

Serie of exercises No2

Exercise No1 :

Consider a memory management system with variable partitions, where the initial memory state is given by a user area of 300 Kbytes. The user asks to run programs of the following sizes: 80 KO, 42 KO, 95 KO, 35 KO, 50 KO.

1/ Can we run the last program while giving the memory state after allocation?

2/ The program of size 95 ends, then the program of size 80 KO, the user restarts the program of size 50 KO, then another of size 23 KO. What will be the state of memory after allocation of a memory area to each of the two programs in the allocation cases: First Fit, Best Fit and Worst Fit? Which is the best strategy?

Exercise No2 :

Consider a program consisting of 8 pages and a physical memory of 3 blocks, and the execution trace $P = 70121350426303012017015321$.

1/ Calculate the number of page faults in the two cases of FIFO and LRU replacement.

2/ Calculate the fault rates in both cases.

3/ What do you notice if the memory consists of 4 page frames for the FIFO strategy?

Exercise No3 :

A computer provides an address space of 65536 bytes divided into 4096-byte pages. A P program consists of a code segment of 32768 bytes, a data segment of 16386 bytes and a stack segment of 15870 bytes.

1/ What memory sharing strategy is used here?

2/ Give the structure of this program in virtual memory. Is this address space sufficient for the entire program?

Exercise No4 :

Consider the following segment table:

Segment number	Presence in MM	Memory address	Size
0	1	678	222
1	1	2048	512
2	1	64	300
3	1	3248	128
4	1	998	1024

Give the physical addresses corresponding to the following virtual addresses:

(1, 45), (0, 200), (1, 468), (2, 115), (3, 56), (4, 600), (4, 1012)

Exercise No5 :

Consider a machine with 4 pages. The memory manager maintains the following information: date the virtual page was loaded, date the page was last referenced, R bit (=1 if the page has been referenced and =0 otherwise) and an M bit (=1 if the page has been modified and =0 otherwise). Let the following table:

Page	Loading date	Last reference date	R	M
0	26	30	0	1
1	12	20	0	0
2	45	46	1	1
3	31	38	1	0

Q/ Which page should be replaced according to the following replacement strategies: FIFO, LRU and NRU.

Exercise №6 :

Consider a paging system with a page size of 4kB, a physical memory of 12kB and a memory word of 1 byte.

1/ How many page frames does this memory contain?

2/ Consider a program of size 24KO, which refers to the following logical addresses:

2, 5012, 6200, 8215, 2000, 17800, 50, 13248, 1 8456, 1203, 5741, 9442, 16524, 23580, 16895, 22630, 123

- For each address, give the page number and the displacement within the page (p, d).
- Deduce the chain of pages referenced during execution of this program.

3/ Calculate the page fault rate resulting from a FIFO and LRU replacement. Which algorithm minimizes this rate?