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19BCE1027

1. Compare the features of Magnetic disk, Optical disk and Magnetic tapes.

### MAGNETIC DISK

1. Media type used is Multiple fixed disk.
2. Intermediate signal to noise ratio.
3. Sample rate is Low.
4. Implemented where data is randomly accessed.
5. Only one disk can be used at a time.
6. Tracks in magnetic disk are generally circular.
7. The data in which the magnetic disk is randomly accessed.
8. In the magnetic disk, only ~~there~~ one disk is accessed at a time.
9. High cost
10. More reliability.
11. Less Access Time
12. More data transfer rate.
13. Used as secondary storage.
14. High/fast data accessing rate.
15. Data can be updated.
16. Less Portable.
17. Contains Round platters made up of plastic or metal.
18. Magnetic disk for data recording, magnetic material coated on both side of platter.

### OPTICAL DISK

1. Media type used is single removable disk.
2. Excellent signal to noise ratio.
3. Sample rate is high.
4. Implemented in streaming files.
5. Mass replication is possible.
6. In optical disks, data tracks are constructed spirally.
7. In the optical disk, the data is sequentially accessed.
8. Optical disk allows mass replication.

### MAGNETIC TAPES

9. Less cost.
10. Less reliability.
11. Less More access time.
12. Less data transfer rate.
13. Used as backups.
14. Slow Accessing rates.
15. Data can't be updated after fed-up of data.
16. More portable.
17. Contains reels of tape which is made up of plastic ~~or metal~~ strips.
18. In magnetic tape for data recording, magnetic material coated on single side of tape.

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- 2) If the TLB hit ratio is 0.6, 60 msec to access main memory and the 30 msec to search the TLB then find effective access time?

$$\text{TLB hit ratio} = 0.6$$

$$\therefore \text{TLB miss ratio} = 1 - 0.6 = 0.4$$

$$[\text{Time taken to access TLB (t)} = \cancel{10 \text{ ms}} + \cancel{60 \text{ msec}} + \cancel{60 \text{ msec}}]$$

$$\text{Time taken to access main memory (m)} = 60 \text{ ms}$$

$$\text{Time taken to access TLB (t)} = 30 \text{ ms}$$

$$\text{Effective Access Time} = 0.6 (\text{TLB search time} + 2 \times \text{memory access time}) * (1 - \text{hit ratio}) + (\text{TLB search time} + \text{memory access time}) \times \text{hit ratio}$$

$$= 0.6 (60 + 30) + 0.4 (30 + 2(60))$$

$$= 0.6 (90) + 0.4 (30 + 120)$$

$$= 0.6 (90) + 0.4 (150)$$

$$= \frac{6}{10} \times 90 + \frac{4}{10} \times 150$$

$$= 54 + 60$$

$$= 114 \text{ ms}$$

$$\begin{array}{r} 60 \\ 54 \\ \hline 114 \end{array}$$

- 3) In a paging system, the translation Look-aside Buffer (TLB) hit ratio is 50%, it takes 40 ns to search TLB and 120 ns to access the main memory. Compute effective memory access time.

Effective access time = hit ratio  $\times$  time during hit + miss ratio  $\times$  time during miss

$$\text{TLB time} = 40 \text{ ns}$$

$$\text{Memory time} = 120 \text{ ns}$$

$$\text{Hit ratio} = \frac{50}{100} = 0.5$$

$$\begin{aligned}\text{Miss ratio} &= 1 - \text{Hit ratio} \\ &= 1 - 0.5 \\ &= 0.5\end{aligned}$$

$$\begin{aligned}\text{E.A.T} &= 0.5(40 + 120) + 0.5(40 + 2(120)) \\ &= 0.5(160) + 0.5(40 + 240) \\ &= 0.5(160) + 0.5(280) \\ &= 80 + 140 \\ &= 220 \text{ ns}\end{aligned}$$

4) A TLB-access takes 15 ns, hit ratio is 92% and physical memory access takes 45 ns. What is effective memory access time?

$$\text{TLB time} = 15 \text{ ns}$$

$$\text{Hit ratio} = \frac{92}{100} = 0.92$$

$$\text{Miss ratio} = 1 - 0.92 = 0.08$$

$$\text{Memory time} = 45 \text{ ns}$$

$$\begin{aligned} \text{E. A. T} &= 0.92(15 + 45) + 0.08(15 + 2(45)) \\ &= 0.92(60) + 0.08(15 + 90) \\ &= 0.92(60) + 0.08(105) \\ &= 55.2 + 8.4 \\ &= 63.6 \text{ ns} \end{aligned}$$