Assignment 12

Operating System Lab (CS341)

Department of CSE, IIT Patna

Date: - 13-04-2021 Deadline:- 11:59 PM, 14-04-2021

Instructions:

1. All the assignments should be completed and uploaded by 11.59 pm. Marks will be deducted for submissions made after 11.59 pm.
2. Markings will be based on the correctness and soundness of the outputs. Marks will be deducted in case of plagiarism.
3. Proper indentation and appropriate comments (if necessary) are mandatory.(2+2 marks)
4. You should zip all the required files with file names **Q1.c, Q2.c, Q3.c** and name the zip folder as **roll_no.zip, eg. 1801cs01.zip**.
5. Upload the assignments (the zipped folder) in the following link:

https://www.dropbox.com/request/ceqWZW3egNovC0fDJ4T5

Questions:

Q1**) DESCRIPTION**: One of the responsibilities of the operating system is to use the hardware efficiently. For the disk drives, meeting this responsibility entails having fast access time and large disk bandwidth. Both the access time and the bandwidth can be improved by managing the order in which disk I/O requests are serviced which is called as disk scheduling. The simplest form of disk scheduling is, of course, the first -come, first-served (FCFS) algorithm. This algorithm is intrinsically fair, but it generally does not provide the fastest service. In SSTF (Shortest Seek Time First), after a request, go to the closest request in the work queue, regardless of direction reduces total seek time compared to FCFS. In the SCAN algorithm, the disk arm starts at one end, and moves towards the other end, servicing requests as it reaches each cylinder, until it gets to the other end of the disk. At the other end, the direction of head movement is reversed, and servicing continues. The head continuously scans back and forth across the disk. C-SCAN is a variant of SCAN designed to provide a more uniform wait time. Like SCAN, C-SCAN moves the head from one end of the disk to the other, servicing requests along the way. When the head reaches the other end, however, it immediately returns to the beginning of the disk without servicing any requests on the return trip.

Work Queue: 23, 89, 132, 42, 187

There are 200 cylinders numbered from 0 – 199. The disk head stars at number 100. Write a C program to simulate disk scheduling algorithms and plot the head movements using a 2D graph.

a) FCFS b) SCAN c) C-SCAN d) SSTF

Calculate total head movement (THM) of the disk for each algorithm. Assuming a seek rate of 5 milliseconds, sort the algorithms from worst to best on the basis of seek time.
Formula:
Seek time = THM * 5 ms

Q2**) DESCRIPTION:** The **LOOK** algorithm is a popular disk scheduling algorithm that honors requests on both sweep direction of the disk head. If no requests are pending in the direction of head movement, then the disk head traversal will be reversed to the opposite direction and requests on the other direction can be served. The movement of the head direction is choose randomly and sometimes it increases the seek time.
The minimum seek distance to cover the total distance is reached when the disk head seeks towards **its closer far-end request first, then switches to serve the other direction** .This modified version of LOOK algorithm is called **S -LOOK(Shortest LOOK)** . The algorithm is designed to make a decision of which direction should be served first instead of only continuing to seek in the same direction before the new requests have arrived.

Given a disk with 200 cylinders (0-199), suppose we have 8 pending requests:
98, 183, 37, 122, 14, 124, 65, 67
And read/write read is currently at cylinder 100.
Apply S-LOOK and show the disk head movement and seek time.