

York University - CSE 3221 Project - Summer 2013

Research the performance of a memory paging system as follows:

- The number of processes should be specified as a constant
- The processes take turns in the round-robin manner
- The research should include the equal and proportional allocation algorithms. Declare the sizes of processes as 100MB times their number (so process 1 is 100MB, process 2 is 200MB etc.)
- You should research the following page replacement algorithms:
 - FIFO
 - LRU Approximation via Counters
 - LRU Approximation via Reference Bits
 - LRU Approximation via Additional-Reference-Bits
 - Second-Chance
 - LFU
 - MFU
- Assume that average regular memory access is 80ns and disk page save or load time is 10ms
- The reference string (cumulative for all processes) should be produced with standard rand function seeded with 0 (so every time you need a number just call rand without worrying about which process needs it). The size of the reference string should be 1000000 times the number of processes.
- Declare the amount of physical memory as a constant of 1GB
- Assume the page size is 128KB and that the virtual address space of each process is 4 times its size and the pages are accessed randomly within the entire address space
- For various number of processes (1 through to 10) you should produce a table and a chart showing the page fault rate and the average memory access time as percentage of the regular access time
- Please check what happens if the amount of physical memory doubles
- Discuss and explain the various results and differences between algorithms and in relation to number of processes, compare the various algorithms under equal and proportional allocation
- Can you reasonably adjust the memory parameters (size of RAM and size of page) to show some dramatic results?
- The program must be very well documented via comments
- The project should be documented and presented in a PDF document with a cover page, table of contents, background, assumption, results, discussion, and summary

You can work in groups of 3. If you feel that some members of the group did not contribute equally please notify the instructor and it will be investigated without revealing your identity. The due date is August 15th and no extensions are possible. The material from this project will be on the final exam so it is advised to do the project before it.