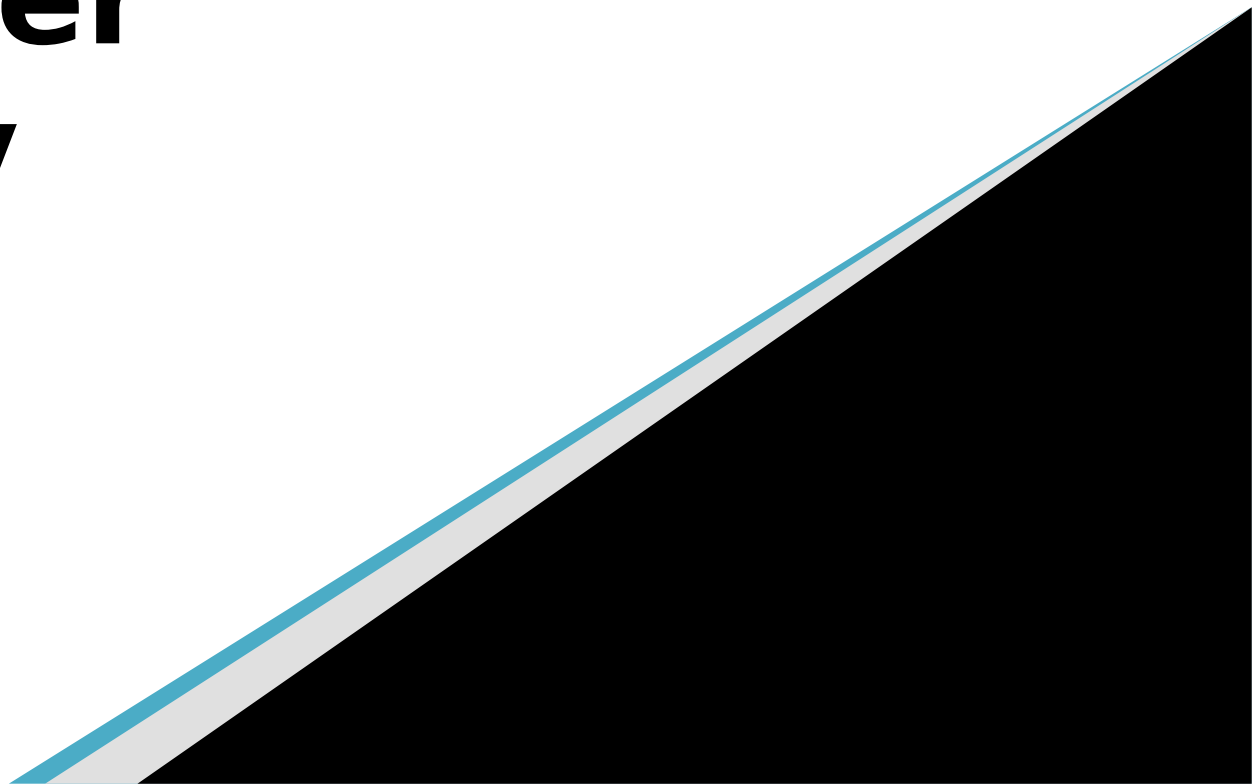
Computer Memory



1.Memory and Storage Devices

2.Primary Memory

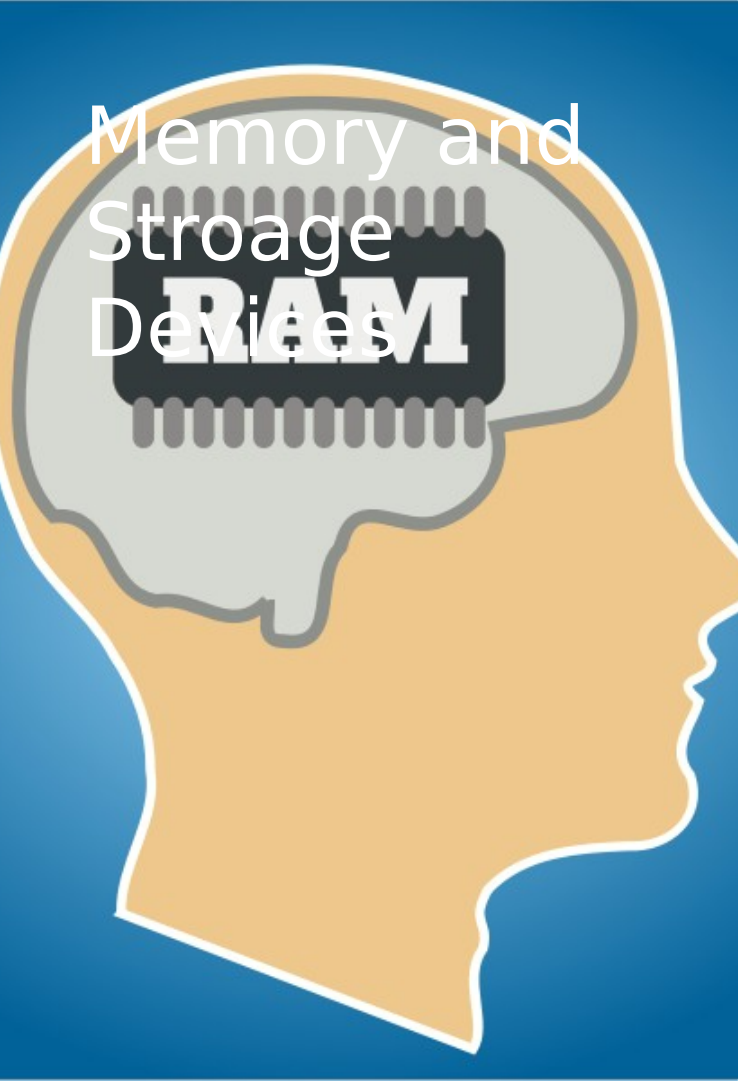
3.Secondary Memory

4.Cache Memory

5.Memory Hierarchy

By Atul Shukla

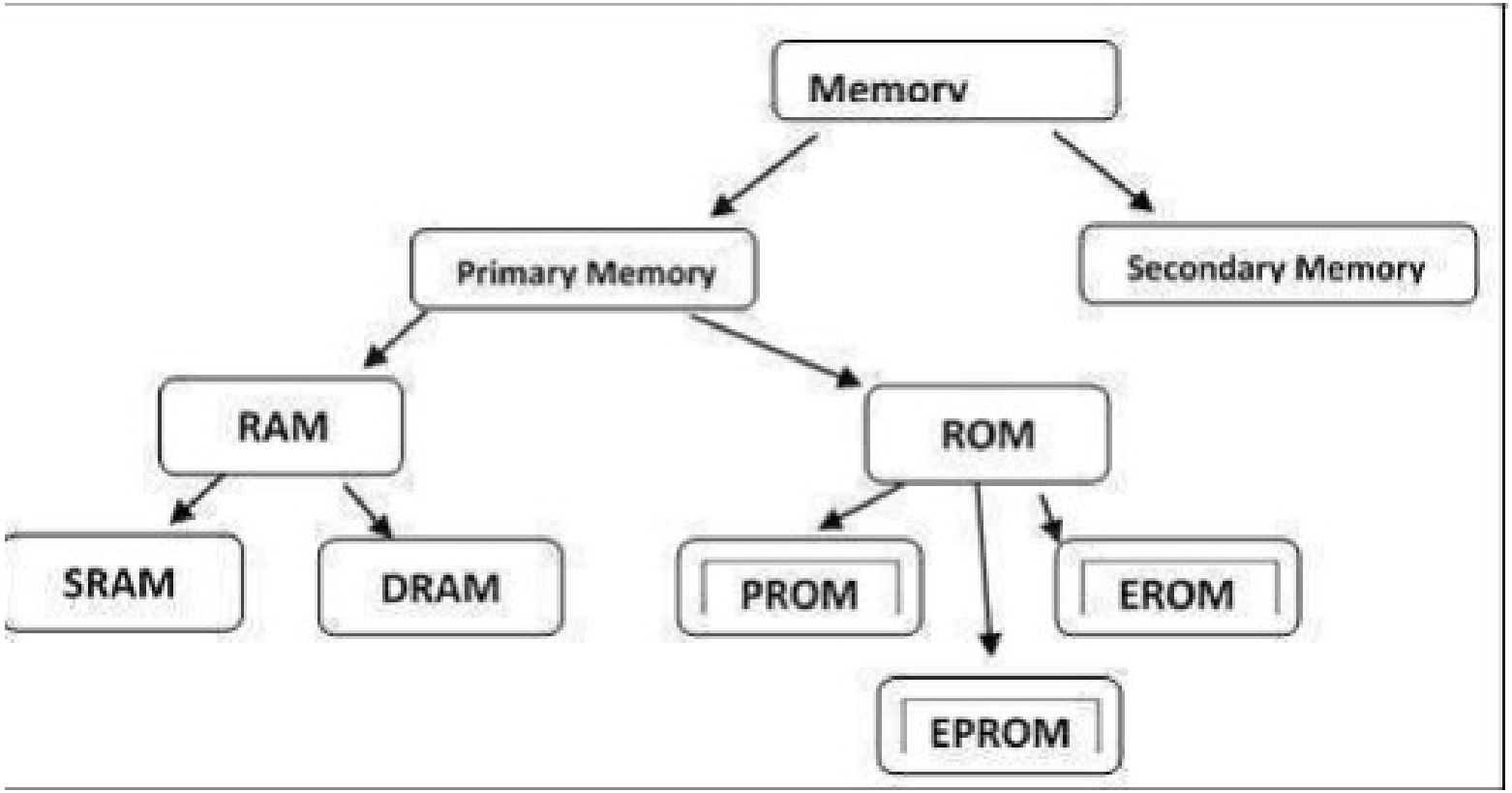
Memory and Stroage Devices



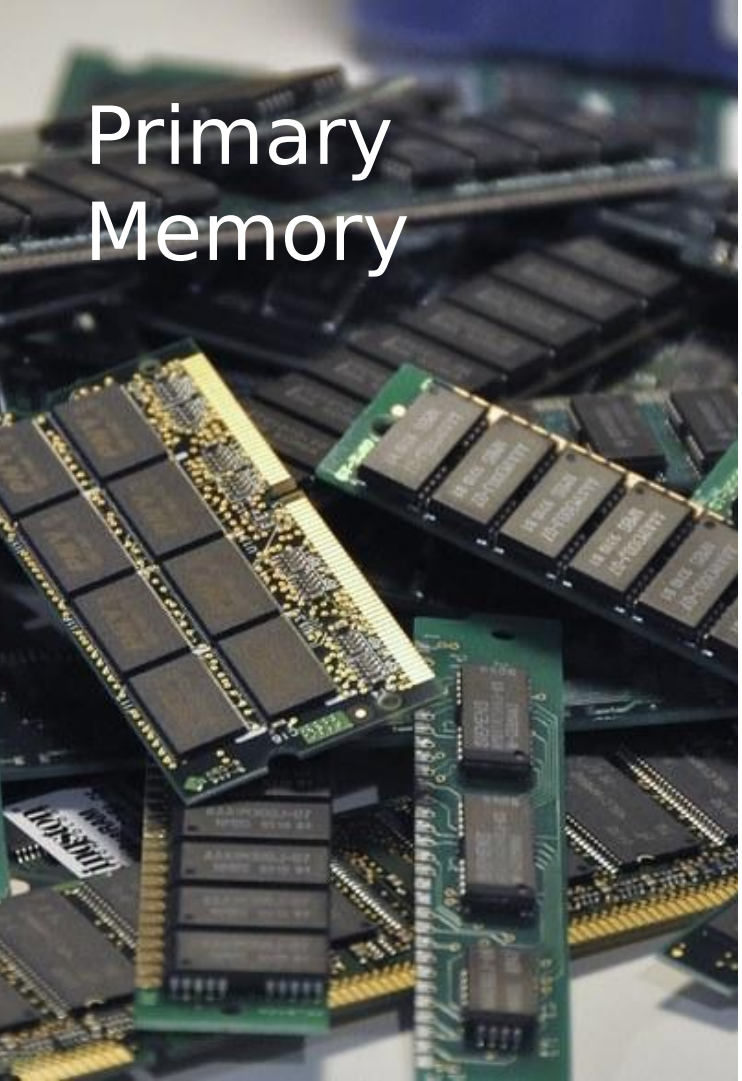
The memory unit of a computer is used to store data, instructions for processing data, intermediate results of processing and the final processed information. The memory unit of a computer is classified as primary and secondary memory.

By Atul Shukla

Types of Memory



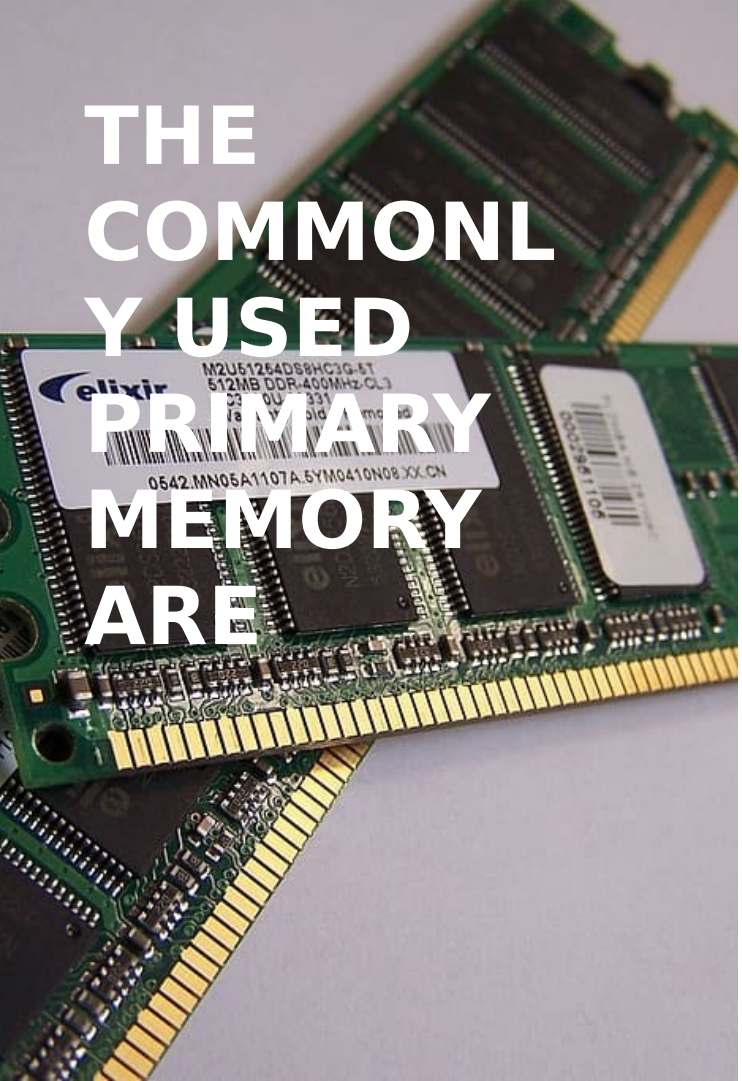
By Atul Shukla



Primary Memory

The primary memory is available on the computer as a built-in unit of the computer. The primary memory is represented as a set of location occupying 8 bits. Each bit in the memory is identified by a unique address. The data is stored in the machine understandable binary form in these memory locations.

By Atul Shukla



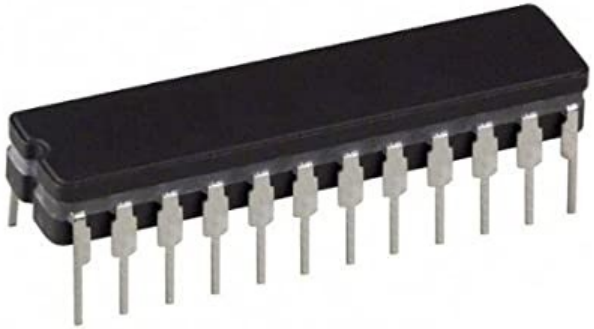
THE COMMONLY USED PRIMARY MEMORY ARE

Random Access Memory: - This is the primary memory from where data & instructions can be received in a random manner (RAM). It is a volatile memory in which the contents are lost once the power is turned off. The kind of memory is used to store the data temporarily during the computer operations.

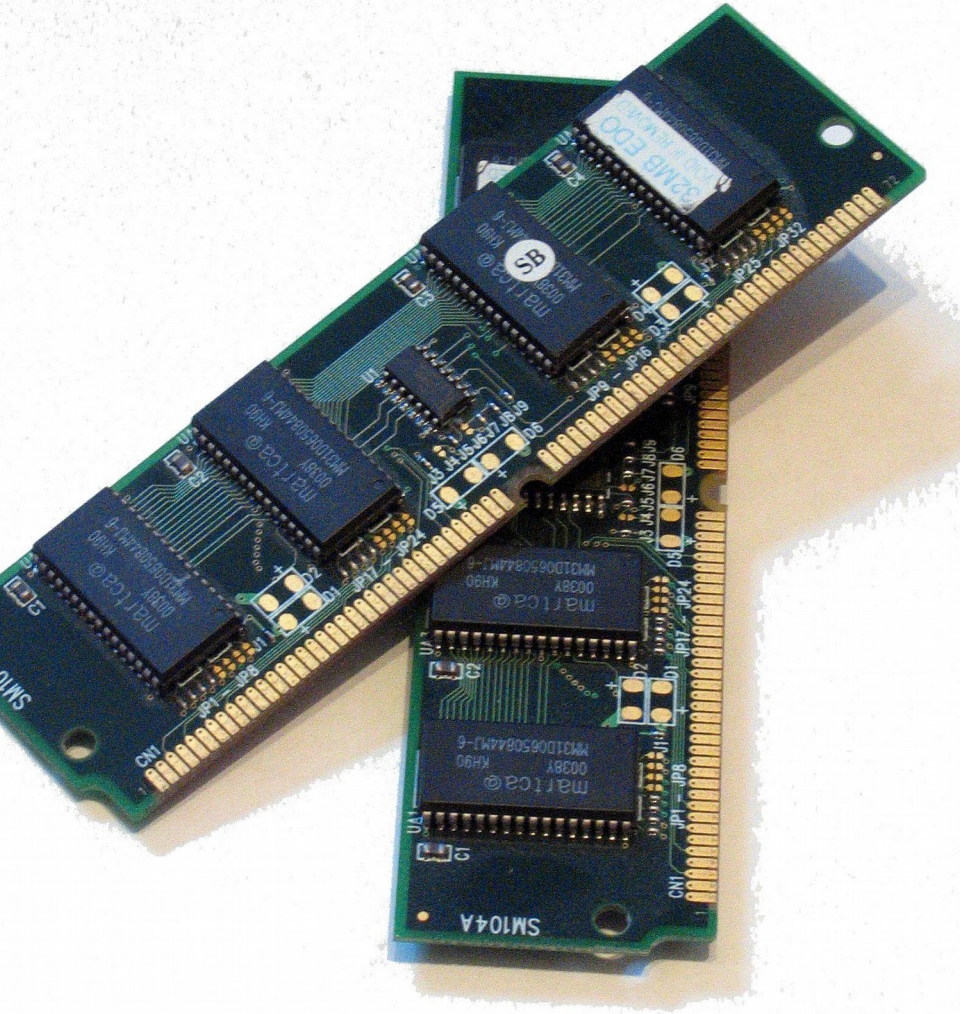
By Atul Shukla

Static random-access memory (SRAM):

It is a volatile memory based on traditional transistors using flip-flop gates to hold data if the power is on. The contents are lost once the power is turned off. It is very fast and that’s why used in the cache memory. The SRAM takes more space and is expensive too, but it is easy to use. It does not need to be refreshed periodically and synchronizes itself with



By Atul Shukla



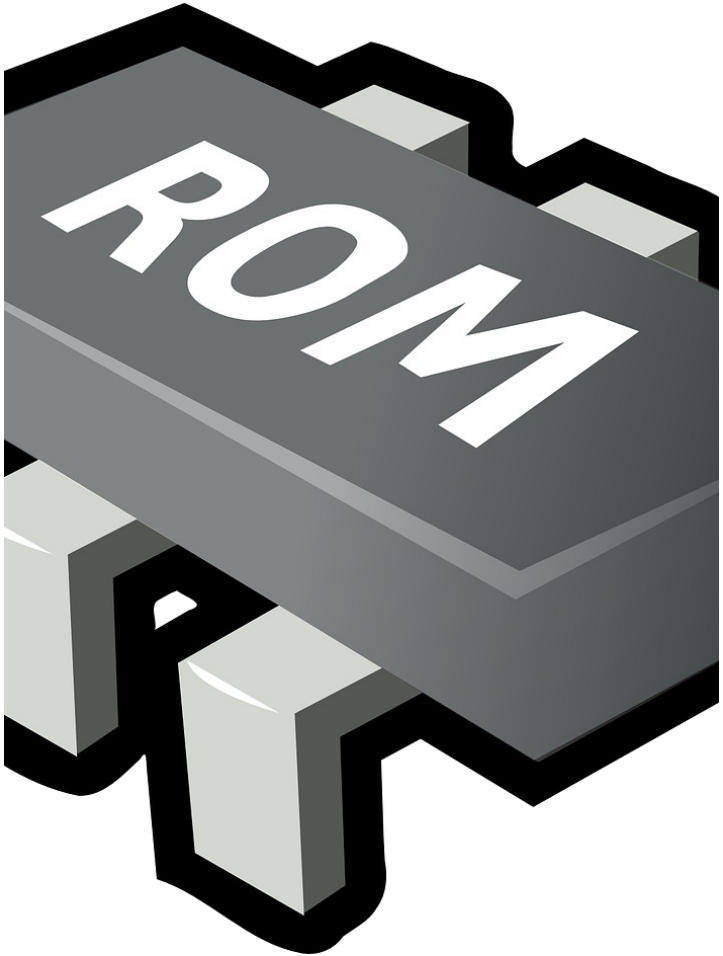
Dynamic random-access memory (DRAM):

It is a volatile memory based on the capacitors that hold data if the power is on. Due to discharging capacitors, the DRAM is refreshed periodically. This refreshing is done automatically, and due to the time consumed in refreshing. The DRAM is slow. It is inexpensive and takes less space; therefore, DRAM is used as the main memory.

By Atul Shukla

Read Only Memory:

ROM is a special type of memory which can only be read and contents of which are not lost even when the computer is switched off. ROM chips are used not only in computers but in most other electronic items such as washing machines, microwave ovens, calculators, laser printers, media players etc. It is not limited to electronic chips, CD ROM and DVD ROM.



By Atul Shukla

Masked read-only memory (MROM):

MROM is the oldest type of read-only memory whose program or data is pre-configured by the integrated circuit manufacture at the time of manufacturing. Therefore, a program or instruction stored within the MROM chip cannot be changed by the user.

Programmable read-only memory (PROM):

This is a kind of ROM has not been pre-recorded by the manufacturer but is supplied empty. The user of this ROM can store programs on it using a special tool. Once the empty ROM is programmed, it behaves like any other ROM, that is, it cannot be rewritten.

By Atul

Erasable programmable read-only memory (EPROM):

It is the type of read only memory in which stored data can be erased and re-programmed only once in the EPROM memory. It is a non-volatile memory chip that holds data when there is no power supply and can also store data for a minimum of 10 to 20 years. In EPROM, if we want to erase any stored data and re-programmed it, first, we need to pass the ultraviolet light for 40 minutes to erase the data; after that, the data is re-created in EPROM.

By Atul Shukla

Electrically erasable programmable read-only memory (EEPROM):

The EEPROM is an electrically erasable and programmable read only memory used to erase stored data using a high voltage electrical charge and re-programmed it. It is also a non-volatile memory whose data cannot be erased or lost; even the power is turned off. In EEPROM, the stored data can be erased and reprogrammed up to 10 thousand times, and the data erase one byte at a time.

By Atul Shukla

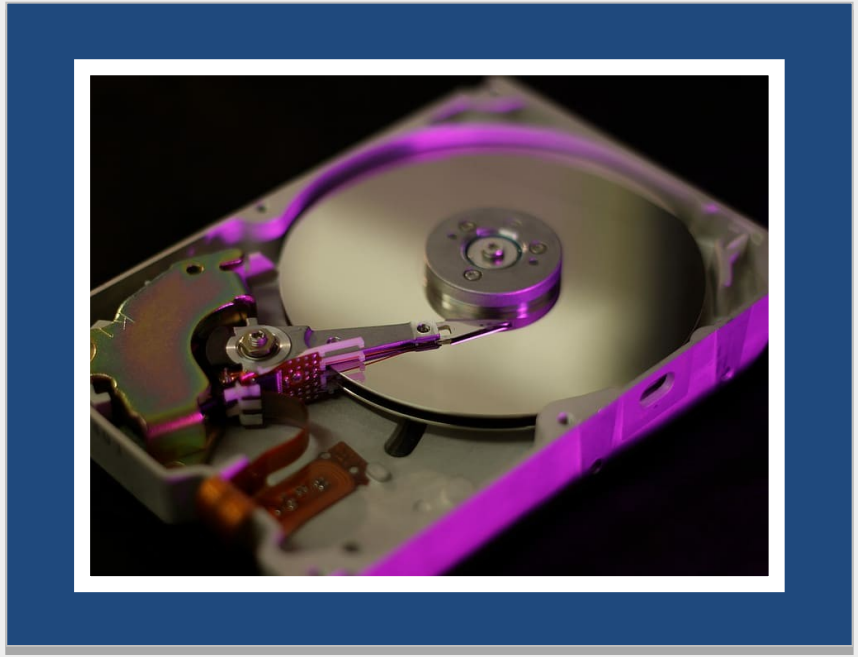
SECONDARY MEMORY: -

The secondary memory is the storage devices in which the data can be stored for a longer duration, and it is not lost even when the power is turned off. The hard disks, flash drive, floppy disks, CD-ROMs, and DVDs, etc., are examples of secondary memory. This memory has greater storage capacity than the primary memory. Also, it is inexpensive but slow.

By Atul Shukla

The secondary storage device can be classified as:

Magnetic Storage device: -The magnetic storage devices store information that can be read, erased and rewritten many times. These include a floppy disk, hard disk, and magnetic tapes.



By Atul

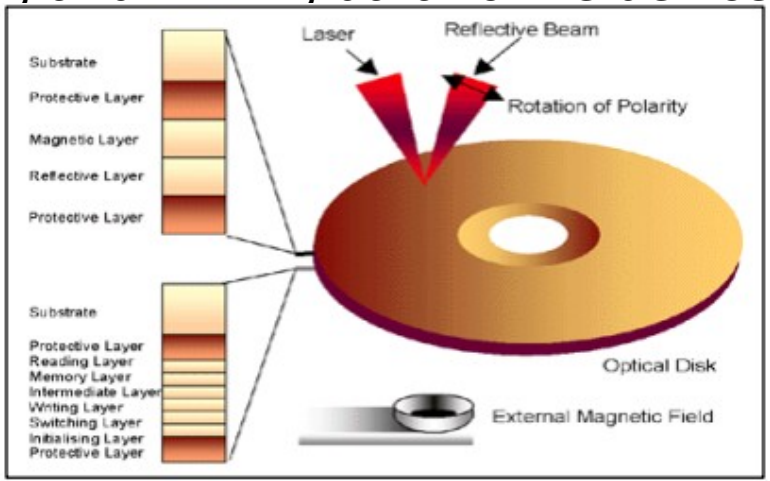
Optical storage device: -

The optical storage devices are secondary storage devices that use laser beams to read the stored data. These include CD-ROM, rewritable compact disk (CD-RW). Digital video disks with read-only memory, etc

By Atul Shukla

Magneto-optical storage device: -

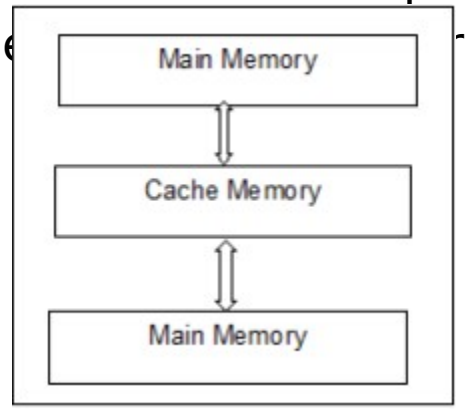
The magneto-optical devices are generally used to store information, such as large programs, files and backup data. The end user can modify the information stored in magneto-optical devices multiple times. These devices provide higher storage capacity as they use lease beams and magnets for reading and writing data to the device.



By Atul Shukla

CACHE MEMORY: -

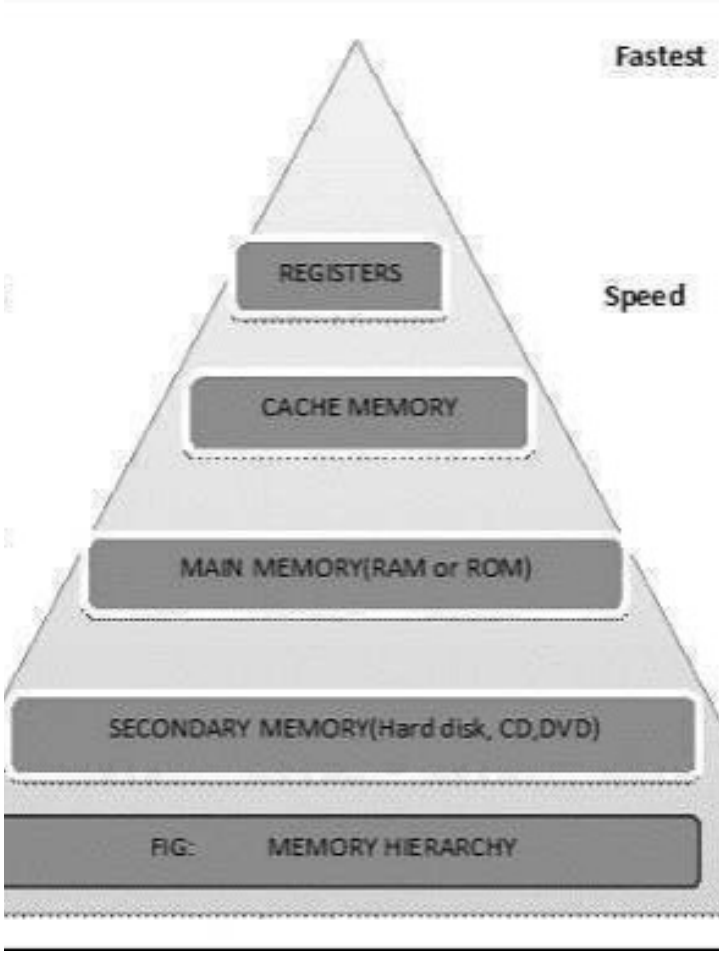
The cache memory is faster than the CPU registers and slower than the main or primary memory. It is a SRAM placed between the CPU and the main memory, and when CPU needs any data or instruction is found in the cache memory, it is retrieved by the CPU for processing. Otherwise, the main memory is searched for the same information. The most frequently used instructions and data are placed in the cache memory; therefore, the overall spee r is increased.



By Atul Shukla

MEMORY HIERARCHY: -

The computer requires different kinds of memory for its proper functioning. Since the fast memories are very expensive, therefore they cannot be used in excess. There is a hierarchy of memories considering their speed and cost. The registers are the fastest storage devices; even faster than the cache memory (SRAM), which is faster than the main memory.



By Atul Shukla

By Atul Shukla