

## Memory Management

In this lab, I learned about the different algorithms that can be used for memory page replacement. I learned that certain algorithms work better for different applications. For example, for the sequential memory access test we ran, most of the algorithms we used (FIFO, LRU) had a 100% miss rate. That is because these algorithms look at past memory accesses, and make their decisions on that. But since the sequential test goes in order through all of memory, we won't get a repeat access (at least not for a long time).

The optimal algorithm did the best in all tests. This makes sense as it uses information about the future to choose which page to replace. This obviously isn't a practical algorithm for most cases, since we don't know what the future holds. For my custom algorithm, I designed it based on what I knew about the LR memory access pattern. I know that it has a .9 chance that the next access is one of the last 5 locations accessed, and a .1 chance that it won't be. So when my algorithm runs, I find the last 5 pages to be accessed, and then I run the LRU algorithm on all the frames that are not one of the last 5 to be accessed.

Here is a table of average number of page faults for each algorithm on different memory access patterns:

	FIFO	LRU	OPT	CUST
Random	8760	8759	5925	8505
Sequential	10000	10000	8830	10000
LR	883	874	611	857

Note that my custom algorithm performs better than the LRU algorithm on the locality of reference test.

### Program Output:

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The average number of page faults for FIFO with Random Access is 8760.
The average number of page faults for LRU with Random Access is 8759.
The average number of page faults for OPT with Random Access is 5925.
The average number of page faults for CUST with Random Access is 8505.
The average number of page faults for FIFO with Sequential Access is 10000.
The average number of page faults for LRU with Sequential Access is 10000.
The average number of page faults for OPT with Sequential Access is 8830.
The average number of page faults for CUST with Sequential Access is 10000.
The average number of page faults for FIFO with LR Workload Access is 883.
The average number of page faults for LRU with LR Workload Access is 874.
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The average number of page faults for OPT with LR Workload Access is 611.  
The average number of page faults for CUST with LR Workload Access is 857.