



Contiguous Memory Allocation – Variable Size Partitioning

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Previous Lecture Covered

- Basics of Memory
- Memory Hierarchy
- Basics of Memory allocation
- Contiguous allocation
- Non-contiguous allocation

Contiguous Memory Allocation

- **Contiguous memory allocation** is a memory allocation method that allocates a single **contiguous** section of **memory** to a process or a file.

Example: Array

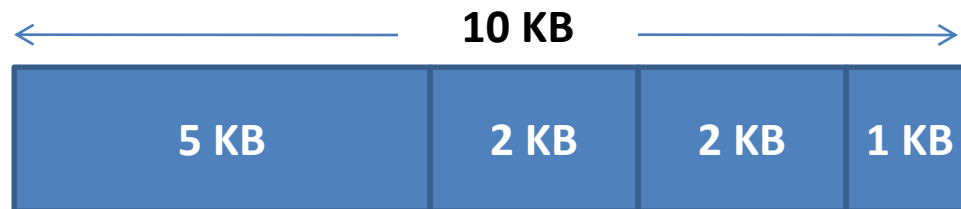
- Advantage: Fast access of element
- Disadvantage: External Fragmentation



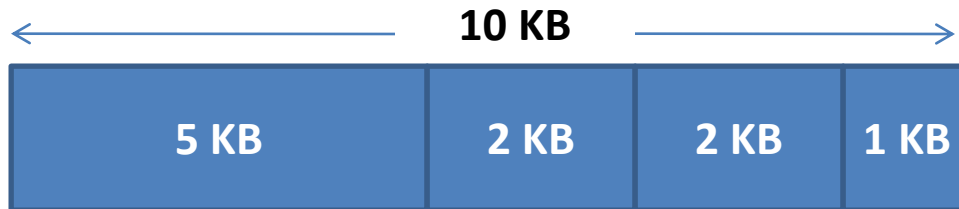
A file of 5 KB needs space in main memory. In total available space is 8 KB but even file can not get space into memory.

Contiguous Memory Allocation- Fixed Size Partitioning

- The simplest technique which can be used to load more than one processes into the main memory.
- It divides the memory in certain partitions.
- The partitions cannot overlap.
- A process must be contiguously present in a partition for the execution.



Contiguous Memory Allocation- Fixed Size Partitioning

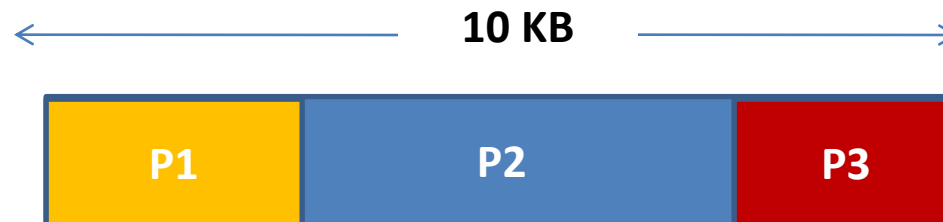


if a process of 4 KB has to be uploaded, it will accommodate first block, where remaining 1 KB is wasted. This is called internal fragmentation

- Internal Fragmentation: If the size of the process is lesser than the total size of the partition then some size of the partition gets wasted and remains unused. This is wastage of the memory and is called internal fragmentation.

Contiguous Memory Allocation- Variable Size Partitioning

- Dynamic partitioning tries to overcome the problems caused by fixed partitioning.
- In this technique, the partition size is not declared initially.
- It is declared at the time of process loading.
- The size of each partition will be equal to the size of the process.
- The partition size varies according to the need of the process so that the internal fragmentation can be avoided.
- P1=3 KB, P2=5 KB, P3=2 KB



Contiguous Memory Allocation- Variable Size Partitioning

No Internal Fragmentation - Given the fact that the partitions in Variable size partitioning are created according to the need of the process, It is clear that there will not be any internal fragmentation because there will not be any unused remaining space in the partition.

Algorithms for selecting free space

1. First Fit: allocate first hole that is big enough. We can stop searching as soon as we find a free hole that is large enough.
2. Best Fit: allocate the smallest hole that is big enough. We must search the entire list, unless the list is ordered by the size.
3. Worst Fit: allocate the largest hole. Again we must search the entire list.

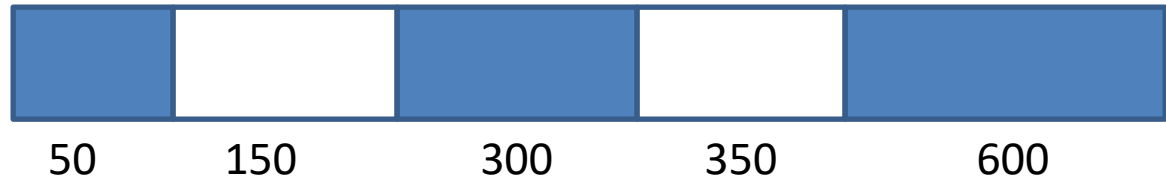
Space Allocation in Variable Size Partitioning

P1=300

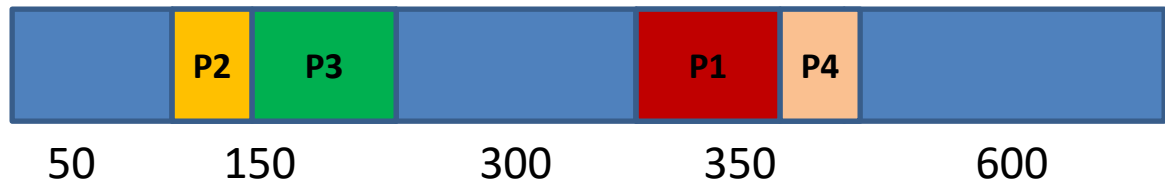
P2=25

P3=125

P4=50

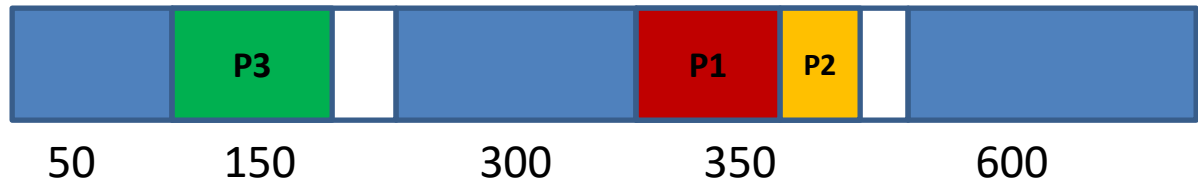


First Fit

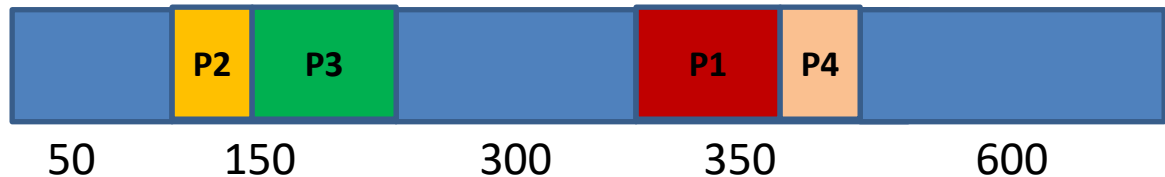


Best Fit

P4 could not get space:
External fragmentation



Worst Fit



Thank You