COMPUTER ORGANISATION

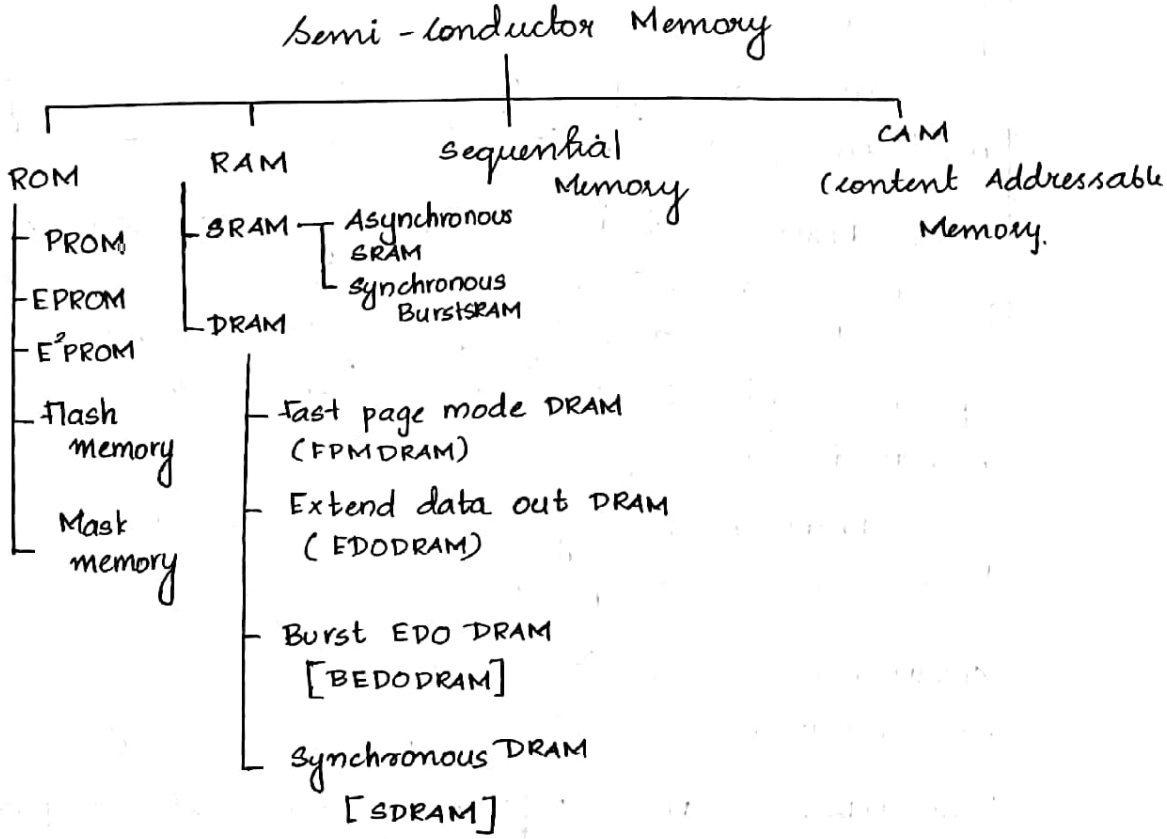
ASSIGNMENT

SEMICONDUCTOR MEMORY : Memories that consists of semi-conductors as basic element is called as semi-conductor memory.

It is a digital electronic semi-conductor device used for digital data storage, such as computer memory. This typically refers to MOS memory.

There are two main types or categories that can be used in semi-conductor technology. These memory types differentiate the memory to the way it operates.

(i) RAM : Random Access Memory. (Volatile)
(ii) ROM : Read only memory. (Non-Volatile)



RAM: Random Access Memory.

• Read and write memory of a computer.

User can write information to it and read information from it.

• RAM is volatile memory.

Information written in it can be accessed as long as power is ON. i.e Information cannot be accessed when power is OFF.

• RAM holds data and process it temporily until CPU needs it.

Types of RAM:

(i) Dynamic RAM [DRAM]:

• Type of memory typically used for data or program code that a computer processor needs to function.

• Common type of random access memory used in personel & computers, work stations and servers.

• DRAM must be continually re-written in order for it to maintain its data.

This is done by placing the memory on a refresh circuit that re-writes the data several hundred times per second.

• DRAM is mostly used for system memory because it is cheap and small.

ADVANTAGIES: Simple design, speed and low cost in comparison to alternate types of memory.

DISADVANTAGIES: Needs refreshing this adds complexity to memory design.

(ii) Static RAM (SRAM):

- Maintain data as long as power is provided to the memory chips.
- Need not be re-written periodically.
- Random access memory that retains data bits in its memory as long as power is being supplied.
- DRAM uses capacitors and transistors to store data and has to be periodically refreshed. But SRAM uses flip-flops to store data and need not be periodically refreshed.

ADVANTAGES: Faster access to data. SRAM is usually ≠ used as cache memory due to its speed.

DISADVANTAGE: Expensive.

ROM: [Read Only Memory]

- Non-volatile memory.
- class of storage medium used in computers and other electronic devices.
- Also known as firmware.
- Integrated circuit programmed with data when manufactured.
- The instructions for starting computers are on Read-Only-Memory chip.

Types of ROM:

(i) PROM: Programmable read only Memory:

- Users do not have authority to manipulate firmware yet they can customize the system.

- For customising, user has to convert program to microprogram and store them into ROM with the help of PROM programs.
- Once a PROM is programed it cannot be altered.
- Cost of preparing masks needed for storing a particular information pattern in ROMs makes them very expensive when only a small number are required.
- PROM provides a faster and considerably less expensive approach, because they can be directly programed by the user.

EPROM: Erasable Programmable Read only Memory:

- Facility to erase and ~~reprogram~~ re-program stored information. All this can be done by exposing the chip to ultra-violet light for a certain period.
- Non-volatile Memory
- one cannot modify or re-program the stored information until all the current information has been completely erased.
- since E-PROM is capable of retaining stored information for a long time they can be used in place of ROM while software is being developed. In this way memory changes and updates can be easily done.

E^2PROM: EEPROM: Electrically Erasable Programmable Read only Memory.

- Non-volatile Memory.
- Electronic circuit is used for erasing and re-programming High voltage electrical pulse is being used here.
- Suitable in applications that require program security, as well as making program changes and allowing online program changes.

• Disadvantage of EPROM is that; different voltages are required for erasing, writing and reading the stored data.

(iv) EAROM: Electrically Alterable Read-Only Memory.

• Combines characteristics of RAM and ROM.
• It is non-volatile like ROM, but can be written into by the processor.
• It can be re-programmed only a limited no: of times.
• It is a specialised read-only memory with special slow-write cycle and much faster read cycle, used with micro-processors and micro-computers.
• Only one-bit can be modified at a time.
• writing is a slow process and requires higher voltage (usually around 12V) than is used for read access.