End Of Chapter 10 Exercises

Q1)  A multiplattered hard disk is divided into 1100 sectors and 40,000 cylinders. There are six platter surfaces. Each block holds 512 bytes. The disk is rotating a rate of 4800 rpm. The disk has an average seek time of msec. What is the total capacity of this disk?

Sol: Capacity of the disk is 1100\*40000\*6\*512 =135168000000bytes

Q2) The average latency on a disk with 2200 sectors is found experimentally to be 110 msec. What is the rotating speed of the disk?

Sol: 110ms is 9 spins a second. So, for 60 seconds in a minute the rotating speed of the disk will be 9\*60 = 540RPM

Q3) For a display of 1920 pixels by 1080 pixels at 16 bits per pixel how much memory, in megabytes, is needed to store the image?

Sol: 1920 \* 1080 = 2,073,600 pixels

2,073,600 pixels \* 2bytes/pixel = 4,147,200 bytes

Convert to megabytes: 4,147,200 bytes (1 MB / 1048576 bytes) = 3.955MB

Where 1MB = 2^20B = 1,048,576

Q4)  What is the average rotational latency of a hard drive rotating at 7,200 RPM or 120 revolutions per second? (Give your answer in milliseconds)

Sol: Formula from text: average latency time = ---------- x ----------------------------

2 rotation speed

Change rotational speed to revolution per sec: 7200 rev/min x [1 min / 60 sec] = 120 rev/sec

1 1

Average latency time = ---------- x ------------------ = 0.004167 sec or 4.167 ms

2 120 rev/sec

Q5) What is the transfer time for a hard drive rotating at 7,200 RPM or 120 revolutions per second? Assume there are 30 sectors per track. (Give your answer in milliseconds)

Sol: From formula in text: Transfer time = --------------------------------------------

Number of sectors x rotational speed

1 1

Transfer time = --------------------- x ----------------------- = .000278 sec or .278 ms

30 sector/track 120 rev/sec