

P3 – Page Replacement Algorithms
CS3310 Operating Systems

Due at the beginning of the class as indicated on the course schedule

Page Replacement:

Complete the program that implements the FIFO and LRU algorithms presented in the chapter and calculates the number of page faults generated given a particular reference string. Implement the replacement algorithms such that the number of page frames can vary. *Assume that demand paging is used.*

Required Modifications:

- Implement LRU and FIFO algorithms
 - o Add appropriate data structures and private helper methods to LRU.h and FIFO.h
 - o Implement the insert() method in LRU.cpp and FIFO.cpp as well as any helper functions you specify in the header files.
- ReplacementAlgorithm.h should not be modified.
- testPR.cpp may be modified to facilitate testing and/or analysis. Comment appropriately.
 - o You may want to modify the number of pages MAX_PAGE_NUMBER.
- reference_string.txt is given as an example reference string that can be opened via the command line arguments. You must create at least one more interesting and representative reference string and use one of them in your testing and analysis. If an input file is not specified, a random sequence of page numbers is generated.

Extra Credit (+30%)

- Create the OPT (optimal) replacement algorithm and compare its results with LRU & FIFO in your analysis. The implementation will have to be slightly different than the LRU & FIFO algorithm classes. If you make any changes to ReplacementAlgorithm.h or substantial changes to testPR.cpp, please be sure to document them appropriately.

Please adhere to Cedarville University's C++ style guide and comment well.

Turn in:

- Electronic Materials:
 - o All source code files (.cpp & .h files) uploaded as individual files
 - o A simple written analysis of the results. Describe the observed behavior of each algorithm using your reference string and the reason behind that behavior. May be included with the cover sheet.
 - o The reference string file at least 100 values long that emulates in some part the working-set concept which was used for your analysis.
 - o A spreadsheet or graph detailing the results of each algorithm with varying numbers of page frames when using your handcrafted reference string.
 - o A coversheet with your name, class and section, date, development environment, lessons learned, and a statement affirming you personally completed the project
 - o A cropped screenshot (png) of sample output from your executable(s)