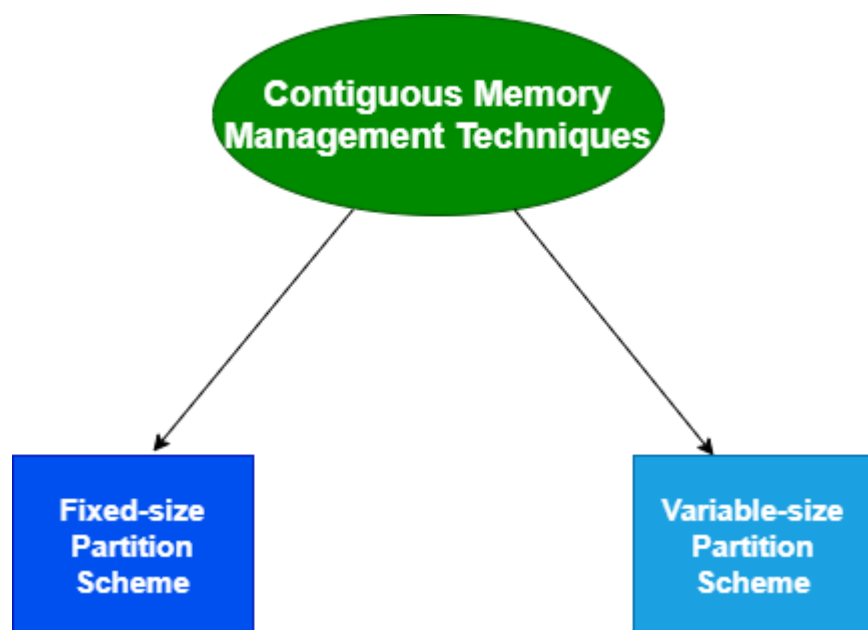


In the Contiguous Memory Allocation, each process is contained in a single contiguous section of memory. In this memory allocation, all the available memory space remains together in one place which implies that the freely available memory partitions are not spread over here and there across the whole memory space.

In **Contiguous memory allocation** which is a memory management technique, whenever there is a request by the user process for the memory then a single section of the contiguous memory block is given to that process according to its requirement.

Contiguous Memory allocation is achieved just by dividing the memory into the **fixed-sized partition**.

The memory can be divided either in the **fixed-sized partition or in the variable-sized partition** in order to allocate contiguous space to user processes.



Fixed-size Partition Scheme

This technique is also known as **Static partitioning**. In this scheme, the system divides the memory into fixed-size partitions. The partitions may or may not be the same size. The size of each partition

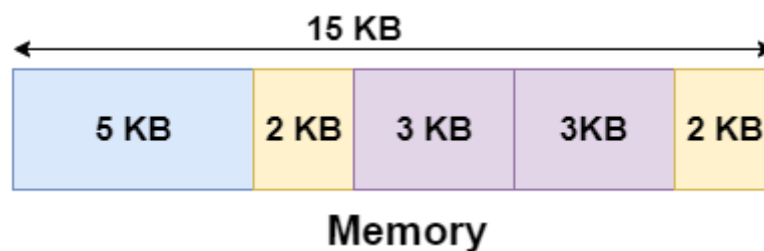
is fixed as indicated by the name of the technique and it cannot be changed.

In this partition scheme, each partition may contain exactly one process. There is a problem that this technique will limit the degree of multiprogramming because the number of partitions will basically decide the number of processes.

Whenever any process terminates then the partition becomes available for another process.

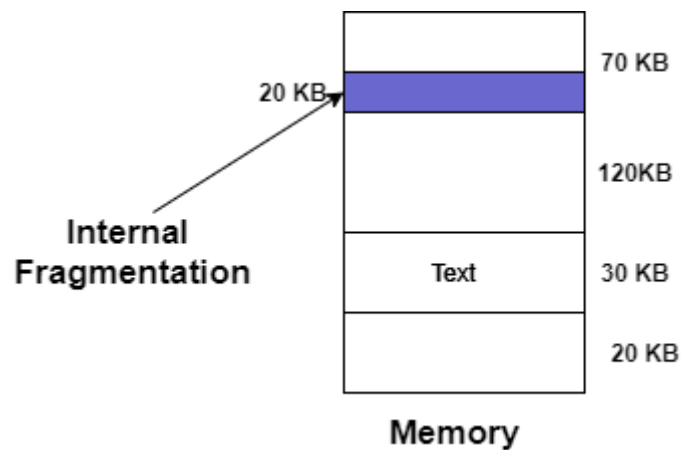
Example

Let's take an example of fixed size partitioning scheme, we will divide a memory size of 15 KB into fixed-size partitions:



It is important to note that these partitions are allocated to the processes as they arrive and the partition that is allocated to the arrived process basically depends on the algorithm followed.

If there is some wastage inside the partition then it is termed **Internal Fragmentation**.



Advantages of Fixed-size Partition Scheme

- This scheme is simple and is easy to implement
- It supports multiprogramming as multiple processes can be stored inside the main memory.
- Management is easy using this scheme

Disadvantages of Fixed-size Partition Scheme

Some disadvantages of using this scheme are as follows:

1. Internal Fragmentation

Suppose the size of the process is lesser than the size of the partition in that case some size of the partition gets wasted and remains unused. This wastage inside the memory is generally termed as Internal fragmentation

As we have shown in the above diagram the 70 KB partition is used to load a process of 50 KB so the remaining 20 KB got wasted.

2. Limitation on the size of the process

If in a case size of a process is more than that of a maximum-sized partition then that process cannot be loaded into the memory. Due to this, a condition is imposed on the size of the process and it is:

the size of the process cannot be larger than the size of the largest partition.

3. External Fragmentation

It is another drawback of the fixed-size partition scheme as total unused space by various partitions cannot be used in order to load the processes even though there is the availability of space but it is not in the contiguous fashion.

4. Degree of multiprogramming is less

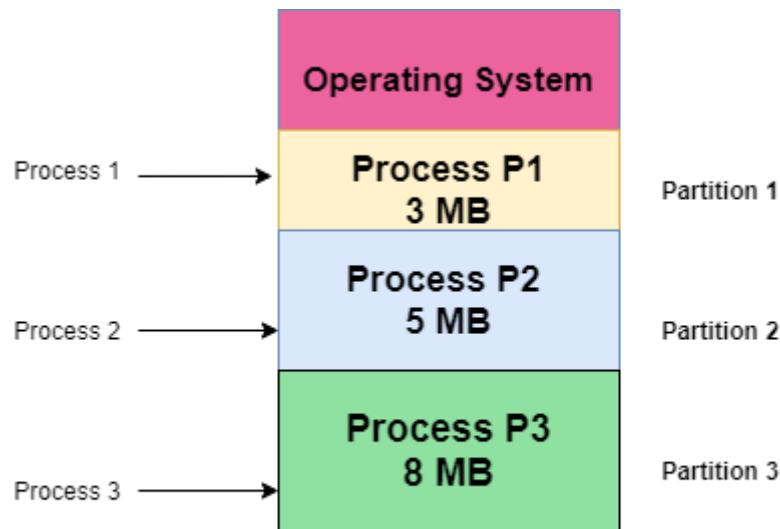
In this partition scheme, as the size of the partition cannot change according to the size of the process. Thus the degree of multiprogramming is very less and is fixed.

Variable-size Partition Scheme

This scheme is also known as **Dynamic partitioning** and is came into existence to overcome the drawback i.e internal fragmentation that is caused by **Static partitioning**. In this partitioning, scheme allocation is done dynamically.

The size of the partition is not declared initially. Whenever any process arrives, a partition of size equal to the size of the process is created and then allocated to the process. Thus the size of each partition is equal to the size of the process.

As partition size varies according to the need of the process so in this partition scheme there is no **internal fragmentation**.



Size of Partition = Size of Process

Advantages of Variable-size Partition Scheme

Some Advantages of using this partition scheme are as follows:

1. **No Internal Fragmentation** As in this partition scheme space in the main memory is allocated strictly according to the requirement of the process thus there is no chance of internal fragmentation. Also, there will be no unused space left in the partition.
2. **Degree of Multiprogramming is Dynamic** As there is no internal fragmentation in this partition scheme due to which there is no unused space in the memory. Thus more processes can be loaded into the memory at the same time.
3. **No Limitation on the Size of Process** In this partition scheme as the partition is allocated to the process dynamically thus the size of the process cannot be restricted because the partition size is decided according to the process size.

Disadvantages of Variable-size Partition Scheme

Some Disadvantages of using this partition scheme are as follows:

1. **External Fragmentation** As there is no internal fragmentation which is an advantage of using this partition scheme does not mean there will no external fragmentation.

Let us understand this with the help of an example: In the above diagram- process P1(3MB) and process P3(8MB) completed their execution. Hence there are two spaces left i.e. 3MB and 8MB. Let's there is a Process P4 of size 15 MB comes. But the empty space in memory cannot be allocated as no spanning is allowed in contiguous allocation.

Because the rule says that process must be continuously present in the main memory in order to get executed. Thus it results in External Fragmentation.

2. **Difficult Implementation** The implementation of this partition scheme is difficult as compared to the Fixed Partitioning scheme as it involves the allocation of memory at run-time rather than during the system configuration.

As we know that OS keeps the track of all the partitions but here allocation and deallocation are done very frequently and partition size will be changed at each time so it will be difficult for the operating system to manage everything.