Individual Project
Due Monday, 04/30, at 11:59pm
Points 100

For this project you are going to write a simulator for the various Page Replacement Policies described in chapter 8 of the textbook. You want to determine which policy generates the lowest page fault rate.

Your simulator should implement the following page replacement policies:

- First-in-first-out (FIFO)
- Least Recently Used (LRU)
- Clock Policy
- Optimal

The PageRequest.zip archive file attached to the Blackboard assignment contains the page requests for five different processes. Your simulator should interleave these page requests either round-robin or consecutively (i.e. one process runs to completion before the next one starts). The page request streams for each process are comma delimited within each text file.

Your simulator should be implemented so that:

- The scheduler runs each process:
  - In a round robin fashion until the process is complete.
  - In a consecutive (sequential) fashion.
- A process is complete when it makes its last page request.
- All processes have equal priority.
- Each page request occurs inside of a time-slice (a time-slice = a clock-tick). There is no time penalty for a page fault. If the page requested is not in memory, a frame can be replaced in zero time, i.e. processes do not block on page faults.
- Write you simulator so that you can adjust the number of frames of memory available at the command line.
- There is enough virtual memory to hold all of the processes.

Output Requirements

1) Run a simulation for each of the eight scenarios with ten (10) frames of memory available for each of the replace policies and report the page fault rate for each replacement policy.

2) Run a simulation for each of the eight scenarios with five (5) frames of memory available for each of the replace policies and report the page fault rate for each replacement policy.

Sample Output

```
Buffer Size: 3

Consecutive
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FIFO Page Fault Rate: 39.24%
LRU Page Fault Rate: 38.25%
Clock Page Fault Rate: 39.42%
Optimal Page Fault Rate: 23.80%

Round Robin
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FIFO Page Fault Rate: 97.13%
LRU Page Fault Rate: 97.05%
Clock Page Fault Rate: 97.04%
Optimal Page Fault Rate: 71.53%
```

You may choose the programming language and platform for your simulator.

Submit your source code to Blackboard as a ZIP file along a document with a screenshot of the output of the two output requirements and instructions on how to build and execute your code.

Rubric

32 points -- Output

- Matches solution output for buffer sizes 5 and 10 (2 points for each field shown above)

10 points -- Instructions

- Includes well written instructions for how to build and execute your code

58 points -- Code

- 5 points for each page replacement algorithm implementation
- 10 points for each process "scheduling" algorithm implementation
- 18 points for style, comments, and other errata