

EECS 343: Homework 4

I/O and File Systems

Fall 2014

Important Dates

Out: November 22, 2014.

Due: December 3, 2014, 11:59PM CDT.

Submitting your assignment: Please use the course submission site. There is a link to it from the class site.
Submit only ASCII text files.

Problems

1. Discuss at least two advantages and one disadvantage of Memory-mapped I/O.
2. Disk requests come in to the disk driver for cylinders 10, 22, 20, 2, 40, 6 and 38, in that order. A seek takes 6 msec per cylinder moved. How much seek time is needed for the following algorithms. In all cases, the arm is initially at cylinder 20.
 - (a) FCFS:
 - (b) SSTF:
 - (c) C-SCAN (initially moving upward and cylinders range within $[0,40]$):
 - (d) C-LOOK: (initially moving upward):
3. Free disk space can be kept track of using a free list or a bitmap. Disk addresses require D bits. For a disk with B blocks, F of which are free, state the condition under which the free list uses less space than the bitmap. For D of 16 bits, express your answer as a percentage of the disk space that must be free.
4. How does the Fast File System try to optimize storage utilization and file system performance over the traditional UNIX file system? Briefly explain your answer.
5. List and briefly discuss at least two of the observations that motivated the work on Log-Structured File systems.