

- 8.4** Consider the following string of page references 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2. Complete a figure similar to Figure 8.15, showing the frame allocation for:
- FIFO (first-in-first-out)
 - LRU (least recently used)
 - Clock
 - Optimal (assume the page reference string continues with 1, 2, 0, 1, 7, 0, 1)
 - List the total number of page faults and the miss rate for each policy. Count page faults only after all frames have been initialized.

FIFO

7	0	1	2	0	3	0	4	2	3	0	3	2
7	7	7	2	2	2	2	4	4	4	0	0	0
	0	0	0	0	3	3	3	2	2	2	2	2
		1	1	1	1	0	0	0	3	3	3	3
			F		F	F	F	F	F	F		

Number of page faults after all frames have been initialized: 7

Miss rate: $7/10 = 70\%$

LRU

7	0	1	2	0	3	0	4	2	3	0	3	2
7	7	7	2	2	2	2	4	4	4	0	0	0
	0	0	0	0	0	0	0	0	3	3	3	3
		1	1	1	3	3	3	2	2	2	2	2
			F		F		F	F	F	F		

Number of page faults after all frames have been initialized: 6

Miss rate: $7/10 = 60\%$

Clock

7	0	1	2	0	3	0	4	2	3	0	3	2
7*	7*	->7*	2*	2*	->2*	->2*	4*	4*	4*	->4	3*	3*
->	0*	0*	->0	->0*	0	0*	->0	2*	2*	2	->2	->2*
	->	1*	1	1	3*	3*	3	->3	->3*	0*	0*	0*
			F		F		F	F		F	F	

Number of page faults after all frames have been initialized: 6

Miss rate: $7/10 = 60\%$

Optimal

7	0	1	2	0	3	0	4	2	3	0	3	2
7	7	7	2	2	2	2	2	2	2	2	2	2
	0	0	0	0	0	0	4	4	4	0	0	0
		1	1	1	3	3	3	3	3	3	3	3
F			F			F			F			

Number of page faults after all frames have been initialized: 4

Miss rate: $4/10 = 40\%$