

Unit 4 Semiconductor Main Memory

Introduction: In this topic we're going to learn how the operation of main memory with the help of semiconductor takes place. Therefore for performing such kind of memory cell plays an important role as all the operation related to the Semiconductor main memory gets performed with the help of cell only. We can't perform any type of operation without the help of memory cell.

In this case there are two states for

State 1 is termed as the on state and State 0 is considered as the off state.

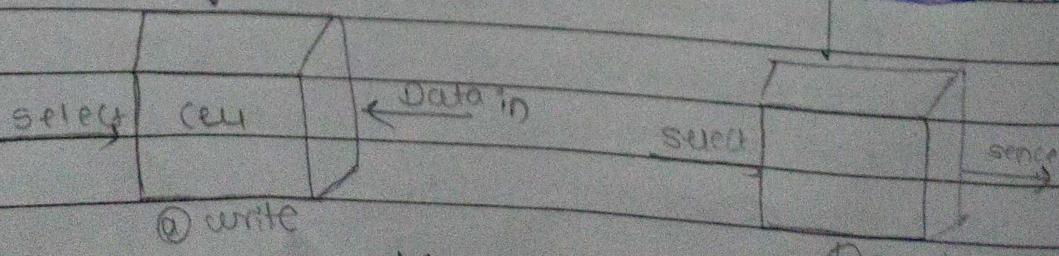
Semiconductor main memory can perform the operation of two types that is read operation and write operation.

For performing the write and read operation we have to follow these two diagrams:

Semiconductor main memory

The basic element of a Semiconductor memory is the memory cell. Its main properties are:

- They exhibit two stable states (1 and 0)
- They are capable of being written to set the state
- They are capable of being read to sense the state



1. Write operation

- While operating performing the write operation we first have to select the data that we want to store inside the semiconductor main memory.
- Afterwards the data will get stored in the cell and notification of the data is given to the control unit.
- If the control unit wants to store the data then it will give the permission to cell. Then, the data will get stored inside the semiconductor main memory in order to perform the write operation.

2. Read operation

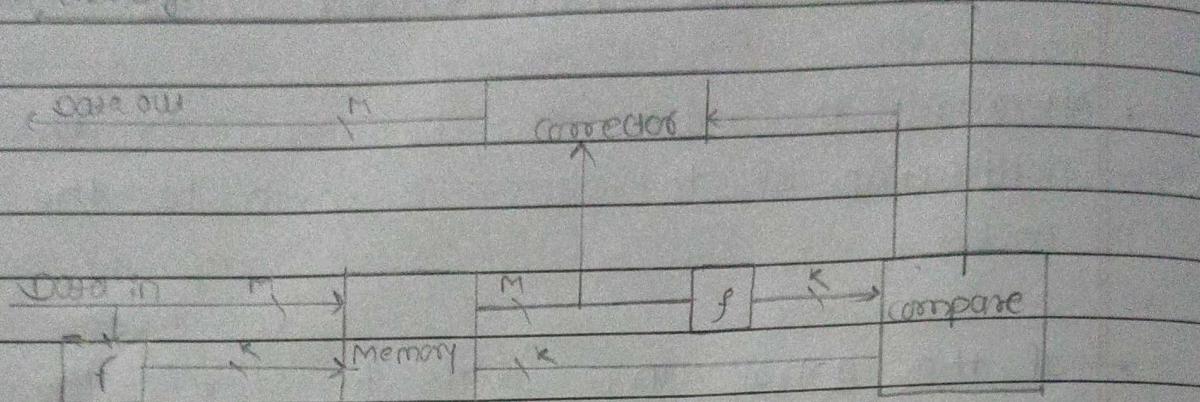
- Firstly we will send the data that we want to retrieve to the cell therefore the data will get stored inside the cell, cell will inform about the data to the control unit.
- Afterwards the control unit give permission to the cell then only the data will get retrieved to the user by the semiconductor main memory. In this way the operation of semiconductor main memory takes place.

Note:- Here the write operation is also termed as set in operation whereas read operation is termed as sense operation. In this way the semiconductors main main memory works.

* Error Correction

The diagrammatic representation of error correction is as follows.

(in signal) Detector using Hamming error correcting code.



In case of error correction there are two type of errors which occurs.

1. Hard failure:- It is a type of error which is permanent. These errors cannot be resolved at any stage. Therefore such type of errors which permanently damages the entire system and the errors cannot be resolved are called as hard failure or permanent defect error.

2. Soft errors- These errors are those type of errors which are random occurring errors therefore due to this non destructive error no permanent damage takes place to the memory. Therefore such type of the concept which causes normal errors and doesn't result in any destruction are known as soft errors. And these are random and non destructive with errors correction type of errors.

Error correction :- It is one of the very important step while resolving all type of error in the computer system. This is one of the best architectural view that every semiconductor main memory devices can construct in order to solve the problem. This concept is termed as error correction.

Error Correcting code consist of three parameters Data input , Data output as well as error signal data input will send the data and function in to the memory , the data can be directly send to the memory but the function has to go through the function block and then only it get rich to the functional block which is placed inside the memory as memory block consist of both function and data , if there are any errors in the data at that time the error data gets send to the correcter in order to correcter make your data error free therefore the error gets directly removes out from the data output zone but the function which consist of error , if firstly have to go to the functional block in order to shortout the error and make your code error free then the error free code will gets send to the compare block.

When the compare block is analized the data then it can be possible that compare block found the error containing code therefore the compare block will through the error outside of error signal zone and the functions which are there in order to compare such type of error free codes gets directly send to the output delivered block therefore such type of the mechanism is termed as error correcting code .

Virtual memory and cache memory

Virtual memory is not a real content and it can not be also seen by the naked eye: such type of memory which is not in a real manner such type of the memory is virtual memory.

Page 0

Page 1

Page 2

⋮

⋮

⋮

⋮

⋮

⋮

⋮

⋮

⋮

⋮

⋮

⋮

⋮

⋮

⋮

⋮

⋮

⋮

⋮

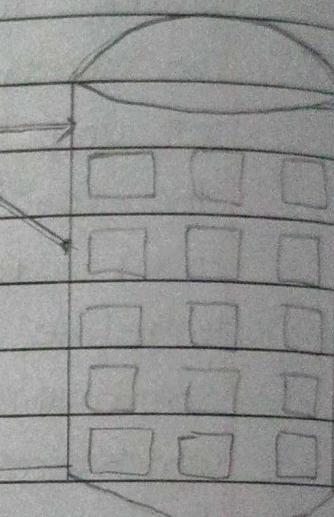
memory

map

Users

physical

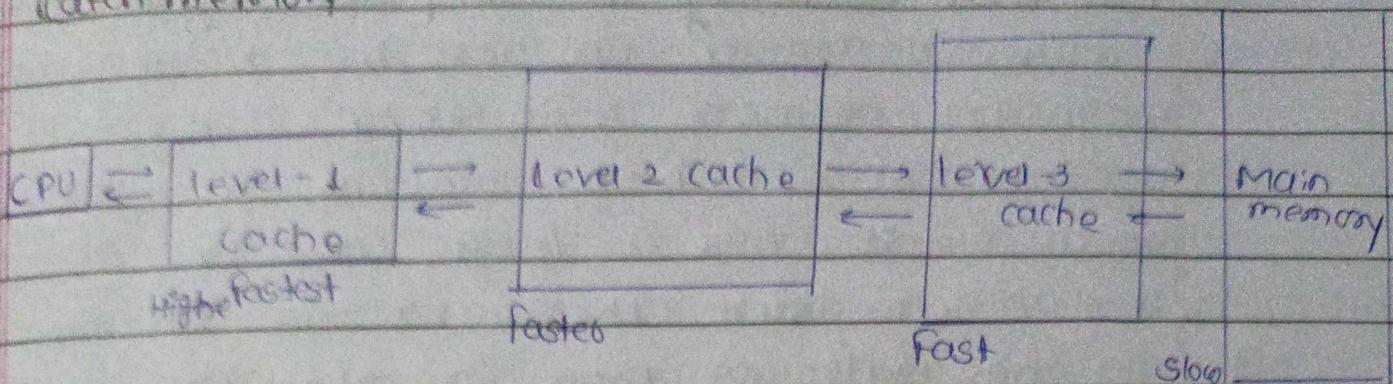
memory



Firstly the user will send request to the physical memory. Physical memory will pass the request to the Virtual memory. Then the Virtual memory will give its feedback to the memory map. Therefore memory map will send to the user feedback to the send message. Physical memory will convey.

In this way the operation of virtual memory will take place. This operation gets takes place in both the cases whether the response is yes or no.

Catch memory



Catch memory is a temporary memory which stores the data on temporary basis whenever main memory does not have in a space to store the data at that time catch memory is used.

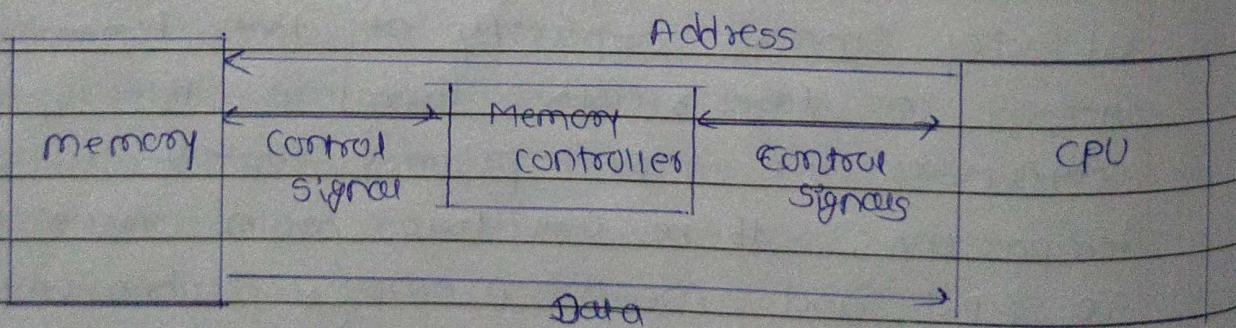
Here the data gets stored inside the catch memory the data get stored in the pattern of category stages therefore whenever we have the data of huge capacity at that time the data gets stored in level one catch but when the data is of medium range at that time the data gets stored in the level 2 catch memory but when the data is of very small capacity at that time it gets stored in level 3 catch therefore this type of catch contain is the very primary content to store it temporary, there are two main axes co-ordinates i.e. CPU and main memory whenever they both want to access the data at that time they can make use of any type of data according to their choice in this way catch memory gets work.

* External memory in computer organization
External memory can also be known as secondary memory or backing store. It is used to store a huge amount of data because it has a huge capacity. At present it can measure the data in hundreds of megabytes or even in gigabytes. The important property of external memory is that whenever the computer switches off, then stored information will not be lost. The external memory can be categorized into four parts :

1. Magnetic disk
2. Raid
3. Optical memory
4. Magnetic Tape

* Memory controller

The diagrammatic representation of memory controller is as follows



Memory controller is the particular component which is used to handle all the mechanism in between the Memory and the CPU in short way can say that memory controller is the particular mediator component which handles

all the operations related to the CPU and the memory unit therefore such component is termed as memory controller.

The operations of memory and CPU gets done by using the control signals therefore control signals have the responsibility to manage and handle all the data and address at the particular zone therefore whenever we want to perform a new operation at that time we should have to know about the proper address related to the data therefore by using this we can easily detect the contain and handle all the operations where the data is appropriately stored.

Working of memory controller is as follows.

firstly the data has been send from memory to the CPU, CPU stores the data appropriately and send the actual address where the exact data has been stored therefore by using this we come to no the actual data where the exact material gets stored. Such type of the concept is termed as memory controller.

Organization and characteristics of magnetic disk

The characteristics of magnetic disk is as follows:-

① Fixed Head Disk

- It consists of only one head that means it can perform read and write operation from the one end it is mounted on a particular arm which can cover maximum distance at one go therefore it is termed as the movable head disk also.

② Movable head Disk

= As the magnetic disk can cover huge distance and it performs all the track therefore we can cover the huge space.

③ Non-Removable Disk

= As it is a permanently mounted disk because it can not be changed once it is placed therefore such type of the permanent mounted track disk is termed as non-removable Disk because we can make the changes to it but we can not remove it.

④ Replaceable Disk

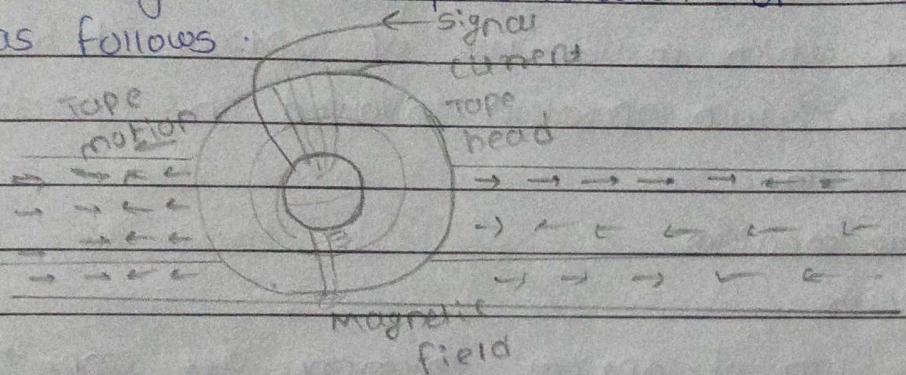
= When we want to remove the current disk at that time we have to replace that disk into another one. Floppy disk and zip cartridge are the examples of replaceable Disk. It can store unlimited amount of data and the disk can be move from one

computer system to another computer system
these are the advantages of replaceable disk

⑤ Double sided disk :- Double Sided disk are those Sided disk which can be used from both the sides therefore this type of contains are termed as the magnetic disk contains.

* Magnetic Tape

The diagrammatic representation of magnetic tape is as follows :



- ① Magnetic Tape is the first type of secondary storage device that we used of till now therefore the
- ② magnetic tape structure is same as that of the video tape that we used at home . Therefore we make
- ③ use of the 2400 fitt tape that is passed through the tape head in order to start the mechanism efficiently therefore tape head is also termed as the starting point of the magnetic tape . Therefore we have to make ^{use} of electrical current in order to use the magnetic tape therefore the magnetic tape will write the tape information in the form of small magnetic dots therefore we can say that small magnetic dots is used to represent the entire operation of the magnetic tape therefore this type of the concept is very much essential in order to

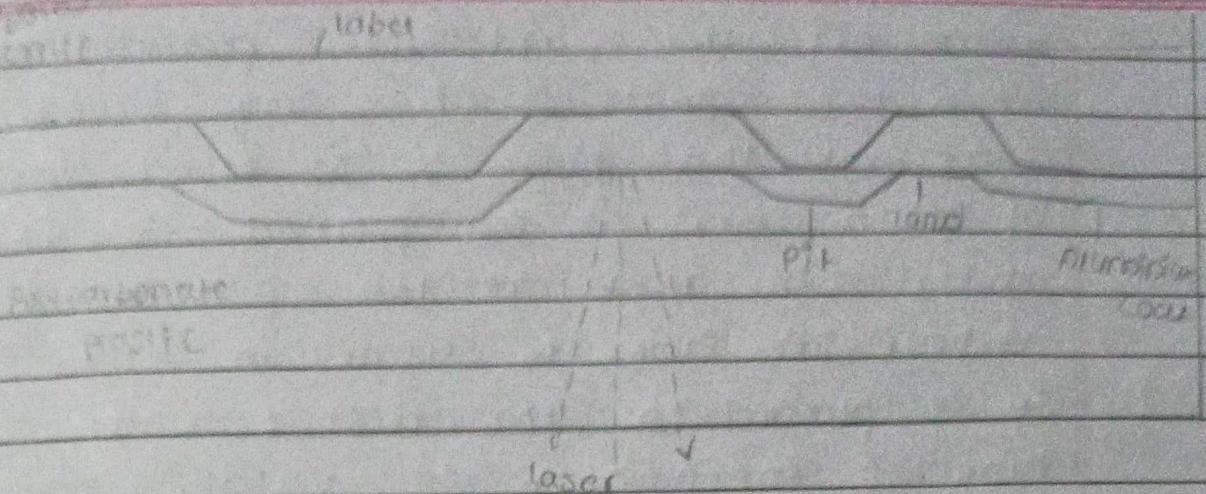
make use of the content very properly, where the magnetic dots are placed at that time the flux which is obtained is termed as magnetic field, in that flux the information gets printed and operation get performed, such type of the main secondary storage is termed as the magnetic tape.

Optical Memory

optical memory is the particular type of storage memory which make use of optical technique to further certain operation involved in optical memory.

- ① laser beam
- ② storage medium
- ③ detector

This type of optical memory get only use for audio that means we can make use of 75 min audio to the 650 megabytes of data. in this case we & the data get stored by the polycarbonate coated with aluminium therefore the data gets stored in the form of pits and land therefore we will read all the reflective laser, it will generate the information continuously one after the another by the optical memory here constant angular velocity is used firstly that in order to improve the quality of data we will require capacity constant linear velocity therefore such type of the component is the best mechanism of optical technique its scope is very high therefore we can use it at any time and at any range therefore this mechanism of optical disk storage contained is termed as optical memory.

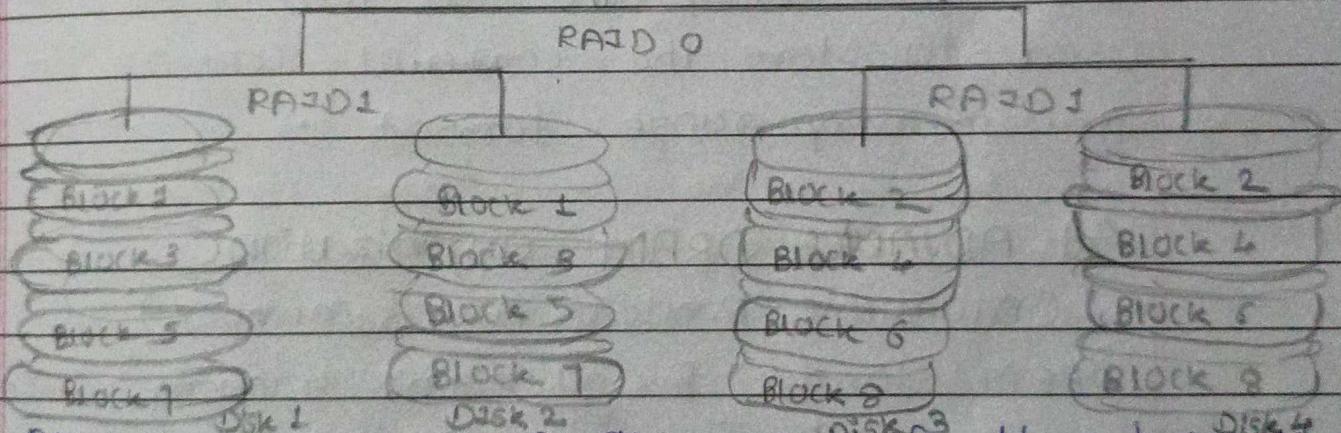


RAID

The diagrammatic representation of RAID is as follows

RAID 10

Disk striping and mirroring



RAID is a proper arrangement of the data layer all the concept of memory gets placed. The RAID is the form of array where all the work dedicated to the memory gets stored in the form of block when the operation of any memory location have to be done at that time the operation gets takes place in the disc 1 and disc 2 where all the blocks are used in order to perform the operation and work on those concept therefore this type of mechanism is used in order to

work on the particular pattern of data when the operation of any block gets done at that time it is used for compilation of data and it is placed in the disc and disc 2 therefore the parameter which is true in order to work on data then it is placed in the disc 1 and 2 . This type of mechanism is voidly use in order to stored the elements of content in a very proper way therefore RBid mechanism is one of the most popular mechanism in the computer architecture and organization when the operation of one entire disc gets completed at that time it is used to store the ~~content~~ content in a new memory range format .

At ADVANCE DRAM Organization

(Dynamic Random Access memory)

DRAM stands for dynamic random access memory , it ^{performs} all types of operation in a dynamic way therefore all the operation in both external architecture and interface gets takes place in both processor and memory with the help of bus . it can perform all types of operation regarding read and write concept gets takes place in a very concurrent way therefore this type of mechanism is voidly used for doing the concurrent work . It takes less amount of time for working and the all operation

Page: _____
Date: / /

get perform by using CPU therefore for performing the entire concept of dram we will make use of 'dianamic content'. one of the pattern of DRAM is Used that is enhanced DRAM when the DRAM is not in progress at that time we'll make use of all the component are the SRAM it stands for static random access memory therefore we will make use of SRAM in order to work and perform the necessary operation.