Solution [1]Assignment 2

Question 1.

Consider a disk with an "*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 5000 sectors for a total of 2.56 Mbytes. What is the total time of transfer?

Solution

Data
Ts = 4ms

Rotation Speed = 15,000 rpm
r   = 15000/60 rev per secs
Rotational Delay: 1/2r = 60/(2*15000) = 2ms

500 sectors per track. 512 byte of 1 sector.
5000 sectors will be on 10 tracks.
Time to read 500 sectors = b/rN
b = 512 * 500
r = 15000/60
N = 512* 500

$$\frac{b}{rN} = \frac{(512*500)}{} * \frac{60}{15000} * \frac{1}{(500*512)}$$

$$= 4ms$$

Therefore, time to read first track = Ts + Rotational Delay + Read 500 sectors
$$= 4ms + 2ms + 4ms = 10ms \qquad (Eq1)$$
Assuming, no seek time is required for subsequent tracks, each successive track is read in 2 + 4 = 6ms   (Eq2)

Therefore, using Eq1 and Eq2,
Total Time of transfer for 10 tracks is = 10 + (9*6)
$$= 10 + 54$$
$$= 640ms$$

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Question 2

Using two- and three- address instructions, compute

Total_Marks = [(Quiz1 + Quiz2 + Quiz3)/3 + Mids + Finals]*0.7 + [Labs * 0.3]

Solution

Using Three Addresses:

ADD Total_Marks, Quiz1, Quiz2
ADD Total_Marks, Total_Marks, Quiz3
DIV Total_Marks, Total_Marks, 3
ADD T, Mids, Finals
ADD Total_Marks, Total_Marks, T
MPY Total_Marks, Total_Marks, 0.7
MPY T, Labs, 0.3
ADD Total_Marks, Total_Marks, T

Using Two Addresses:

MOVE Total_Marks, Quiz1
ADD Total_Marks, Quiz2
ADD Total_Marks, Quiz3
DIV Total_Marks, 3
ADD Total_Marks, Mids
ADD Total_Marks, Finals
MPY Total_Marks, 0.7
Move T, Labs
MPY T, 0.3
ADD Total_Marks, T