Tutorial 9
Chapter 10 – Mass Storage Structure
Operating Systems Comp Sci 3SH3 Term 2, Winter 2022
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Tutorials are not mandatory. They are simply a tool for you to understand the course concepts better.

Tutorial Format: The questions will be posted a day before or on the day of the tutorial on the course website. You can choose to solve these problems beforehand and come in with your solutions. I or one of the TAs helping me will check your solutions. If you have all of the questions correct you can choose to leave. If you have any of them incorrect, it is recommended that you stay and understand the solutions.

Solutions to the tutorial will not be posted online.

Question 1: Explain why SSTF scheduling tends to favor middle cylinders over the innermost and outermost cylinders.

Question 2: Explain why SSDs often use a FCFS disk-scheduling algorithm?

Question 3: Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 2150, and the previous request was at cylinder 1805. The queue of pending requests, in FIFO order, is:

2069, 1212, 2296, 2800, 544, 1618, 356, 1523, 4965, 3681

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms?

1. FCFS =
2. SSTF =
3. SCAN =
4. LOOK =
5. C-SCAN =
6. C-LOOK =

Question 4: Consider a RAID Level 5 organization comprising five disks, with the parity for sets of four blocks on four disks stored on the fifth disk. How many blocks are accessed in order to perform the following?

a. A write of one block of data
b. A write of seven continuous blocks of data

Question 5: Compare the performance of write operations achieved by a RAID Level 5 organization with that achieved by a RAID Level 1 organization.

Question 6 Assume that you have a mixed configuration comprising disks organized as RAID Level 1 and as RAID Level 5 disks. Assume that the system has flexibility in deciding which disk organization to use for storing a particular file. Which files should be stored in the RAID Level 1 disks and which in the RAID Level 5 disks in order to optimize performance?

Question 7: Discuss the reasons why the operating system might require accurate information on how blocks are stored on a disk. How could the operating system improve file system performance with this knowledge?