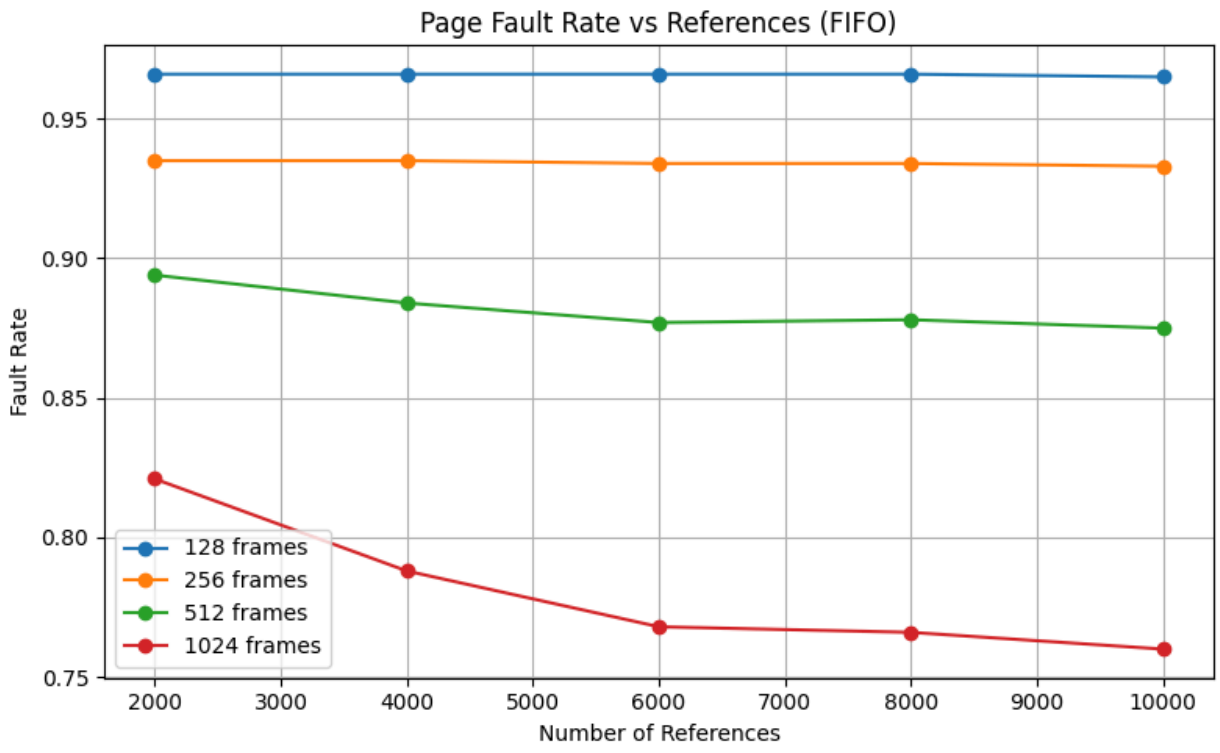
Lab3

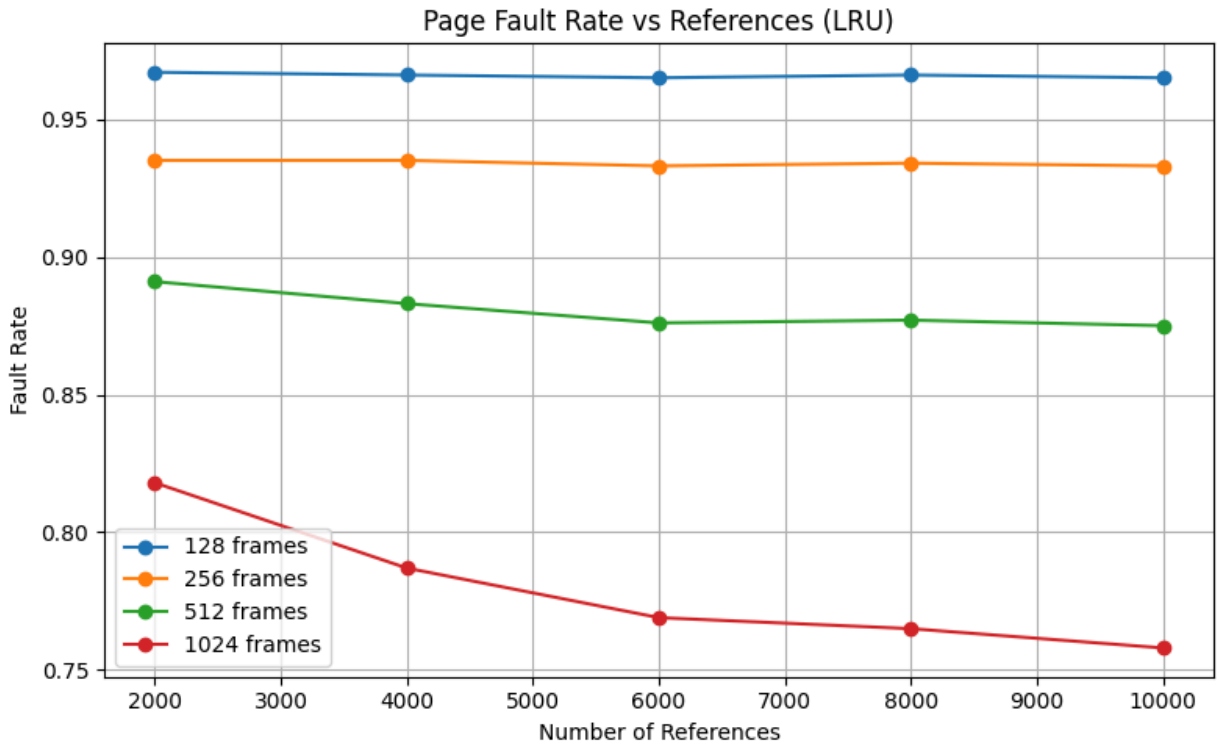
Date	@December 5, 2025
Course	CSCI 3453
Done	☐

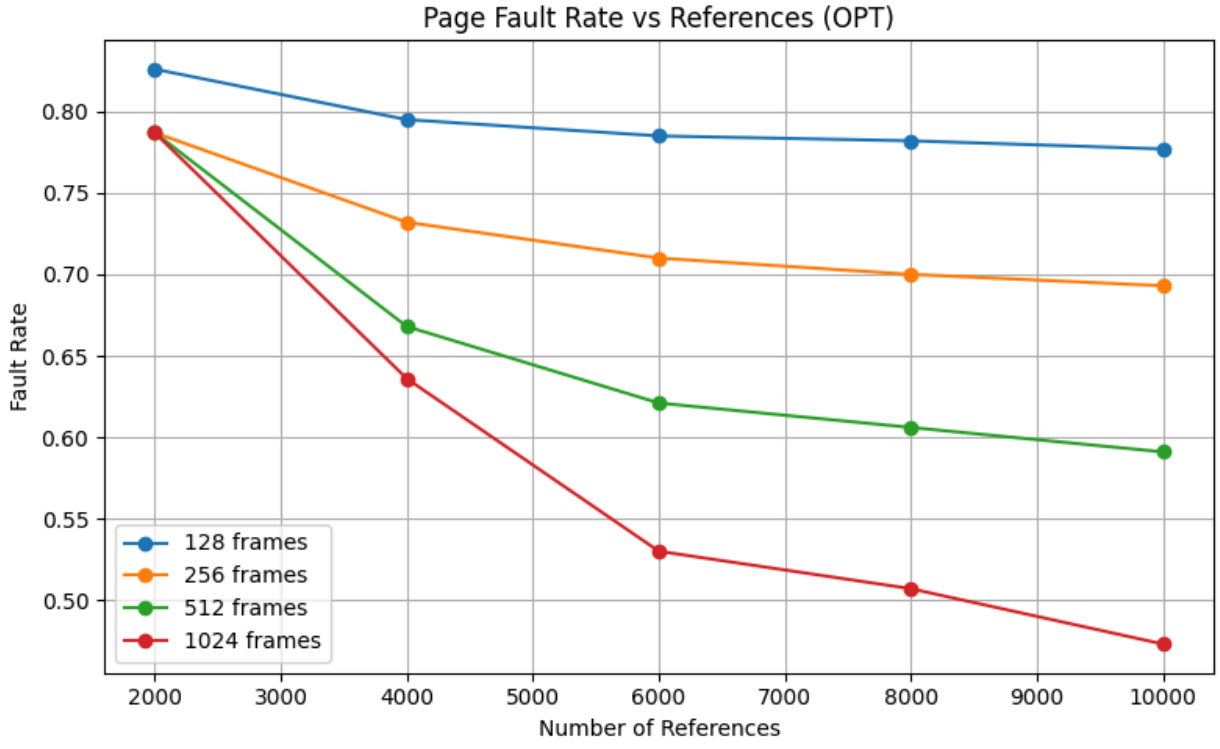
https://ucdenver.instructure.com/courses/565995/assignments/2018328?module_item_id=5713037

Lab 3 - Eduardo Galvez

Graphs:




Page Fault Rate vs References (LRU)
Fault Rate
Number of References
128 frames
256 frames
512 frames
1024 frames
0.95
0.90
0.85
0.80
0.75
2000
3000
4000
5000
6000
7000
8000
9000
10000


Page Fault Rate vs References (OPT)
Fault Rate
Number of References
128 frames
256 frames
512 frames
1024 frames
0.80
0.75
0.70
0.65
0.60
0.55
0.50
2000
3000
4000
5000
6000
7000
8000
9000
10000

Report:

While numbers tell us a lot, the human mind has a difficult time really comprehending the data without visuals. This is why these graphs are very telling. In this specific test case, FIFO (First In First Out) performs very similarly to LRU (Least Recently Used). This does not mean FIFO is generally preferred in real systems, but it does show that on certain workloads FIFO can behave close to LRU despite having far lower implementation complexity and overhead.

The graphs also show that the dominant factor affecting performance is the frame size. FIFO and LRU immediately benefit from additional frames, and their fault rates drop quickly as frame size increases. The number of references does not change performance, but having more reference points (2000, 4000, 6000, 8000, 10000) makes it easier to see the long-term trend of each algorithm.

OPT (Optimal) consistently outperforms both FIFO and LRU at every frame size and every measurement point. Its advantage is visible as early as the 2000-reference mark, and becomes even more pronounced as frames increase. As expected, all three algorithms show diminishing returns: doubling the number of frames does not halve the fault rate, and each additional block of memory provides a smaller incremental improvement.