

Score: \_\_\_\_\_

Name: SOLUTION

ECE 3055 Quiz - November 6, 2002

2 pts. / Problem

1-3. Determine the number of page faults that will occur in the following page reference string assuming 4 page frames are available. All frames are initially empty.

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

Page Frames

1	1	1	1	1	1	5	5	5	5	5	3	3	3	3	3	1	1	1	1
	2	2	2	2	2	6	6	6	6	6	7	7	7	7	7	7	3	3	3
		3	3	3	3	3	3	2	2	2	2	2	6	6	6	6	6	6	6
			4	4	4	4	4	4	1	1	1	1	1	1	1	2	2	2	2

Page Fault Y/N

Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	N	Y	N
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1. With the FIFO algorithm, 14 page faults will occur.

Page Frames

1	1	1	1	1	1	1	1	1	1	1	6	6	6	6	6	6	6	6	6
	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
		3	3	3	3	5	5	5	5	3	3	3	3	3	3	3	3	3	3
			4	4	4	4	6	6	6	6	7	7	7	7	1	1	1	1	1

Page Fault Y/N

Y	Y	Y	Y	N	N	Y	Y	N	N	Y	Y	Y	N	N	Y	N	N	N	N
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2. With the LRU algorithm, 10 page faults will occur.

Page Frames

1	1	1	1	1	1	1	1	1	1	1	7	7	7	7	1	1	1	1	1
	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			4	4	4	5	6	6	6	6	6	6	6	6	6	6	6	6	6

Page Fault Y/N

Y	Y	Y	Y	N	N	Y	Y	N	N	N	N	Y	N	N	N	Y	N	N	N
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3. With the best possible algorithm, a minimum of 8 page faults will occur.

2 pts.

4. (True or False) F Increasing the number of physical memory page frames will always reduce the number of page faults for a given page reference string.

Belady's anomaly p. 314

5. What is thrashing and how can an OS attempt to prevent it? Explain

1pt. A process is thrashing if it spends more time paging than executing.

1pt. An OS can attempt to prevent thrashing by providing each process with enough frames. Several techniques can be used to avoid over allocation of physical memory such as controlling the degree of multiprogramming