Assignment 10

Operating System Lab (CS341)

Department of CSE, IIT Patna

Date:-06-April-2021   Deadline : 07-April-2021, 10 AM

Instructions:

1. All the assignments should be completed and uploaded by 10 am (7th April 21).

All the assignments should be completed and uploaded by 10 am (7th April 21).

2. Markings will be based on the correctness and soundness of the outputs. Marks will be deducted in case of plagiarism. All questions are of equal marks.

3. Proper indentation and appropriate comments (if necessary) are mandatory. [2+2 marks]

4. You should zip all the required files and name the zip file as roll_no.zip, eg. 1501cs11.zip.

5. Code for each question should be named as Q1_1.c, Q1_2.c, Q1_3.c.

6. Each question will be evaluated on 10 test cases and marks will be given accordingly.

7. Upload your assignment (the zip file) in the following link:

https://www.dropbox.com/request/P64UzxbeGxufkYdDtCOd

Q1. In this assignment you will test the efficacy of various virtual memory paging schemes. You will implement a paging scheme:

a) First-in-First-out (FIFO)
b) Least Recently Used (LRU)
c) Optimal.

Your program should read the sequence of page accesses from the file **"pages.txt"**, emulate the paging schemes, and then print a short report detailing the performance statistics.

Input Format

The file consists of a sequence of "tries". Each try consists of a line containing a single integer, f, representing the number of frames of memory in the operating system, and then, in subsequent lines, any number of integers, 1-99, representing page numbers. The sequence of integers is a "reference string"--a sequence of page requests. The reference string shall be terminated by a value of -1 (which does not represent a page number.)

Sample Input:
```
3
4 7 6 1 7 6 1 2 7 2 -1
4
```

1 2 3 4 2 7 5 1 1 6 4 7 2 1 2 5 -1

Output

For each "try" your program should print a table detailing the page replacements affected by each of the three paging methods. Be sure that you properly handle the printing of these tables when the length of the reference string is large enough that the table is wider than the page. After printing the paging tables, your program should print a table detailing the number of page faults affected by the paging schemes. Below is the output that should result from the sample input.

Example output:

FIFO:

4 7 6 1 7 6 1 2 7 2

Frame content at each time step t

F1 F2 F3

X X   X   at t = 0

4   X   X   at t = 1

………………….

#Page Faults: 6

LRU:

4 7 6 1 7 6 1 2 7 2

Frame content at each time step t

F1 F2 F3

X X   X   at t = 0

………………….

#Page Faults: 6

Optimal:

4 7 6 1 7 6 1 2 7 2

F1 F2 F3

X X   X   at t = 0

………………….

#Page Faults: 5