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Q No 1 Discuss each of the following

(a) Characteristics of Computer memory system?

Ans Following the characteristics of Computer memory system.

- (1) Location
  - (2) Capacity
  - (3) Access method
  - (4) Unit of transfer
  - (5) Performance
  - (6) Physical type
- etc.

(1) Location :-

This characteristic represent whether the location is external or internal to the computer.

(2) Capacity :-

It is most important

(2)

Characteristic of the memory system. It is different for external and internal memory.

(3) Access method:-

This characteristic has four types of method

- Direct
- Sequential
- Random
- Associate

(4) Unit of transfer:-

This characteristic measure the transfer rate of data in and out of the memory. It is different for both internal and external memory.

(5) Performance:-

It is also most important characteristic of the memory system. The following parameters need to be considered for different types of memory.

- Transfer Rate
- Memory cycle time
- Access time.

(6) Physical type:-

There are various types of memory such as

- (a) Magnetic (b) Semiconductor
- (c) Magneto-optical (d) Optical

(3)

(b)

Ans Following the cache memory write policies:

Write-through policy:

One of the

central caching policies is known as write-through policy. This means that data is stored and written into the cache and to the primary storage devices at the same time. One advantage of this policy is that it ensures information will be stored safely without risk of data loss.

Write-back policy:

The other well

known policy is called write-back. This method saves data only to the cache when processing, it is most important to note that there are only certain times or conditions where the information will also be written to the primary storage devices as well.

(c)

Ans

Micromicroprocessor acts as controller or brain of electronic devices. Without it even most high technology devices cannot be self

(9)

functioning. One of company that invented the microprocessor is Intel that established in USA and that first microprocessor invented in 1971. Microprocessor is a revolution of transistor which was invented in 1947 and from the invention of integrated circuit which was invented in 1958.

(d)

Ans Following the physical characteristics of magnetic disks.

- (1) The storage capacity of a single disk ranges from 10MB to 10GB. A typical commercial database may require hundreds of disks.
- (2) A disk controller interfaces b/w computer system and actual hardware of hard drive. It accept command to r/w a sector, and initiate actions.
- (3) SCSI (Small Computer System Interconnect) is commonly used to connect disks to PCs and workstations.

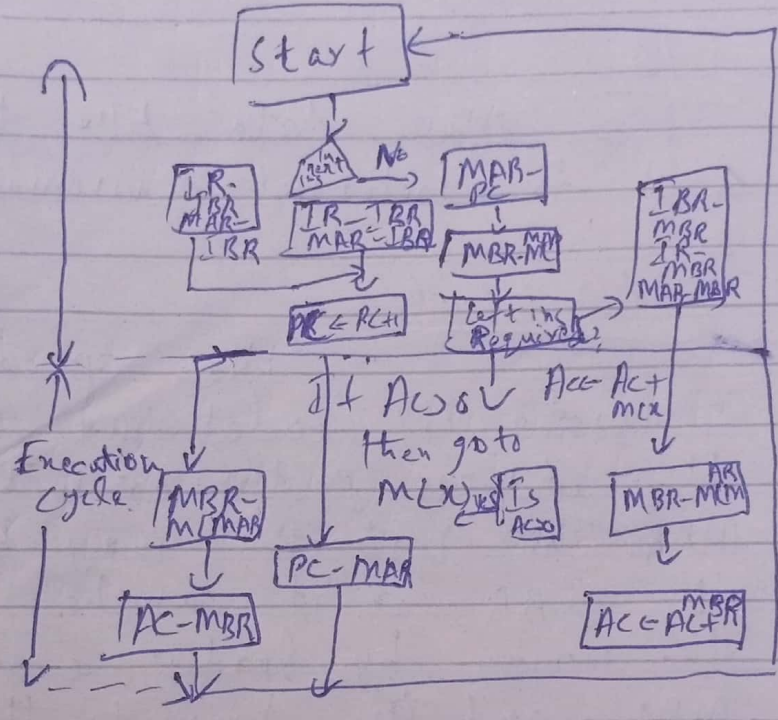
(e)

Ans Each scheme, or RAID level provides a different balance among the key goals: reliability, availability, performance and capacity. RAID level greater than RAID 0 provide protection against unrecoverable sector read errors, as well as against failures of whole physical drives.

Q No 2

Draw and explain each of the following?

(a) Flowchart for IAS operation?



$M(x) =$  contents of memory location whose address is  $x$ .

$(i:j) =$  bits  $i$  through  $j$ .

→ Instruction Register : (IR)

Contains 8 bits opcode instruction being executed.

→ IBR :-

Employed to hold temporarily the right hand instruction from a word in memory.

(6)

→ CRU :-

Controls the operation of the computer system and performs its data processing functions, offered simply as referred to processor.

I/O :-

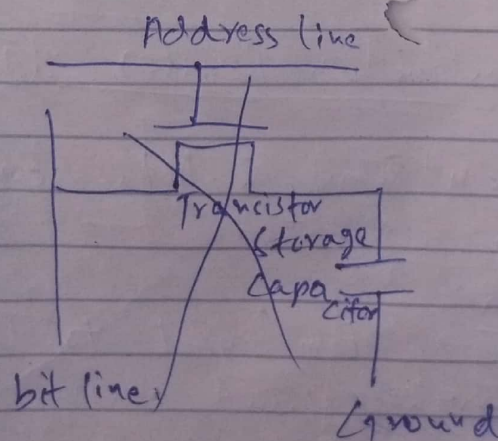
Move data b/w the computer and its external environment.

Fetch cycle :-

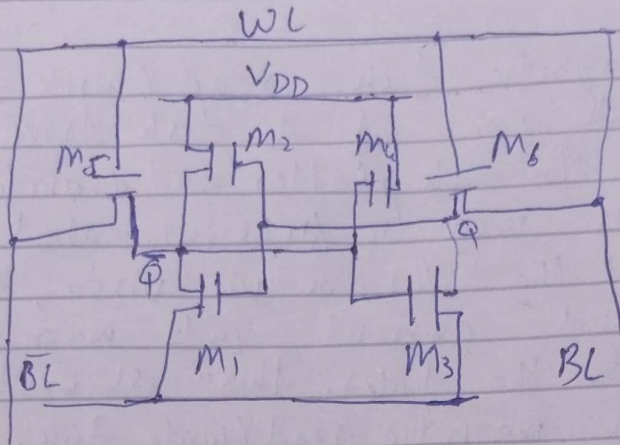
The opcode of next instruction is loaded into the IR and the address portion is loaded into the MAR. This instruction may be taken from the IBR, or it can be obtained from the memory by loading a word into the MBR, and then down to the IBR, IR and MAR.

(b)

Ans

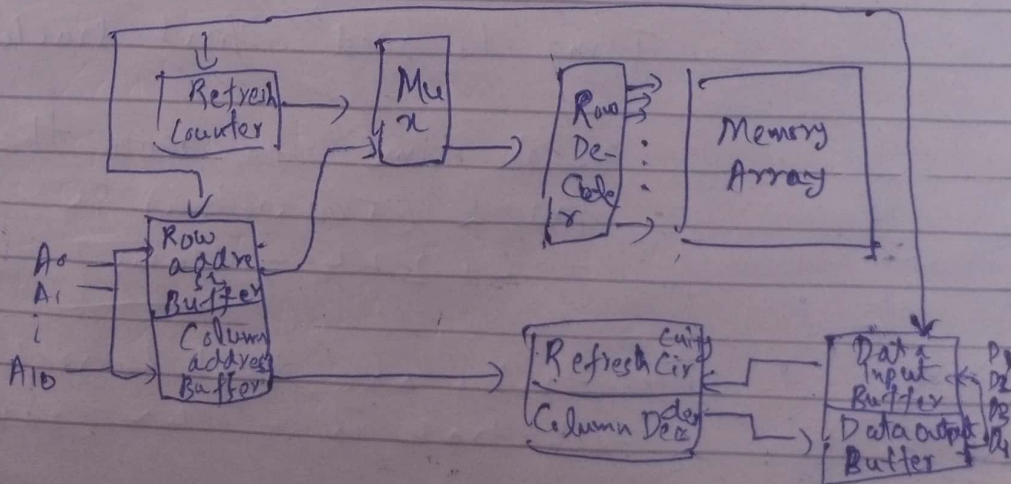
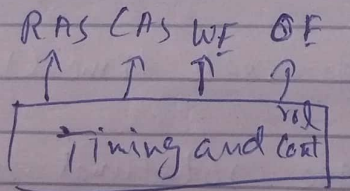


(7)



Static Random access memory is a type of memory that using latching circuitry (flip-flop) to store each bit. SRAM is volatile memory. Data is lost when power is removed.

(C)  
 ~~~~~  
 Ans



(D)

Ans

Magnetic disk read/write heads are small part of a disk drive which move above the disk platter and transform the platters magnetic field into electrical current (read the disk), or vice versa, transform electrical current into magnetic field (write the disk). This all mechanism is called magnetic read/write disk.

Q No 4

(a)

Sol

If consider the 2500 sectors are arranged on all of sectors on 5 adjacent tracks

$$5 \text{ track} \times 500 \text{ sectors/track} = 2500 \text{ Sectors}$$

$$\text{Average seek time} = 4 \text{ ms}$$

$$\text{Average rotational delay} = 2 \text{ ms}$$

$$\text{Time to read first track (500 sectors)} = 4 \text{ ms}$$

Total time to read the first track (500 sectors) is;

$$= 4 + 2 + 4 = \underline{10 \text{ ms}}$$

$$4 \text{ tracks are left to read} = 2000 \text{ sectors each track} = 4 \times (2+4) = 24 \text{ ms}$$



(9)

Avg seek time  $(t) \rightarrow 4 \text{ ms}$

total time to access  $\rightarrow 4 + 2 + 6 \cdot 0.008 = 6.008 \text{ ms}$

total transfer time  $= 2500 \times 6.008 = 15020$

Ans.

Q No 3

(a)

Ans

A split cache that consists of two physically separate parts, where one part, called the instruction cache is dedicated for holding instructions and the other, called the data cache, is dedicated for holding data, (i.e. instruction memory ~~operands~~ operands). And a cache that is not split called a unified cache.

(b)

Ans

A solid-state drive is a newer, faster type of device that stores data on instantly accessible memory chips.

A hard-disk drive (HDD) is an old-school

(b)

Storage device that uses mechanical platters and a moving read/write head to access data.

(c)

Ans  $\rightarrow$  For constant angular velocity (CAV) system, the number of bits per track is constant. An increase in density is achieved with multiple zoned recording in which the surface is divided into a number of zones, with zones further from the center containing more bits than zones closer to the center.

(d)

Ans  $\rightarrow$  HD DVD (Short for high definition Digital Versatile disk) is a discontinued obsolete high-density optical disc format for storing data and playback of high-definition video.

Blue-ray is a media format designed to replace the DVD format. Blue-ray uses different type of laser to read the disc, allowing more data to be stored on a single disc.