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4. Given that main memory is composed of four page frames and that a program has been divided into eight pages (numbered 0 through 7):

a. How many page faults will occur using FIFO with a request list 0, 1, 7, 2, 3, 2, 7, 1, 0, 3 if the four page frames are initially empty?
b. How many page faults will occur with the same conditions but using LRU?

5.

a. What is an operating system?
b. What is the kernel?
c. What is the function of a system call?
d. What is a directory?
e. What are the operations that can be performed on a directory?
f. What are the most common schemes for defining the logical structure of a directory?
g. What are the structures used in file-system implementation?

6.

Consider moving-head disk with 100 tracks, numbered from 0 to 99. Assume that it takes one time unit to move the head from one track to the adjacent track, and that the time to locate and read a particular sector within a track is small enough to be ignored.

The table below lists a series of track requests and their arrival time. Assume that the head is currently positioned at track 40, and was positioned at track 30 prior to that.

Track Request	Arrival time
45	0
35	1
50	3
32	12
37	23
25	35

a) Copy and complete the chart below to show the time at which each request was serviced using the First-Come-First-Served algorithm

Track	30	40						
Time	-10	0						

b) Copy and complete the chart below to show the time at which each request was serviced using the Shortest-Seek-Time-First

Track	30	40						
Time	-10	0						

c) Copy and complete the chart below to show the time at which each request was serviced using the Elevator algorithm

Track	30	40						
Time	-10	0						