Computer Science Practice and Experience: Operating Systems (Comp Sci 3SH3),
Term 2, Winter 2018
Dr. Neerja Mhaskar

Assignment-III [40 points]

Due at 11:59pm on April 9ᵗʰ, 2018

- **No late assignments accepted.**
- Make sure to submit a version of your assignment ahead of time to avoid last minute uploading issues.
- Note that groups copying each other's solution will get a zero, and reported to the department.
- Only one copy of your assignment should be submitted.
- In your C programs, you should follow good programming style, which includes providing instructive comments and well-indented code.
- You submission should include a readme file. Your readme file should contain the names, studentIDs and MACIDs of each student in the group. It should also clearly state the work done by each student in the group.
- You need to ensure that your solution works correctly on the Linux virtual machine.

Assignment Outline:

Important

- **Please submit your solution to Avenue ->Assessments -> Assignments 3 folder.**
- **If you submit it elsewhere 5 marks will be deducted from your final mark for the incorrect submission.**

You are to write a C program that implements the following disk scheduling algorithms:

    a. FCFS [5 marks]
    b. SSTF [10 marks]
    c. SCAN [10 marks]
    d. C-SCAN [5 marks]
    e. LOOK [5 marks]
    f. C-LOOK [5 marks]

Your program will service a disk with **300** cylinders numbered **0 to 299**. The program will service the requests (a list of 20 cylinder numbers) given in the file **request.bin**. This file can be downloaded from Avenue -> content -> Assignments. This file contains (4 byte) integer values representing requests ranging from 0 − 299.

Your program will take the initial position of the disk head as the **first command line argument** and the direction of the head as the **second command line argument**. It will then output the requests in the order in which they are serviced, and the total amount of head movements required by each algorithm.

In particular your program needs to do the following:

1) Your program should take two command line arguments
   a. First command line argument - initial position of the disk head (an integer value)
   b. Second command line argument - direction of the head (LEFT or RIGHT)

2) Read the requests from the binary file (`requests.bin`), and store these requests in an integer array (for example: `requests`), after which you need to close the file.

3) Write functions for each disk scheduling algorithm.

4) The FCFS and SSTF algorithms will service requests present in the `requests` array.

5) Since the requests are serviced in **an order** by the SCAN, C-SCAN, LOOK and C-LOOK algorithms, you will need to first sort the requests in the `requests` array in an increasing order and store the sorted requests in another integer array (for example: `sortedrequests`). These algorithms will then service the requests in the `sortedrequests` array and compute the head movements.

6) You can use any sorting algorithm of your choice.

7) Your program should output the following (see sample output given below):
   a. Requests in the order in which they are serviced by each algorithm.
   b. Total amount of head movement incurred by each algorithm while servicing all the requests.

Sample Output: **/.assignment3 100 LEFT**
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See outputLeft.txt (This file can be found in Avenue -> Content -> Assignments folder)

Sample Output: **/.assignment3 100 RIGHT**
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See outputRight.txt (This file can be found in Avenue -> Content -> Assignments folder)