

CSCI 3453: Operating System Concepts

HW Assignment # 6

Due Date: April 11, 2021 @ 11:55 PM

- 1) Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4,999. The drive is currently serving a request at cylinder 2,150, and the previous request was at cylinder 1,805. The queue of pending requests, in FIFO order, is:

2,069; 1,212; 2,296; 2,800; 544; 1,618; 356; 1,523; 4,965; 3,681

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

$$\begin{aligned} & - |2150 - 2069| + |2069 - 1212| + |1212 - 2296| + |2296 - 2800| + \\ & |2800 - 544| + |544 - 1618| + |1618 - 356| + |356 - 1523| + |1523 - 4965| + \\ & |4965 - 3681| = 13011 \end{aligned}$$

$$81 + 857 + 1084 + 504 + 2256 + 1074 + 1262 + 1167 + 3442 + 1284 = 13011$$

- 2) SCAN

$$\begin{aligned} & - |2150 - 2296| + |2296 - 2800| + |2800 - 3681| + |3681 - 4965| + \\ & |4965 - 4999| + |4999 - 2069| + |2069 - 1618| + |1618 - 1523| + \\ & |1523 - 1212| + |1212 - 544| + |544 - 356| = 7492 \\ & 146 + 504 + 881 + 1284 + 34 + 2930 + 451 + 95 + 311 + 668 + 188 = \\ & 7492 \end{aligned}$$

- 3) C-SCAN

$$\begin{aligned} & - |2150 - 2296| + |2296 - 2800| + |2800 - 3681| + |3681 - 4965| + \\ & |4965 - 4999| + |4999 - 0| + |0 - 356| + |356 - 544| + |544 - 1212| + \\ & |1212 - 1523| + |1523 - 1618| + |1618 - 2069| = 9971 \\ & - 146 + 504 + 881 + 1284 + 34 + 4999 + 356 + 188 + 311 + 668 + 95 + \\ & 451 = 9917 \end{aligned}$$

- 2) When multiple interrupts from different devices appear at about the same time, a priority scheme could be used to determine the order in which the interrupts would be serviced. Discuss what issues need to be considered in assigning priorities to different interrupts.

- give higher priority generated by devices
- traps generated by users have lower priority
- a device interrupt can therefore interrupt code used for handling system calls
- interrupts controlling devices are preferred over interrupts performing tasks
- devices having real time constraints are preferred over other devices
- devices that don't have any buffering for data are preferred

- 3) Describe three circumstances under which blocking I/O should be used.

- Interrupts
- Disk being read by application program

- keyboard read by application program

Describe three circumstances under which nonblocking I/O should be used.

- user interface that receives keyboard and mouse input while processing and displaying data on the screen
- video application that reads frames from a file on disk while simultaneously decompressing and displaying the output on the display
- network daemons listening to more than one network socket

Create the text file using Microsoft Word, Open Office Writer, or a text editor. Name the document as follows:

FirstName_LastName_HW6