PREPARATION FOR QUIZ 3 Calculation Exercises, Examples

Please review all formulas on pg # 299-310 Chapter 10.

Magnetic Disks

What is the capacity of a hard drive (in GB) consisting of 120,000 tracks, 4,000 sectors, and 4 surfaces? Assume each block has 512 bytes.

Sol: On one surface, the size is 120,000 x 4,000 x 512 bytes = 245,760,000,000 bytes
Convert to GB: 245,760,000,000 bytes per surface *(1G / 2^30 bytes) = 228.9 GB per surface
Total capacity of drive is [4 surfaces] * [228.9 GB / surface] = 916 GB

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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 = $\frac{1}{2} \times \frac{1}{\text{rotation speed}}$

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

Average latency time = $\frac{1}{2} \times \frac{1}{120 \text{ rev/sec}}$ = 0.004167 sec or 4.167 ms

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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 = $\frac{1}{\text{Number of sectors x rotational speed}}$

Transfer time = $\frac{1}{30 \text{ sector/track}} \times \frac{1}{120 \text{ rev/sec}}$ = .000278 sec or .278 ms

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