All About Primary Storage Devices

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ROM and RAM are two main types of primary storages. ROM is non volatile that allows saving the data even if the computer is switched off. RAM is volatile in nature due to which data gets lost once computer is switched off.

In this article, we will be covering what is primary storage, examples of primary storage devices and their importance.

Table of Contents

- Types of Primary Storages
  - ROM
  - RAM
  - Flash memory
  - Cache memory

What is Primary storage?

Primary storage is also known as main memory in computer. It is a component of the computer that holds programs, instructions and data currently in use. It is located on the motherboard which allows a quick process of reading and writing to primary storage. This allows processors to give faster access to the data and instructions that primary storage holds.

Why do We Need Primary storage?

Primary storage is required due to the following reasons:

- **Fast Access to Data:** Primary storage provides rapid access to data and programs, enabling efficient and swift processing.
- **Volatile Storage:** It holds data temporarily, making it essential for processing tasks and operations that require immediate access to data.
- **Operating System Loading:** It is used to load and run the operating system, allowing the computer to function and execute tasks.
- **Application Execution:** Primary storage holds applications and software in use, enabling smooth and efficient execution.
- **Data Caching:** It caches frequently accessed data, enhancing the speed of data retrieval and improving system performance.
- **Buffering:** It provides a buffer for data, smoothing out the differences in data processing and transfer rates, and ensuring uninterrupted data processing.
- **Temporary Data Storage:** It stores temporary data created during program execution, providing space for data manipulation and computation.

- **Supporting CPU:** Primary storage supports the CPU by holding instructions and data for processing, ensuring efficient and seamless operations.
- **Enhancing Performance:** It enhances overall system performance by providing fast, immediate access to data and programs, reducing processing time.
- **Immediate Data Availability:** Ensures that data is immediately available for processing, reducing latency and improving task execution time.

What are primary storage devices?

Primary storage devices are the media that hold memory for a shorter period of time when the computer is running. Such devices have lower access time but faster time. RAM and cache are two examples of primary storage devices. It is also known as main memory, primary memory, internal memory and main storage.

Types of Primary Storage

The following are four different types of primary storage:

1. Read Only Memory (ROM)

It is the memory from which we can only have the capability to read, but we cannot write on it. This non-volatile memory is used for storing information that we use for operating computer systems. It is the primary memory unit of a computer system that contains electronic fuses to be programmed for specific information.

Also known as permanent memory, this information is stored in binary format in ROM. It stores instructions that are needed for starting a computer which is an operation called Bootstrap.

A ROM is of the following four types:

1.1 PROM (Programmable Read Only Memory)

It is a read-only memory that can be modified just once by a user and it is not erasable. A blank PROM is brought and it can be written with the required content using the PROM program. A PROM chip consists of small fuses which are burnt

open while programming.

1.2 EPROM (Erasable and Programmable Read Only Memory)

It is a read-only memory that can be erased when exposed to ultra-violet light for up to 40 minutes. An electrical charge is trapped within an insulated gate region where the charge is retained for more than 10 years since the charge has no leakage path. To erase this charge, ultraviolet is passed via a quartz crystal window (lid). This exposure to UV light helps dissipate the charge.

1.3 EEPROM (Electrically Erasable and Programmable Read Only Memory)

It is an electronically reprogrammable and erasable memory. EEPROM has the capability of being reprogrammed around 10 thousand times. The process of erasing and reprogramming takes about 4 to 10 milliseconds. Any location within EEPROM can be selectively erased or programmed. The process of erasing takes one byte at a time. The process of reprogramming is slow yet flexible.

1.4 MROM (Mask ROM)

It is a type of read-only memory that is masked during production. This type of ROM refers to a part of an integrated circuit consisting of a thin electronic circuit to process data covered with opaque plates called photomasks. It does not allow users to change the stored data in it. Mask ROM are quite often used for storing finalized code of the project.

2. Random Access Memory (RAM)

It is a type of computer memory that can be read and changed in any order. RAM is mostly used for storing work data and machine code. It allows data items to be read and written in the same amount of time, regardless of the physical location of data within the memory.

The following are two main types of RAM:

2.1 DRAM

Also known as Dynamic RAM, this type of RAM allows storing every bit of data in separate capacitpr within specific integrated circut. It is a standard computer memory within most modern desktop computers. DRAM is a volatile memory that should be refershed on a regular basis with voltage. It takes the form of an IC chip that consists of billions of DRAM memory cells.

2.2 SRAM (Static RAM)

It is a type of random access memory that uses latching circuitry for storing every bit. It is a volatile type of computer memory where the data gets lost once the power is removed. Unlike DRAM, it os faster since it uses cache and internal registers of CPU, unlike SRAM that uses the main memory of the computer. SRAM can further be classified as Non-volatile and Pseudostatic.

3. Flash Memory

This is an electronic non-volatile type of computer memory that can be electrically erased and reprogrammed. NOR flash and NAND flash are two types of flash memory. In both cases, the same type of cell design is used, which consists of the floating gate MOSFETs. It is based on the EEPROM technology that consists of one or more flash memory chips as well as separate flash memory controller chips.

4. Cache Memory

It is a high-speed memory that catalyzes and synchronizes with the high-speed CPU. This is an extremely fast type of memory that acts as a buffer between RAM and CPU. Cache memory holds the data and instructions that are frequently requested so that it is available to the CPU for the need.

FAQs

Is CPU primary storage?

Are RAM and ROM primary storages?

Which are three main types of storage devices?