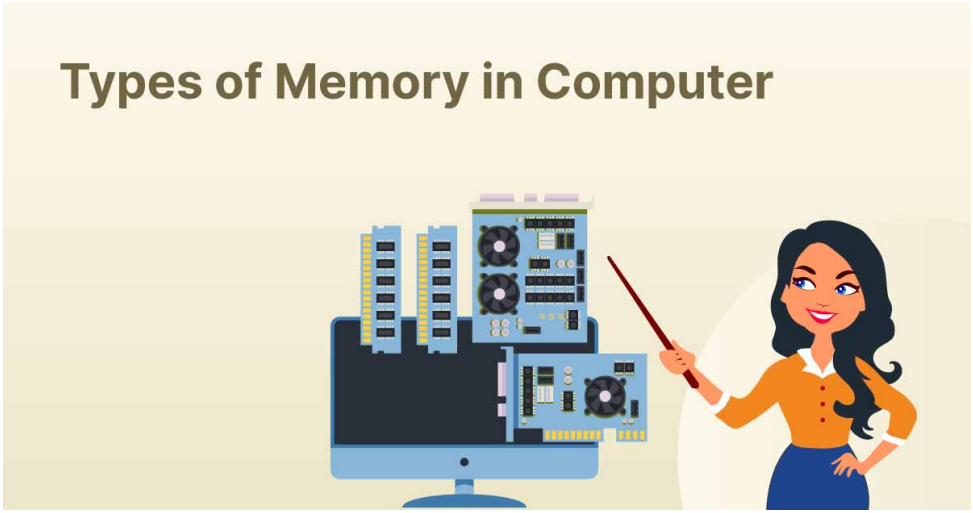
For a system to function properly, it is important to have different types of memory in computer. It stores information that the CPU uses for processing and completing instructions.



In this article, we will be taking a look at the different types of memory in computer systems.

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Let us get started by learning what is memory and its types in computer.

What is memory in computer?

Computer memory refers to different types of data storage technologies used by the computer. A computer system is made up of a combination of types of computer memory. It is electronic that holds a place for instruction and data that a computer needs to reach quickly. Computer memory is the collection of storage units that store binary information in bits. The memory block is split into smaller components called cells. Every cell has a unique address for storing data in memory.

Importance of Different Types of Memory in Computer

Memory in computers is an essential element of the system since, without it, the system cannot perform even basic tasks. In a computer system, memory stores different types of data, such as audio, video, documents, images, etc. This data can be retrieved as and when required. The CPU selects memory cells for reading and writing data based on the task that the user wants the computer to accomplish. There are different memory types in computers to suit the device's needs.

Characteristics of Memory in Computer

The following are the characteristics of memory in computer:

- The storage capacity varies for different types of memories in computers. The storage capacity of external devices is measured in bytes, while internal memory is measured either in words or bytes. Storage word length may vary in 8, 16, or 32 bits.
- Unit of transfer measures the transfer rate of bits that can be either read or written in and out of memory devices. This data transfer rate is different in internal and external devices. For internal memory, it is usually equal to word size and for external memory, it is greater than a word.
- The internal memory in a computer is inbuilt within it, whereas external memory is present as a separate storage device such as USB or disk.
- There are four methods to access memory, including DMA, Associative Access Method, Sequential Access Method, and Random Access Method.

- Memory in computers has different physical behavior, such as volatile, non-erasable, and non-volatile memory.
- The performance of the memory depends on access time, memory cycle time and transfer rate. Access time is the total time taken by memory devices to perform read and write operations.
- Memory cycle time is the total time needed to access the memory block and the additional time needed before starting the second access.

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Types of Memory in Computer

Let us now discuss the classification of various types of memories in computers. Broadly, memory is segregated into Primary, Secondary, Cache and Register. Further classification is between primary and secondary memory.

1. Primary Memory

Also known as main memory in computer, it communicates directly with the CPU, Cache and Auxiliary memory. This type of computer memory keeps data and programs when the process is active to use them.

When a program or the data is activated for execution, the processor loads instructions from the secondary memory into the main memory and then starts execution. It is a volatile memory due to which any unsaved data is lost when a power cut occurs. Primary memory is of two types: RAM and ROM.

1.1 RAM

RAM is hardware that temporarily stores data and programs. It is the faster part of the main memory which can be directly accessed by the CPU. It reads and writes programs until the computer is switched on. RAM is of two types: DRAM and SRAM.

- DRAM full form is Dynamic Random-Access Memory. It is a type of RAM that is used for dynamic data storage. Every cell in DRAM consists of one-bit information. A cell is composed of a transistor and a capacitor. This capacitor and transistor are extremely small in size. The capacitor needs a continuous refresh to retain information since it is

volatile.

- **SRAM full form** is Static Random-Access Memory. This type of RAM stores static data in memory which remains active until there is a power supply. Same sized SRAM chip holds less data than DRAM. Unlike DRAM, it does not require a continuous refresh.

1.2 ROM

Read-Only Memory (ROM) is a permanent storage type. This is a type of read-only memory that only reads the stored information, but it does not have the capability to modify or write. Since it is a non-volatile type of memory in computer, the information stays even after a power cut or when the system has been shut down. ROM is of the following five types:

- **MROM:** It is the oldest ROM whose data is pre-configured via integrated circuit manufacture during the time of manufacturing. Due to this pre-configuration, the user cannot change the instruction stored within the MROM chip.
- **PROM:** It is a digital ROM which only once allows writing any information or program. This is done using a special PROM programmer or burner device.
- **Flash ROM:** This type of ROM can be programmed or written in smaller units called sector or block. It is used for transferring data between computer and digital devices.
- **EPROM:** In this type of ROM, data can be erased as well as reprogrammed only once. It can store data for a minimum of 10-20 years. To erase and reprogram EPROM, the user needs to pass UV light for 40 minutes. Post this, the data can be recreated.
- **EEPROM:** The full form of EEPROM is Electrically Erasable and Programmable Read Only Memory. It is an electrically erasable and programmable ROM. This allows data to be erased using a high-voltage electrical charge. After this, it can be reprogrammed up to thousands of times.

2. Secondary Memory

It is a permanent type of memory in computer that holds a large amount of data. This is an external memory that represents different storage media on which data

and programs can be saved for long term. It is not directly accessible by the CPU and is available as external devices such as CDs, DVDs and USBs. They are cheaper than primary memory but slower than primary memory.

- **Hard disk:** It is a type of permanent computer memory that stores programs, files and data. It is stored on the motherboard of the computer that does not lose data even when there is a power outage or when the system has been switched off.
- **Compact Disc (CD):** It is an optical disk storage device that stores different types of data, such as audio, video, files, and other information. CD uses light to read and write data from CDs.
- **Pen Drive:** This portable device is a type of secondary memory in computer that is used for permanently storing data. It is also known as a USB flash drive that stores and transfers.

Difference between SRAM and DRAM

The main difference between SRAM (Static Random-Access Memory) and DRAM (Dynamic Random-Access Memory) is that SRAM stores data using flip-flop circuits, which are faster and require continuous power to retain**...read more**

Difference Between RAM And ROM

RAM and ROM are two commonly used terms in computers. The primary distinction between RAM and ROM is that RAM is random access memory, whereas ROM is read-only memory. RAM**...read more**

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3. Cache Memory

This small-sized chip-based memory in computer lies between the main memory and

CPU. It is very close to the chip of CPU. The aim of this type of computer memory is to enhance the performance of the CPU. It is a high-performance and temporary type of memory that reduces the access time of data from main memory. Every instruction and data that is often used by the CPU is stored within Cache memory. Cache memory is of three types: L1, L2, and L3 cache.

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FAQs

How many type of memory are there in computer?