Fundamental of Computer & Emerging Technologies
MCA 1001
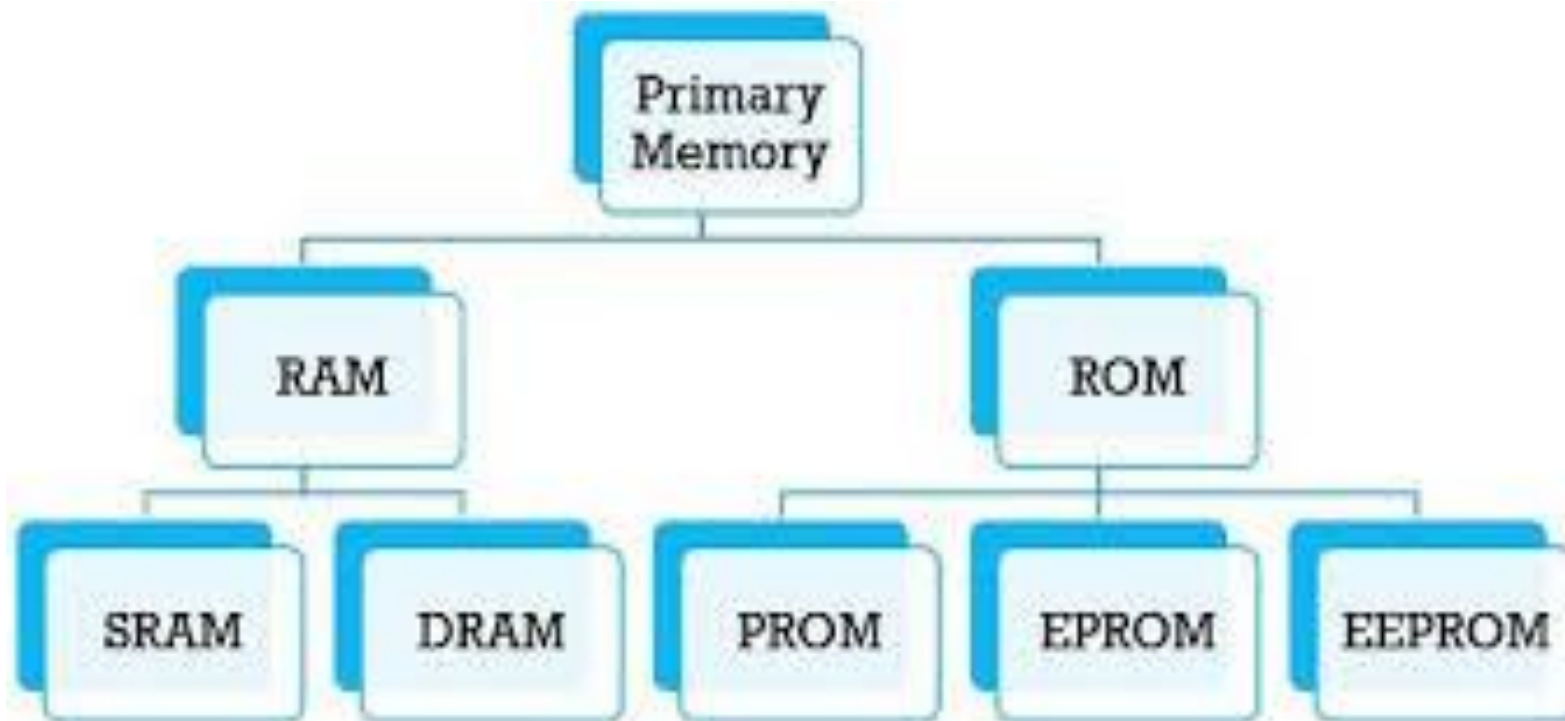
Primary Memory

By
Himanshu Shukla

PRIMARY MEMORY

Primary Memory (Main Memory)

➢ Primary memory holds only those data and instructions on which the computer is currently working. It has a limited capacity and data is lost when power is switched off.

➢ It is generally made up of semiconductor devices.

➢ These memories are not as fast as registers.

➢ It is divided into two subcategories RAM and ROM.

STRUCTURE OF PRIMARY MEMORY

Characteristics of Main Memory

➢ These are semiconductor memories.

➢ It is known as the main memory.

➢ Usually volatile memory.

➢ Data is lost in case power is switched off.

➢ It is the working memory of the computer.

➢ Faster than secondary memory.

➢ A computer cannot run without the primary memory.

RAM (Random Access Memory)

➢ Alternatively referred to as **main memory, primary memory,** or **system memory, Random Access Memory.**

➢ (**Ram**) is a hardware device that allows information to be stored and retrieved on a computer.

➢ The computer can access the data much faster.

➢ RAM is a volatile memory and requires power to keep the data accessible.

➢ If the computer is turned off, all data contained in RAM is lost.

Types of RAM

Over the evolution of the computer, there have been different variations of RAM.

Some of the more common examples are
❖ SRAM (Static Random Access Memory)
❖ DRAM (Dynamic Random Access Memory)
❖ SDRAM (Synchronous Dynamic Random Access Memory)
❖ DDR SDRAM (Double Data Rate Synchronous Random Access Memory)
❖ RDRAM (Rambus Dynamic Random Access Memory)

SRAM (Static Random Access Memory)

❖ S – RAM retains stored information only as long as the power supply is on.

❖ Costlier are used and consumed more power.

❖ They have higher speed than D – RAM`s.

❖ No need to be refreshed.

❖ Static RAM is fast and expensive.

❖ Static RAM is used to create the CPU`s speed sensitive cache.

DRAM (Dynamic Random Access Memory)

➤ DRAM was first invented and patented by **Robert Dennard** in <u>1968</u> and first released commercially by **Intel** in <u>October 1970.</u>

➤ It stores its information in a cell containing a capacitor and transistor.

➤ Need to be refreshed.

➤ DRAM is less expensive to produce than SRAM.

➤ DRAM requires less power than SRAM.

ROM (Read Only Memory)

➢ ROM is a permanent type of memory.

➢ Its contents are not erased when the power supply is switched off however, the user can not write into a ROM, and its contents are retained in additional manufacturing time.

➢ ROMs store permanent programs and other types of Data that are needed by the computer to execute user programs different types of ROMs.

Types of ROM

There are **five** basic ROM types.

✓ Mask ROM

✓ PROM (Programmable Read Only Memory)

✓ EPROM (Erasable Programmable Read Only Memory)

✓ EEPROM (Electrically Erasable Programmable Read Only Memory)

✓ FLASH ROM

Mask ROM

➤ It is a static ROM.

➤ A type of read-only memory (ROM).

➤ A fixed–program read-only memory in which the data content of each cell is determined during manufacture by the use of a mask.

PROM (Programmable Read Only)

➢ It was first developed in the 70s by Texas instruments.

➢ The data stored in it cannot be modified; therefore, it is also known as a one-time programmable device.

➢ It can be programmed only once and is not erasable.

➢ The user buys a blank PROM and enters the desired contents using a PROM program.
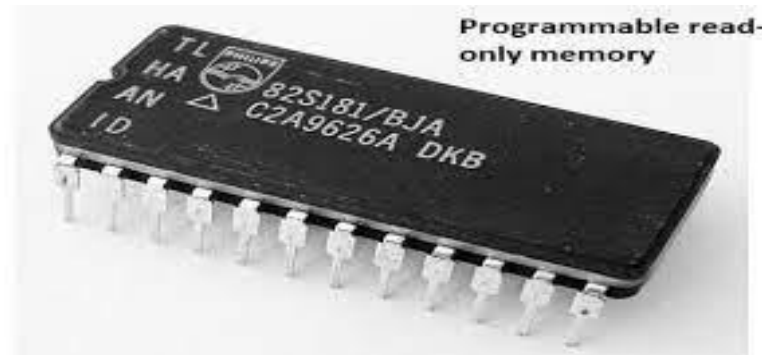
EPROM (Erasable Programmable ROM)

➤ EPROM chips can be rewritten many times.

➤ It is very cost-effective.

➤ It retains memory even without power.

➤ It is re-programmable as mentioned above.

➤ It is easy to erase EPROM completely by exposing it to ultraviolet light.

shutterstock.com · 1806308827

EEPROM (Electrically Erasable PROM)

➤ It can be erased and reprogrammed about ten thousand times.

➤ Both erasing and programming takes about 4 to 10 m.s (milliseconds).

➤ EEPROMs can be erased one byte at a time, rather than erasing the entire chip. Hence, the process of reprogramming is flexible but slow.

➤ The method of erasure is electrical and immediate.

FLASH ROM

➢ FLASH ROM is used for android devices.

➢ There are also some things called custom ROM.

➢ It will provide you with better functionality, user interface, features, and more.

➢ Many android users are going for custom ROMs, as they help them change the look and feel however they want.