Comparing Algorithm Fault Rates

Lab 3 – Analysis

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For Lab 3 I tested four memory scheduling algorithms in a simulation environment to test their page fault rates for different sized page frames. The four algorithms are: First Come First Serve (FIFO), Least Recently Used (LRU), Least Frequently Used (LFU), and Optimal (OPT in source).

As can be observed in the following graph, as the frame size increases, the fault rate decreases for all algorithms. FIFO, LRU, and LFU have near identical performance. For a frame size of 128, FIFO and LRU tie with a total of 5518 page faults, while LFU is slightly worse performing with 5585. For frame size 512, FIFO and LRU are equal with 8752 page faults, while LFU performed better with 8747.

The optimal algorithm remains best performing across all frame sizes with near linear decrease in fault rate as the frame size grows. The problem with optimal for practical use is overhead in computation, not knowing exactly which requests will come in and at which times. It requires knowing the entire order ahead of time to be truly effective, which is simply not possible in real life situations.

This graph shows that for every algorithm, they will be more effective with larger page sizes. However, this simulation is for one program. Outside the simulation, multiple programs could be competing for memory. If the page sizes are too large, less programs will be able to be in memory

simultaneously which reduces the degree of multiprogramming. More testing with multiple programs is needed to determine what is truly the most optimal frame size.