

Series 1: Memory Management (Contiguous Allocation)

Exercise 1

- 1- Give the definition of an operating system, and list its different functions?
- 2- What does it mean?
 - The contiguous mode of allocation, the non-contiguous mode of allocation.
 - The internal fragmentation, the external fragmentation.
- 3- Recall the memory management principle by:
 - a. Fixed partitions.
 - b. Variable partitions.

Exercise 2

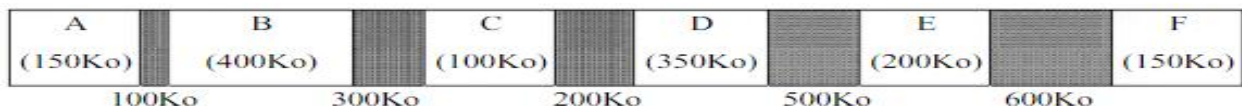
Suppose a main memory using the contiguous allocation technique with fixed partitioning. This memory is composed of 5 partitions P1, P2, P3, P4 and P5. These partitions have for respective sizes: 100, 500, 200, 300 and 600 KB.

These are 4 processes A, B, C, D of the respective sizes 212, 417, 112 and 426 KB. It is assumed that the main memory is initially free.

- 1- Give the different states of the main memory to load the 4 processes A, B, C and D (in order) using the following allocation algorithms:
 - a- First fit,
 - b- Best fit
 - c- Worst fit
- 2- Evaluate the three allocation methods.

Exercise 3

Suppose an operating system, which uses contiguous allocation by variable partitions. The following state of main memory is considered at time T (hatched areas are free):



A) Represent the evolution of the main memory, according to the arrival of the K, L, M and O processes, in this order: K (200 KB), L (450 KB), M (250 KB) and O (50 KB) Using:

- 1- the First Fit allocation strategy.
- 2- the Best Fit allocation strategy.

B) We wish to choose a means of memorizing the free and occupied parts of the memory, as it was represented before the arrival of the new processes.

- 1- Give the bit table corresponding to the previous distribution, assuming the allocation unit is 50KB.
- 2- A representation of the free/occupied parts in the form of a chained list, each node containing a state bit (F/O), the size of the partition, and a pointer to the next partition.
 - Represent the chained list corresponding to the previous allocation (allocation unit: 50KB).

C) We want to load process P (400KB) into memory according to the First Fit allocation strategy.

1. Represent the state of the memory after loading P.
2. Describe the steps required to locate the correct location of the new process in memory using:
 - The bit table.