COA

Chapter 06: | Example

Prof. Dr. Mostafa Elhosseini

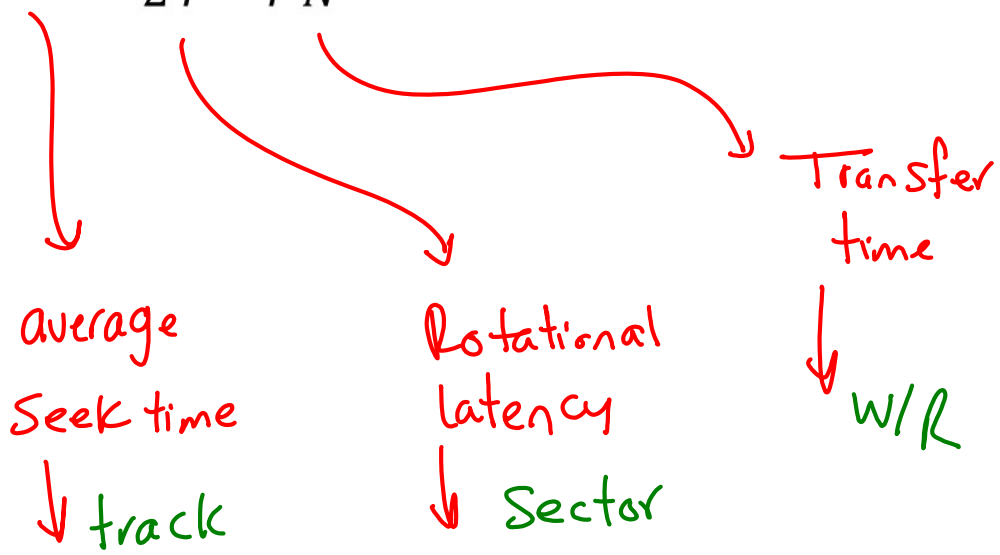
https://youtube.com/drmelhosseini

AGENDA

- Example

Total Average Access Time

$$T_a = T_s + \frac{1}{2\,r} + \frac{b}{r\,N}$$



Example

- Consider a disk with an advertised average **seek time** of 4 ms, **rotation speed** of 15,000 rpm, and 512-byte sectors with 500 sectors per track. Suppose that we wish to **read a file consisting of 2500 sectors for a total of 1.28 Mbytes**. We would like to **estimate the total time for the transfer**

average Rotational delay = 2 ms

Sector size = 512 byte

sectors/track = 500

$T_S = 4$ ms

$r = 15000$ Rpm $= \frac{15000 \text{ Rev}}{1 \text{ min}} = \frac{15000 \text{ Rev}}{60 \text{ Sec}}$

$= \frac{1 \text{ Rev}}{4 \text{ ms}} = \frac{1}{4}$ Rev/ms

5 track * 500 sector/track = 2500 Sector

$$T = \frac{b}{rN} = \frac{500}{r * 500} = \frac{1 * 60 * 1000}{15,000}$$

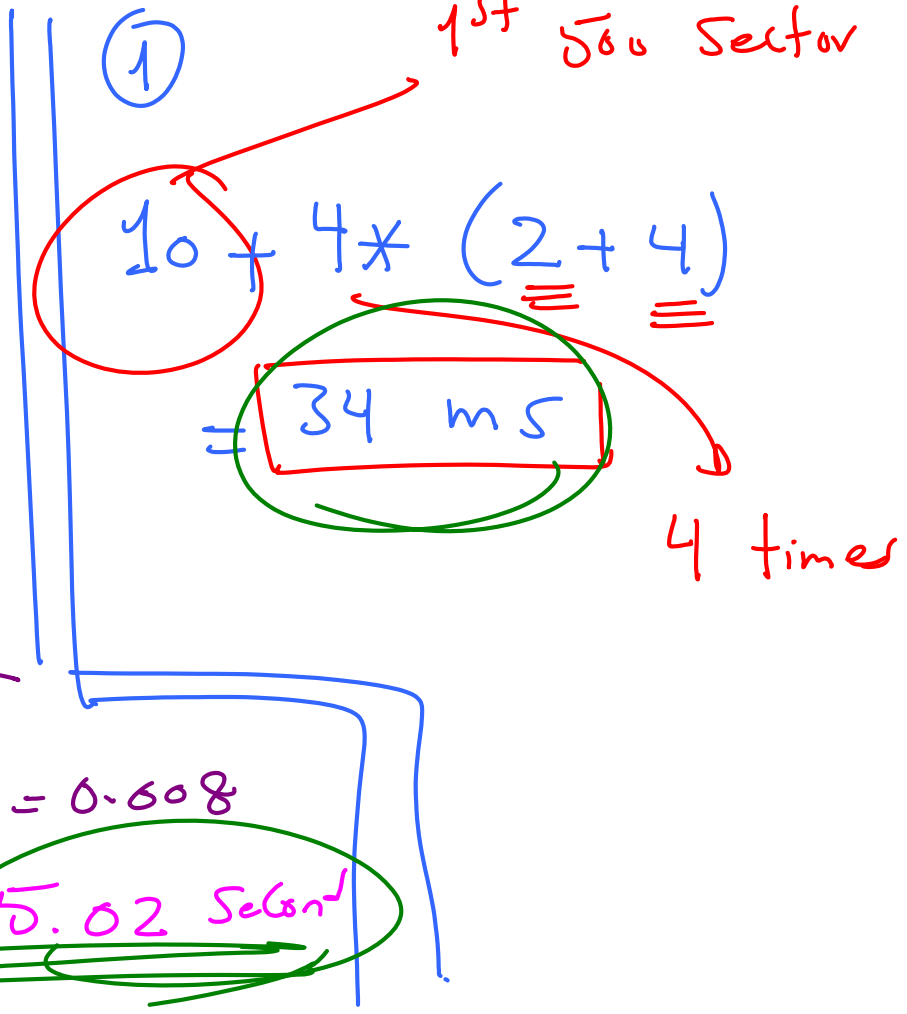
$= 4$ ms $\Rightarrow$ to read 500 sector

$\Downarrow$

one track

- Average seek ⇒ 4 ms
- Average Rotational delay ⇒ 2 ms
- Read 500 Sector ⇒ 4 ms

10 ms



② $T = \frac{b}{r N} = \frac{1 * 60 * 1000}{15000 * 500} = 0.008$ ← 1 sector

Total = 2500 * (4 + 2 + 0.008) = 15.02 Second

Note...

- The **order** in which sectors are read from the disk has a tremendous **effect** on **I/O performance**
- we **have some control over the way in which sectors of data are deployed**.
- **Multiprogramming environment**, there will be I/O requests competing for the same disk.
- **Disk scheduling algorithms**