

## Homework 6 - Paging

*Due by 4:00 p.m. Thursday, 4/28/16*

Write a program that simulates the FIFO and LRU page-replacement algorithms. Your program should accept four command-line arguments specifying the page size, the total virtual memory size, the page-replacement algorithm to use, and the number of frames allocated. The page and virtual memory sizes should be specified by their binary logs. Thus, the following command would simulate a page size of 1KB and a logical memory size of 64KB, using LRU page-replacement with 8 frames allocated:

```
./simulate-paging 10 16 LRU 8
```

Your program should read lines from standard input, each containing a hexadecimal number representing the virtual address of a memory reference. With each memory reference, your program should update an internal page table, keeping track of the number of page faults generated (using pure demand paging). Your program should also maintain any other data structures necessary to implement the two page-replacement algorithms. Your program should terminate upon encountering EOF. It should then print the total number of page faults and exit.

You should submit your source code file(s) and a short writeup in pdf format that includes a description of what you did and the compilation and execution output. In your execution output, test both the FIFO and LRU page-replacement algorithms using a page size of 4KB and a total logical memory size of 64KB, with the number of frames allocated ranging from 1 to 16 (*i.e.* 1, 2, ..., 15, 16). Test each number of frames with 100 random memory references and create a graph of the results (with number of frames on the x-axis and number of page faults on the y-axis). Your writeup should include the two graphs and a discussion of the results they show, including whether Belady's anomaly occurred. Submit everything (including the writeup) to the regular submission link on iLearn, and then submit just the writeup to the TurnItIn link to generate an originality report.