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CS 492

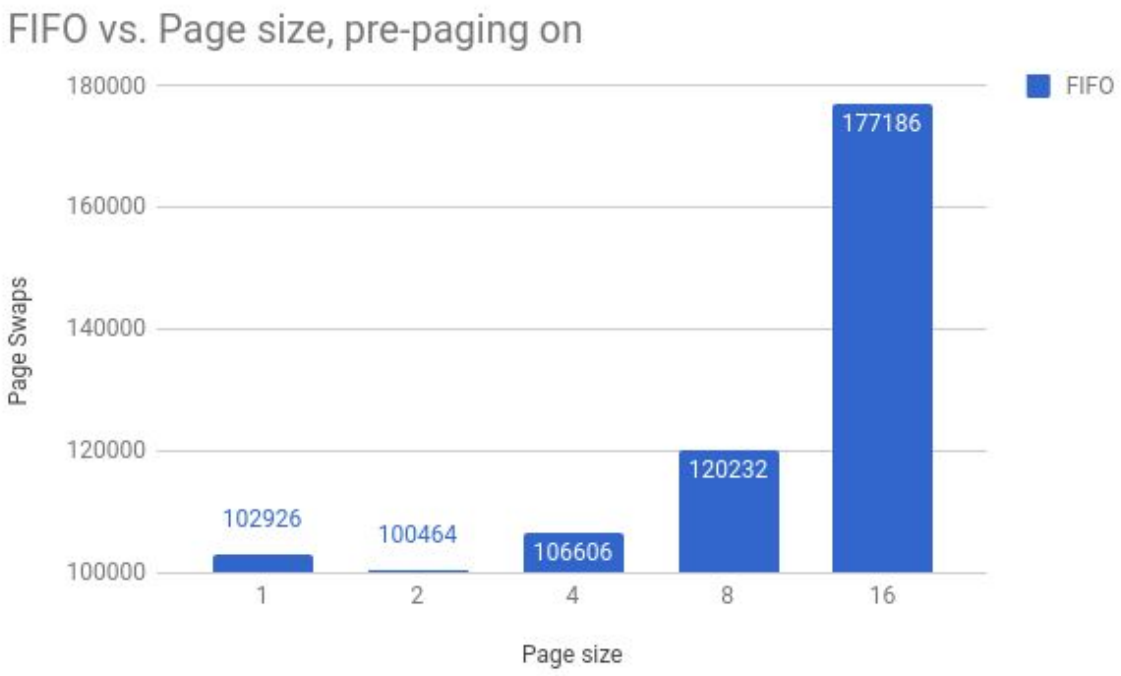
Assignment 2: Paging

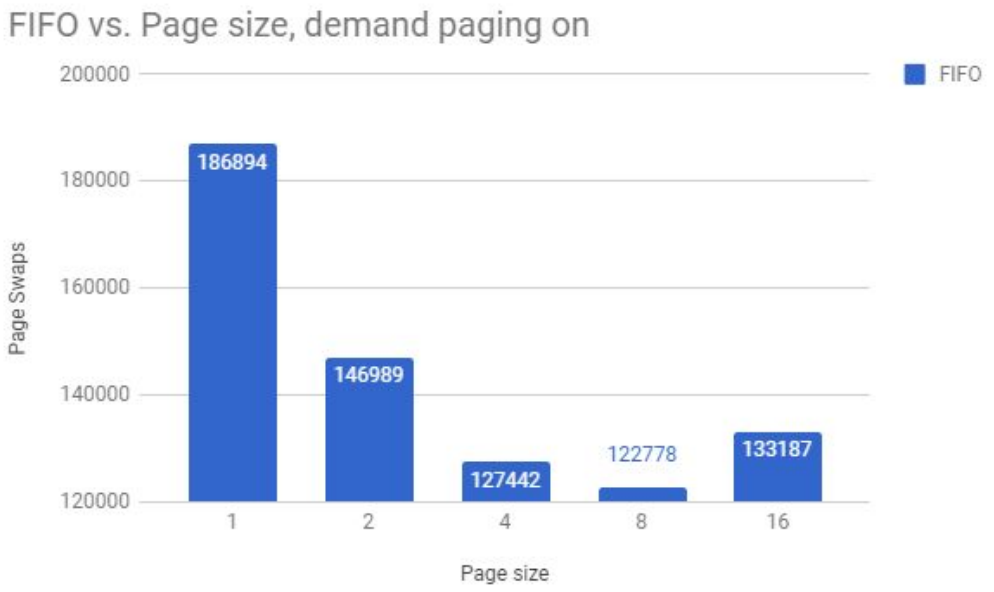
For this assignment we were tasked with simulating virtual memory management systems. Specifically we experimented with the First-in First-out (FIFO), Least Recently Used (LRU) and Clock Page Replacement algorithms. We were also tasked with implementing pre-paging or demand paging based on the inputs of the user at the command line. In the experimentation, page swaps were recorded in order to be used as a metric of each algorithm's performance. Here are the results of the experimentation in tables:

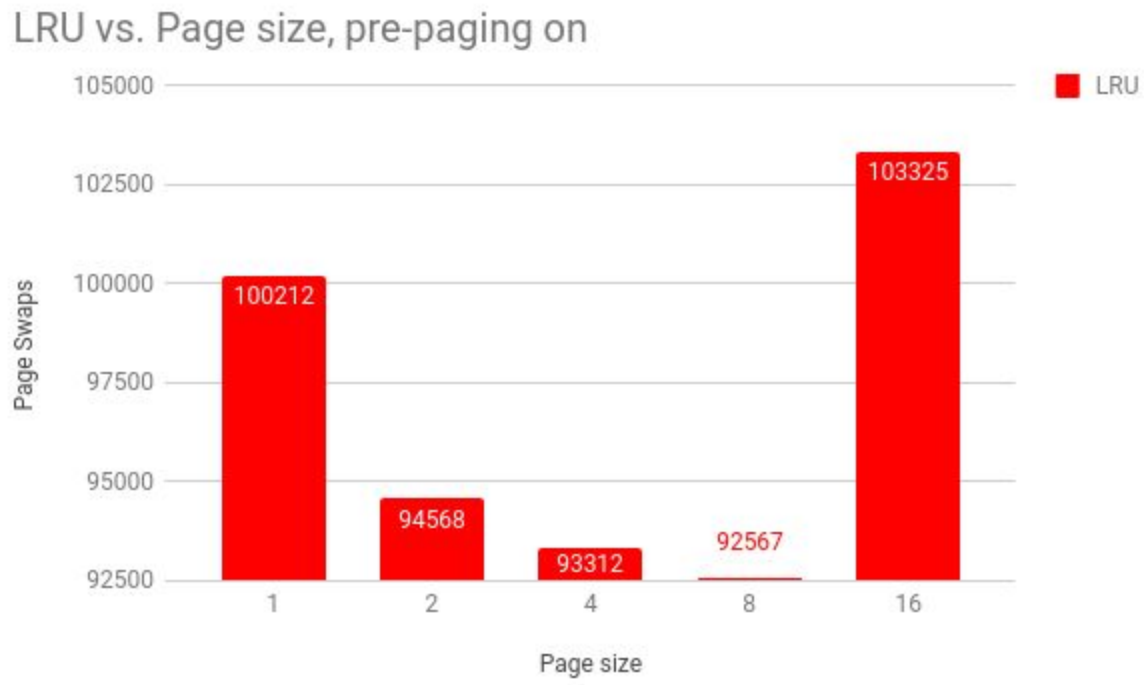
Pre paging			
Page size	FIFO	LRU	Clock
1	102926	100212	100327
2	100464	94568	94643
4	106606	93312	93719
8	120232	92567	96818
16	177186	103325	177181

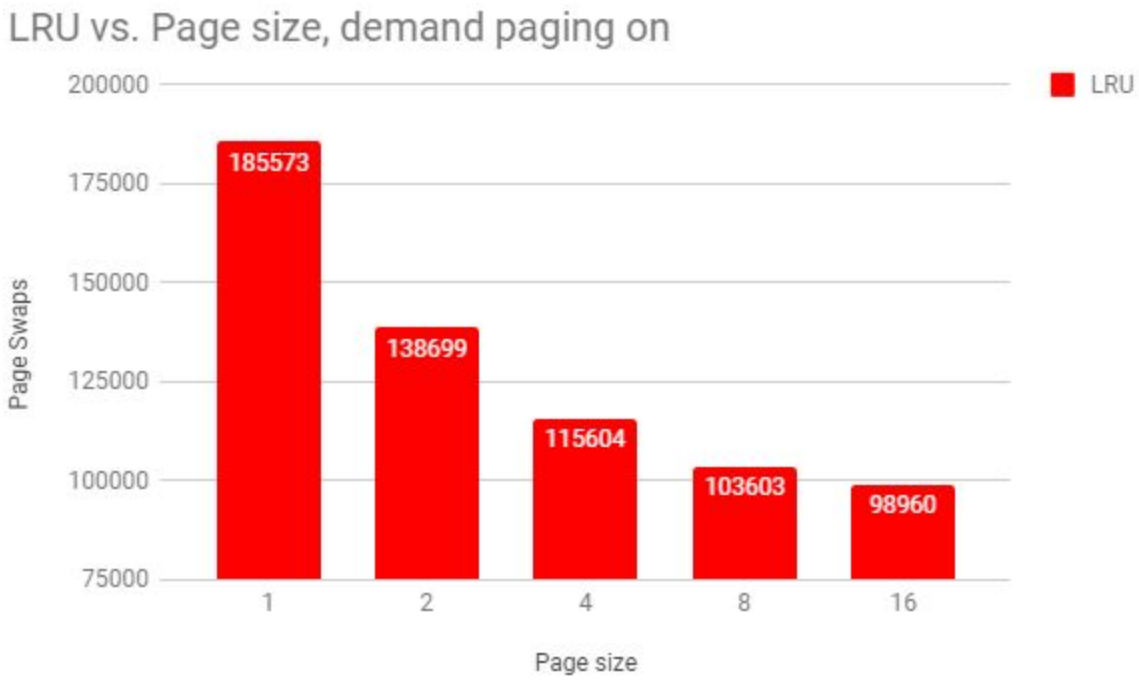
Demand paging			
Page size	FIFO	LRU	Clock
1	186894	185573	185608
2	146989	138699	138751
4	127442	115604	115850
8	122778	103603	105436
16	133187	98960	115268

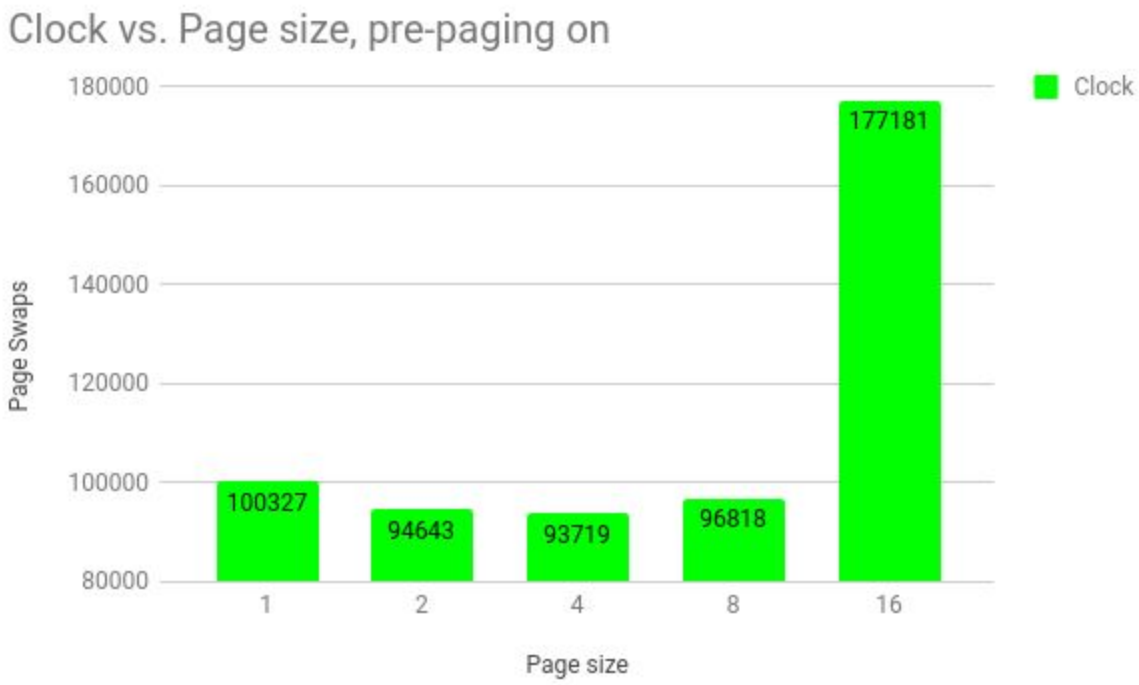
These tables are a little hard to judge based on the numbers, so the graphs below help to envision the data. When page swapping is enabled, it is evident that for the most part the number of page swaps go up as the page size increases. The opposite appears to be true when demand paging is enabled, as the number of page swaps appear to decrease as the page size decreases. In terms of pre-paging, Clock seemed pretty consistent across most page sizes, LRU performed the best at page sizes 4 and 8 and FIFO performed the best at page sizes 1 2 and 4. When demand paging was turned on, all algorithms appeared to have reduced page swaps as the page size increased. The FIFO and Clock had a slight increase of page swaps as the page size increased from 8 to 16, while the LRU algorithm steadily declined in page swaps as the page size increased.

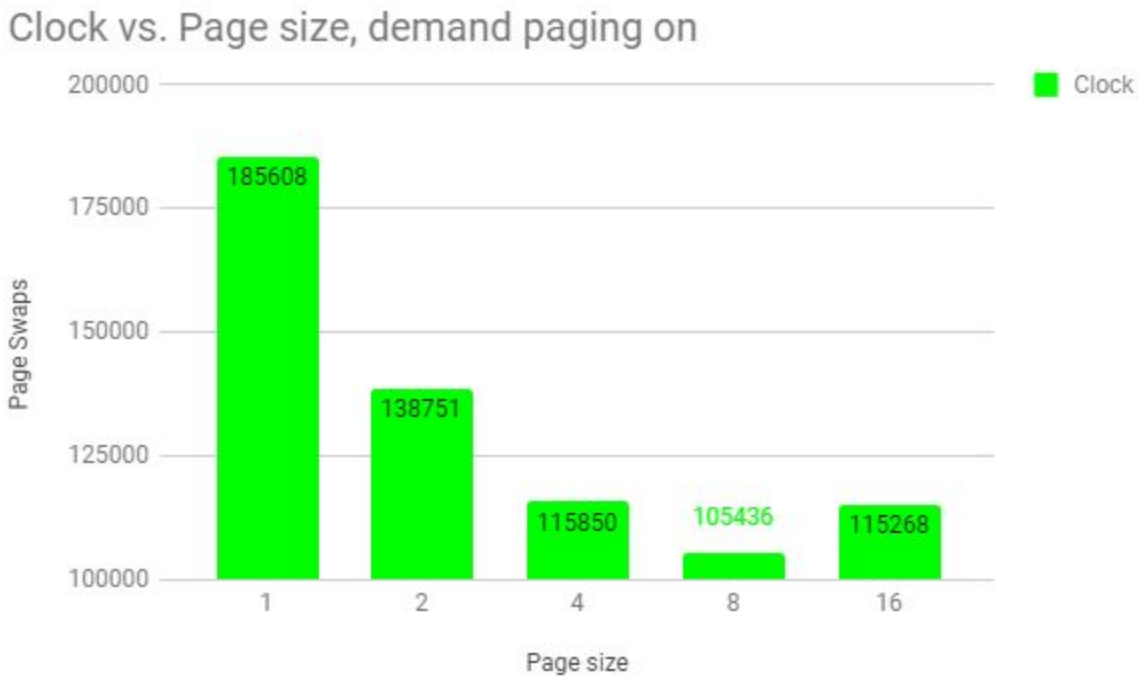



FIFO vs. Page size, demand paging on
FIFO
200000
180000
160000
140000
120000
Page Swaps
186894
146989
127442
122778
133187
1
2
4
8
16
Page size


LRU vs. Page size, pre-paging on
LRU
105000
102500
100000
97500
95000
92500
Page Swaps
100212
94568
93312
92567
103325
1
2
4
8
16
Page size


LRU vs. Page size, demand paging on
LRU
200000
175000
150000
125000
100000
75000
Page Swaps
185573
138699
115604
103603
98960
1
2
4
8
16
Page size


Clock vs. Page size, pre-paging on
Clock
180000
160000
140000
120000
100000
80000
Page Swaps
100327
94643
93719
96818
177181
1
2
4
8
16
Page size


Clock vs. Page size, demand paging on
Clock
200000
175000
150000
125000
100000
Page Swaps
185608
138751
115850
105436
115268
1
2
4
8
16
Page size