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Homework 3

Cs-342/sec-1

1)

existing

5	6	4

available

1	1	2

need

p1	1	0	1
p2	1	2	0
p3	2	0	1
p4	0	3	0
p5	4	0	1

alloc safe sequences

p1	222
p2	322
p3	334
p4	444
p5	564

p1	222
p3	234
p2	334
p4	444
p5	564

p1	222
p3	234
p4	344
p2	444
p5	564

These three are only safe sequences so that it is safe when;

Processes-> 1, 2, 3, 4, 5 or 1, 3, 2, 4, 5 or 1, 3, 4, 2, 5 .

2)

1:

2:

3:

a) LA = 0x0200+0x01a3 = 0x03a3 = 3*0x0100 + 163
PA = 19*0x0100 + 163 = 0x1326+0x009d = **0x13a3**

b) LA = 0x0800+0x0244 = 0x0a44 = 10*256 + 68
PA = 26*0x0100 (x01a34) + 0x0044 = **0x1a44**

c) LA = 0x1000 = 10*0x0100

PA = 20*0x100 = **0x2000**

d) LA = 0xa2ff = 162*256 + 255
PA = 178*256 + 255 = **0xb2ff**

e) LA = 0xe10a
PA = e1*100*01 + 0a = **0xf10a**

f) Segmentation **fault**, aut of address

3)

a)

LRU									
3	6	3	5	6	4	3	5	3	6
x	x		x		x	x	x		x
3	6	3	5	6	4	3	5	3	6
	3	6	3	5	6	4	3	5	3
			6	3	5	6	4	4	5

5	7	5	7	6	5	3	5	2	3	4
	x					x		x		x
5	7	5	7	6	5	3	5	2	3	4
6	5	7	5	7	6	5	3	5	2	3
3	6	6	6	5	7	6	6	3	5	2

So, 11 page fault occurs in LRU

b)

S. C.				r					r
3	6	3	5	6	4	3	5	3	6
x	x		x		x	x			x
3 1	3 1	3 1	3 1	3 1	6 0	5 0	5 1	5 1	4 0
	6 1	6 1	6 1	6 1	5 0	4 1	4 1	4 1	3 0
			5 1	5 1	4 1	3 1	3 1	3 1	6 1

				r					r	
5	7	5	7	6	5	3	5	2	3	4
x	x					x		x		x
3 0	6 0	6 0	6 0	6 1	6 0	5 1	5 1	3 1	3 1	2 0
6 0	5 1	5 1	5 1	5 1	5 1	7 0	7 0	5 0	5 0	3 0
5 1	7 1	7 1	7 1	7 1	7 0	3 1	3 1	2 1	2 1	4 1

So, 11 page fault occurs in Second Chance

c)

opt									
3	6	3	5	6	4	3	5	3	6
x	x		x		x				x
3	3	3	3	3	3	3	3	3	3
	6	6	6	6	4	4	4	4	6
			5	5	5	5	5	5	5

5	7	5	7	6	5	3	5	2	3	4
	x					x		x		x
3	7	7	7	7	7	3	3	3	3	3
6	6	6	6	6	6	6	6	2	2	2
5	5	5	5	5	5	5	5	5	5	4

So, 9 page fault occurs in Optimal

4)

a)

4KB / 8 B = 512 entries in first level

There are 512^2 2nd level block

There are 512^3 3rd level block -> (2^9)^3 = 2^27 and block size = 2^12

⇨ 2^27 * 2^12 = 2^39 = 512 GB

b) 512 entry * 4 KB = 2 MB max file size

For A, 64KB/2Mb then 1 level table enough

For B, 64MB/2MB = 32 for second level, 1 for top level

For C, 2GB/2MB = 512 for second level, 1 for top level

➔ In total, 533 second level and 3 top level blocks are needed.

c)

A= 20 ms

B and C = 30 ms

5)

a)

2^8 * 2^12 = 2^20 = 1 MB third level

For A, 4 MB/1 MB = 4 third level,

4 / 2^8 = 1 second level

1 top level

For B, 16 MB/ 1 MB = 16 third level

1 second level and 1 top level

So, 2*1 first lvl, 2*1 second lvl, 20 third lvl = 24

24*(2^8)*64 = 384 KB

b)

framesize = 2^12 from offset

then, 2 GB / 2 ^12 = 2^19 and 64 byte

2^19 * 2^6 = 2^25 = 32 MB