

**COMP 322/L—Introduction to Operating Systems and System Architecture**  
**Assignment #5—Disk Scheduling**

**Objective:**

- To compare the performance of disk scheduling algorithms FIFO and SSTF.

**Specification:**

- The program compares the disk scheduling algorithms First-in-first-out (FIFO) and Shortest-  
seek-time-first (STTF) in terms of traversing a set of tracks input by the user, and calculates  
the number of tracks traversed, the longest delay experienced by a track, and the average  
delay of all tracks processed later than originally scheduled.
- A menu controls the operations, and each choice calls the appropriate procedure, where the  
choices are:
  - 1) Enter parameters
  - 2) Schedule disk tracks to traverse using FIFO
  - 3) Schedule disk tracks to traverse using SSTF
  - 4) Quit program and free memory

**Assignment:**

- A disk consists of  $n$  concentric tracks, numbered 0 through  $n - 1$ .
- A disk scheduling algorithms accepts a sequence of  $m$  integers in the range  
 $[0 : n - 1]$ , where each integer  $t$  is a request to seek to track  $t$ .
- Each scheduling algorithm generates an ordering according to which the  $m$  requests are  
serviced and calculates the number of tracks traversed. For SSTF, additionally, the algorithm  
calculates: (i) the longest delay experienced by a track; (ii) the average delay of all tracks  
processed later than originally scheduled.
- Example: Assuming the r/w head starts at track 0,
  - FIFO processes a given sequence of tracks, (1, 5, 3, 2, 6, 4), in the given order in 14  
steps (distance from  $0 \rightarrow 1 \rightarrow 5 \rightarrow 3 \rightarrow 2 \rightarrow 6 \rightarrow 4$ ).
  - Assuming the same sequence of tracks, SSTF processes them in the order (1, 2, 3, 4,  
5, 6). Tracks 2 and 4 are processed earlier than under FIFO. The preferential  
treatment is at the expense of track 5, which is delayed by 3 steps, and track 6, which  
is delayed by 1 step. In the above example, track 5 was delayed by 3 steps and track 6  
by 1 step. The average delay is  $(3 + 1)/2 = 2.0$

**What NOT to do (any violation will result in an automatic score of 0 on the assignment):**

- Do NOT modify the choice values (1,2,3,4) or input characters and then try to convert them  
to integers--the test script used for grading your assignment will not work correctly.
- Do NOT turn in an alternate version of the assignment downloaded from the Internet  
(coursehero, chegg, reddit, github, etc.) or submitted from you or another student from a  
previous semester.
- Do NOT turn in your assignment coded in another programming language (C++, C#, Java).

**What to turn in:**

- The source code as a C file uploaded to Canvas by the deadline of 11:59pm PST (-20% per  
consecutive day for late submissions, up to the 4th day—note 1 minute late counts as a day  
late, 1 day and 1 minute late counts as 2 days late, etc.)
- Make sure your code compiles with the online C compiler before submitting:  
[https://www.onlinegdb.com/online\\_c\\_compiler](https://www.onlinegdb.com/online_c_compiler)

## Sample output

Disk scheduling

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- 1) Enter parameters
- 2) Schedule disk tracks with FIFO
- 3) Schedule disk tracks with SSTF
- 4) Quit program and free memory

Enter selection: 1

Enter number of concentric tracks: 7

Enter size of sequence: 6

Disk scheduling

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- 1) Enter parameters
- 2) Schedule disk tracks with FIFO
- 3) Schedule disk tracks with SSTF
- 4) Quit program and free memory

Enter selection: 2

Enter sequence of tracks to seek: 1 5 3 2 6 4

Traversed sequence: 1 5 3 2 6 4

The number of tracks traversed is: 14

Disk scheduling

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- 1) Enter parameters
- 2) Schedule disk tracks with FIFO
- 3) Schedule disk tracks with SSTF
- 4) Quit program and free memory

Enter selection: 3

Enter sequence of tracks to seek: 1 5 3 2 6 4

Traversed sequence: 1 2 3 4 5 6

The number of tracks traversed is: 6

The average delay of all tracks processed later is: 2.0

The longest delay experienced by a track is: 3 by track 5

Disk scheduling

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- 1) Enter parameters
- 2) Schedule disk tracks with FIFO
- 3) Schedule disk tracks with SSTF
- 4) Quit program and free memory

Enter selection: 4

Quitting program...