

CS39002: Operating Systems Lab Spring 2015

Assignment 8 (Virtual Memory)

Due: April 16, 2015, 11:59 PM

In this assignment, you will simulate different page-replacement algorithms and compare their performances. Your simulation should be able to take the required parameters from a data file in the format specified in the appendix.

Your simulator should simulate the behavior of the following page replacement algorithms, and report the number of page faults generated for each algorithm:

- FIFO
- LFU
- LRU
- Second chance algorithm

Submit the file `page.c` containing a main function, and the implementation of the above five algorithms. Each of the algorithms should be implemented as a separate function that is called from the main function. Write a small piece of code that generates the reference string following the appendix. The code should be menu (“select a page replacement algorithms”) driven. The files containing number of frames Vs number of page faults for each page replacement algorithm should be readily available.

Appendix

Input will be the address sequences (aka reference string) generated during the multiplication of two square matrices of dimension n . Another input d denotes the number of integers a page can accommodate. Vary the number of frames and record the number of page faults. Make a plot of number of page faults against number of page frame for each of the algorithm.

Sample Input

$n=3$ $d=2$.

Consider that the address of first matrix starts at 101, address of second matrix starts at 501 and address of output matrix gets stored at 1001.

Each entry below specifies the address of each matrix

First matrix :	Second matrix:	Output matrix
101 101 102	501 501 502	1001 1001 1002
102 103 103	502 503 503	1002 1003 1003
104 104 105	504 504 505	1004 1004 1005

Suppose code for matrix multiplication is as follows:

```
for(int i = 0 ; i < n ; i++)
```

```
for( j= 0 ; j < n ; j++)  
    calculate Output[i][j]
```

The corresponding address sequence will be as follows

101 501 101 502 102 504 1001 101 501 101 503 102 504 1002

Consider this as a reference string for your simulator, calculate the page faults corresponding to each of the algorithm and generate plots.