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Assignment #3 Analysis

In this assignment we implemented three-page replacement algorithms (fifo, lru, sc) and tested them for sample page requests. First-In, First Out (fifo) is a page replacement algorithm that keeps the current pages in a linked list in the order at which they where initially requested, the page at the front is replaced when needed. Second Chance (sc) works similarly to fifo except the pages in the linked list also have a reference bit that is initialized to 0 and set to 1 if they are referenced. Replacement works by replacing the top page if its reference bit is 0, otherwise it is then set to 0 and moved to the tail of the list, with this continuing down the list until a page with a reference bit of 0 is found and replaced. Alternatively, the Least Recently Used (lru) algorithm works by keeping the most recently used page at the front and the least at the bottom of the list. Any page that is referenced whether it causes a page fault or not is immediately placed at the front of the list, and when replacement is necessary it is the page at the end of the list that is replaced. I implemented these replacement algorithms in three programs (fifo.c, lru.c, and sc.c) and then ran them for the sample page requests and output the page faults into the files (simulation\_fifo.txt, simulation\_lru.txt, simulation\_sc.txt). To test my results, I used the diff file1 file2 Linux command to compare the output of my programs with the expected outputs given to us. On each of these runs diff returned no output, meaning that there was no difference between my output files and the expected outputs. Therefore, my three implementations for (fifo, lru, sc) all run according to their intended nature. Bellow is a further visualization of my results, comparing the page size and the hit rates for each of the three algorithms. As you can see as the page size increased the hit rates for all of the algorithms decreased linearly. This makes sense because larger page tables will hold a larger proportion of the requested pages and therefore results in a fewer number of page faults.