

CS418: Operating Systems—**Assignment 1 (10 marks)**

This assignment is on device management. Write a program that will simulate the FCFS, SSTF, LOOK, C-LOOK seek optimization strategies. Assume the following:

- a. The disk's outer track is the 0 track and the disk contains 250 tracks per surface. Each track holds eight sectors numbered 0 to 7. Initially, the head is at track 0, sector 0.
- b. A seek takes  $10 + 0.1 \cdot T$  ms, where  $T$  is the number of tracks of motion from one request to the next, and 10 is a movement time constant.
- c. One full rotation takes 8 ms (i.e., it takes 1 ms to move from the current sector to the next one). The head can rotate in only one direction on a track: sector  $0 \rightarrow 1 \rightarrow \dots \rightarrow 7 \rightarrow 0$ . Transfer time is 1 ms.

You need to do the following.

(1.1) Use the following data to test your program:

Arrival time	Track requested	Sector requested
0	54	0
23	132	6
26	29	2
29	23	1
35	198	7
45	170	5
57	180	3
83	78	4
88	73	5
95	249	7

For comparison purposes compute the average, variance, and standard deviation of the turnaround time to service all requests under each of the strategies. (Turnaround time of a request  $q =$  Finishing time for  $q -$  Arrival time for  $q$ . Better to have a table for comparison.)

(1.2) Run your program again with randomly generated data (50 requests: arrival time 0—99, track 0—249, sector 0—7 and you should sort the random data according to their arrival time). Then compare your results again. Based on your empirical results, determine which policy is the best and explain why.

**Date Due:** before the end of the class on **Wednesday, October 10, 2007 (i.e., before 5:00pm, Oct 10, 2007)**. Only hand in the source code and output. Do not hand in diskette unless requested. Any late assignment will lose 2 marks for each late day. While discussion is allowed, you **MUST** finish the assignment by yourself and it does not matter which language you choose to use.