Operating Systems
Jacobs University Bremen
Jasmine Dayinta

Course: CO20-320202
November 8, 2018

OS 2018 Problem Sheet #4

Problem 4.1

Solution:

a. The physical memory has 256 frames.

b. In the logical address space, there are 16 bits because it is limited to a maximum of 64 pages only, creating a tuple (p,d) with the values: $p = 6$ and $d = 10$.

c. In the physical address space, there are 18 bits because the tuple (f,d) has values of $f = 8$ and $d = 10$.

d. For the page number, there are 6 bits being used.

e. For the offset within a page, there are 10 bits being used.

Problem 4.2

Solution:

a.

reference string	1	2	3	4	1	1	4	2	1	2
frame 0	1	1	3	3	1	1	1	1	1	1
frame 1		2	2	4	4	4	4	2	2	2

There are 6 page faults

b.

reference string	1	2	3	4	1	1	4	2	1	2
frame 0	1	1	1	4	4	4	4	4	4	4
frame 1		2	2	2	1	1	1	1	1	1
frame 2			3	3	3	3	3	2	2	2

There are 6 page faults

c.

reference string	1	2	3	4	1	1	4	2	1	2
frame 0	1	1	1	1	1	1	1	1	1	1
frame 1		2	3	4	4	4	4	2	2	2

There are 5 page faults

d.

reference string	1	2	3	4	1	1	4	2	1	2
frame 0	1	1	1	1	1	1	1	1	1	1
frame 1		2	2	2	2	2	2	2	2	2
frame 2			3	4	4	4	4	4	4	4

There are 4 page faults

e.

reference string	1	2	3	4	1	1	4	2	1	2
frame 0	1	1	3	3	1	1	1	2	2	2
frame 1		2	2	4	4	4	4	4	1	1

There are 7 page faults

f.

reference string	1	2	3	4	1	1	4	2	1	2
frame 0	1	1	1	4	4	4	4	4	4	4
frame 1		2	2	2	1	1	1	1	1	1
frame 2			3	3	3	3	3	2	2	2

There are 6 page faults

Problem 4.3

Solution:

When comparing between the given system with LRU, one could say that at any moment in time, both systems will have the same pages that reside at that moment (and possibly have the same number of page faults). However, what differentiate the two systems is that LRU doesn't re-use a page after it has been discarded, while the given system might use it again later. Therefore, in my opinion, LRU is more preferable.