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COMP 3500

Project 5

Question 1:

a)

First-fit

1. 212K is put in the 500K partition.
2. 417K is put in the 600K partition.
3. 112K is put in the 288K partition (new partition 288K = 500K – 212K).
4. Now the 426K must wait its turn.

Best-fit

1. 212K is put in the 300K partition.
2. 417K is put in the 500K partition.
3. 112K is put in the 200K partition.
4. 426K is put in the 600K partition.

Worst-fit

1. 212K is put in the 600K partition.
2. 417K is put in the 500K partition.
3. 112K is put in the 388K partition.
4. Now the 426K must wait its turn.

b)

The Best-fit algorithm works the best out of the three. It was the only one to meet all the memory requests.

Question 2:

a) 30000
   - 30000 = 11101 01001 10000
   - Page # = $(11101)_2 = 29$
   - Offset = $(0100110000)_2 = 304$

b) 256
- $256 = 100000000$
- Page # = 0
- Offset = 256

c) 16385
- $16385 = 10000\ 00000\ 00001$
- Page # = $(10000)_2 = 16$
- Offset = $(0000000001)_2 = 1$

Question 3:

1024 words using 10 bits is accessed as $2^{10} = 1024$

32 pages using 5 bits is accessed as $2^5 = 32$

16 frames using 4 b its can be accessed as $2^4 = 16$

a) The bits required for the logical address are <u>15.</u> $(5 + 10 = 15)$

b) The bits required for the physical address are <u>14.</u> $(4 + 10 = 14)$

Question 4:

a) 1, 10
- The physical address for 1, 10 is <u>2310.</u> $(2300 + 10)$
- The physical address for 3, 400 is <u>1727.</u> $(1327 + 400)$
- The physical address for 4, 112 has a segmentation error as $112 > 96$.

Question 5:

<u>Best-fit:</u>

OS
6
In use
17
In use
25
In use

14
9

13K program will be inserted to segment as size "14" in best fit.

First-fit:

OS
6
In use
17
In use
25
In use
14
19

First segment where the program of size 13K can be inserted is "17"

Worst-fit

OS
6
In use
17
In use
25
In use
14

19

The program of size 13K will be inserted to segment of size "25" in worst case

Question 6:

a)

Logical Mapping

Page No	Contents
0	A
	B
	C
	D
1	E
	F
	G
	H
2	I
	J
	K
	L
3	M
	N
	O
	P
4	Q
	R
	S
	T

5	U V - -

Physical Mapping

Frame No	Contents
7	A B C D
26	E F G H
52	I J K L
20	M N O P
55	Q R S T

6	U
	V
	-
	-

b)

Page Table

Page No	Frame No
0	7
1	26
2	52
3	20
4	55
5	6

c)

Page size = 4

The physical address of m is <u>80</u>. ((4*20) + 0)

The physical address of d is <u>31</u>. ((4*7) + 3)

The physical address of v is <u>25</u>. ((4*6) +1)

The physical address of r is <u>221</u>. ((4*55) + 1

d)

 The size of each instruction is 1 byte with two vacant spaces in the final frame. The vacant space is 2 bytes. No external fragmentation will be present as the space can be used if any instruction comes. Once a frame is used, it can not be touched a second time. This means the internal fragmentation is of size 2.

External Fragmentation = 0

Internal Fragmentation = 2