Cpe434 spring 2021

Homework Chapters 13 and 14

For the following problems assume a disk with the following specifications

6000 rpm

1024cylinders

8 surfaces

10240 sectors per track

512 bytes per sector

minimum track to track seek time 0 ns

minimum track to track head switch time 0 ns

minimum cylinder to cylinder seek time 1 ms (one cylinder)

average cylinder-to-cylinder seek time 5 ms (512 cylinders)

maximum end to end (first cylinder to last cylinder) seek time 10 ms

maximum data transfer rate of disk interface 100 MB per second

1 (20 points) What is the maximum transfer rate this disk system can sustain, in MB per second, in reading the entire disk from front to back, assuming there is no skewing of sectors, and the upper limit of the disk interface is 100 MB per second. SHOW YOUR WORK

2. (20 points) How would this transfer data rate change if you had the optimal skew of sectors for this task- reading the entire disk from front to back. What is that skew.

3. (20 points) What is the maximum transfer rate of this disk if you only wanted to read the first cylinder, the heads are located at the first cylinder at start-up, and the heads are at sector 0 when you issue the read command.

4. (20 points) If you had an option of using a raid disk system, which one would you chose to give maximum robustness in case of a single disk failure. Explain your answer.

5. (20 points) If you had 8 of these disks in a Raid 1 configuration, would that provide more, less or the same immunity to malware which encrypted your disks with a secret password.