Multiprogramming with Dynamic Partitions

In dynamic partitions, a partition is created dynamically for a requesting process.

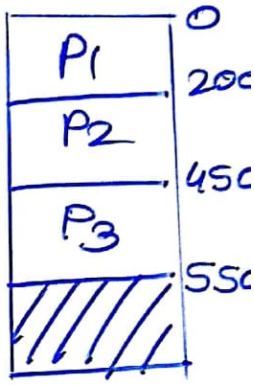
- Compared to fixed partitions, in dynamic partitions, neither the size nor the number of dynamically allocated partitions can be fixed.
- Memory manager continues creating and allocating positions to requesting processes until all physical memory is exhausted.
- When a process is terminated the vacated memory space is returned to the pool of free memory areas.
- The main problem with fixed size partition is the wastage of memory by programs that are smaller than their partitions. This problem is also known as internal fragmentation.
- With dynamic partitioning, the number and the size of partitions vary dynamically. This improves memory utilization but it also complicates the process of allocation and deallocation of memory.

In variable partition, operating system keeps track of which parts of memory are available and which are allocated.

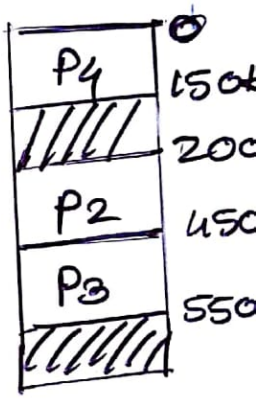
- Assume that we have book of memory available for the processes. Following processes are waiting for execution.

Process No	Size of the process
P_1	200k
P_2	250k
P_3	100k
P_4	150k
P_5	100k

- The Process P_1 to P_3 can be immediately allocated in memory. P_4 can not be accommodated as there is not sufficient memory for P_4.

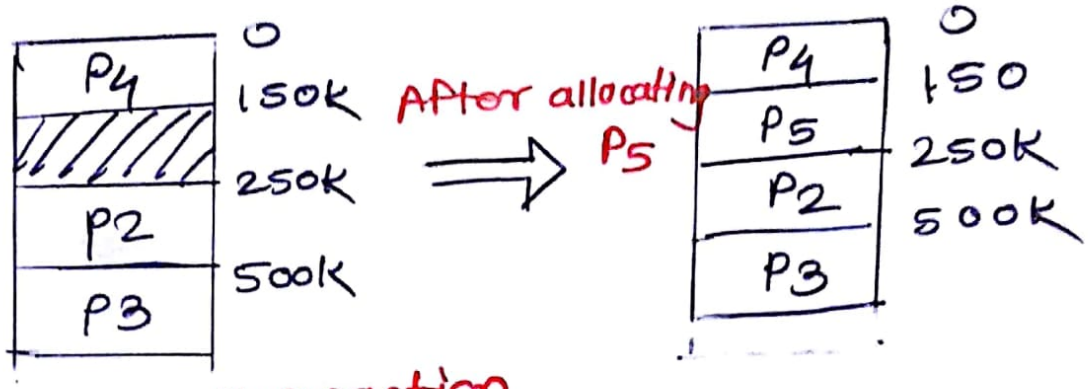


- Let us assume that P_1 terminates It will free 200k memory This space can be given to P_4 as shown
- There are two empty fragments, each of 50k. There is empty space large enough for the requesting process P_5, but the process P_5 can not run as the empty spaces are not contiguous.



storage is fragmented into small number of holes (free space). This problem is also known as external fragmentation.

- One solution to external fragmentation is compaction. It is possible to combine all the h into a large block by moving existing proce as shown



compaction

Advantages of dynamic partitioning:

1. Higher utilization of memory.
2. It supports dynamic memory management. This size of the process can grow during run time
3. There is no problem of internal fragmentation.

Disadvantages of dynamic partitioning

1. Dynamic memory management requires lots of operating system space, time, complex memory management algorithm.
2. Compaction is needed due to external fragmentation. Compaction is the time intensive algorithm.