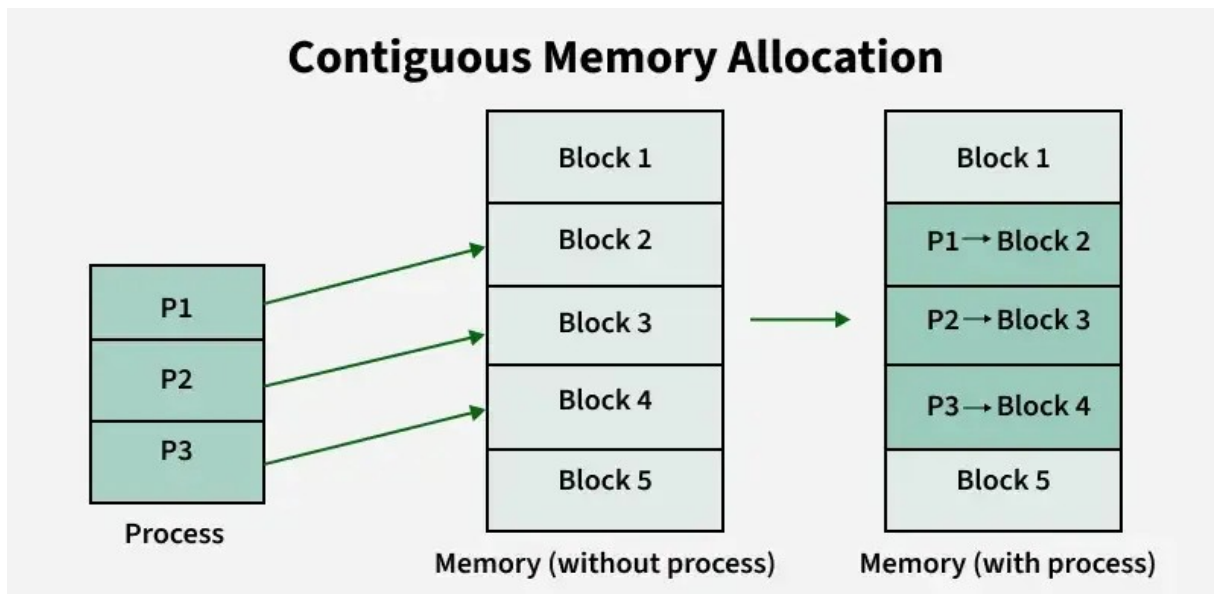


Logical vs Physical Address

An address generated by the CPU is commonly referred to as a logical address. the address seen by the memory unit is known as the physical address. The logical address can be mapped to a physical address by hardware with the help of a base register this is known as dynamic relocation of memory references.

Contiguous Memory Allocation

Contiguous memory allocation is a memory management method where each process is given a single, continuous block of memory. This means all the data for a process is stored in adjacent memory locations.



Partition Allocation Methods

To gain proper memory utilization, memory allocation must be allocated efficient manner. One of the simplest methods for allocating memory is to divide memory into several fixed-sized partitions and each partition contains exactly one process. Thus, the degree of multiprogramming is obtained by the number of partitions.

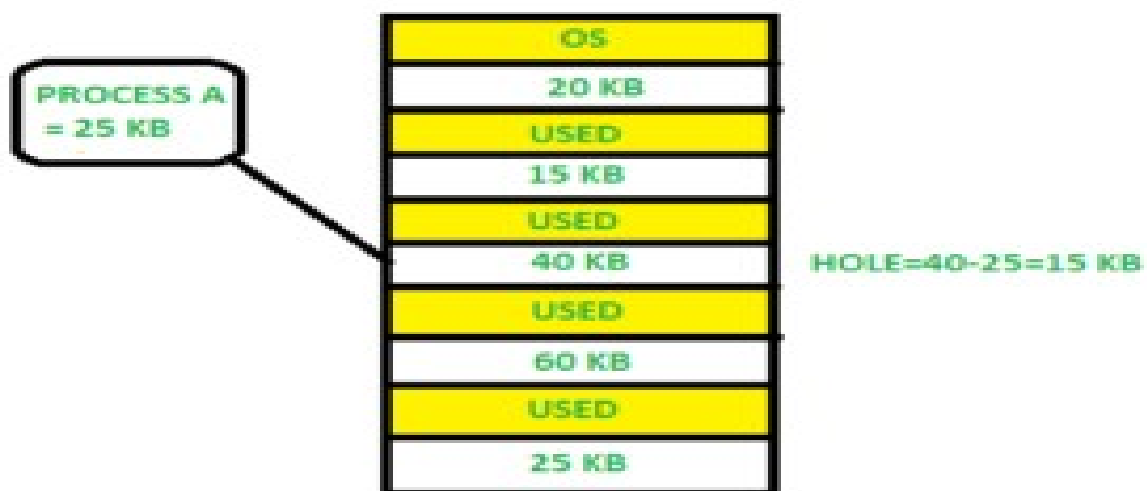
- **Fixed partition allocation:** Memory is divided into fixed-sized partitions during system initialization. Each partition can hold only one process.
- **Dynamic Partition Allocation:** In this allocation strategy, Memory is divided into variable-sized partitions based on the size of the processes.

In **Partition Allocation**, when there is more than one partition freely available to accommodate a process's request, a partition must be selected. To choose a particular partition, a partition allocation method is needed. A partition allocation method is considered better if it avoids internal fragmentation.

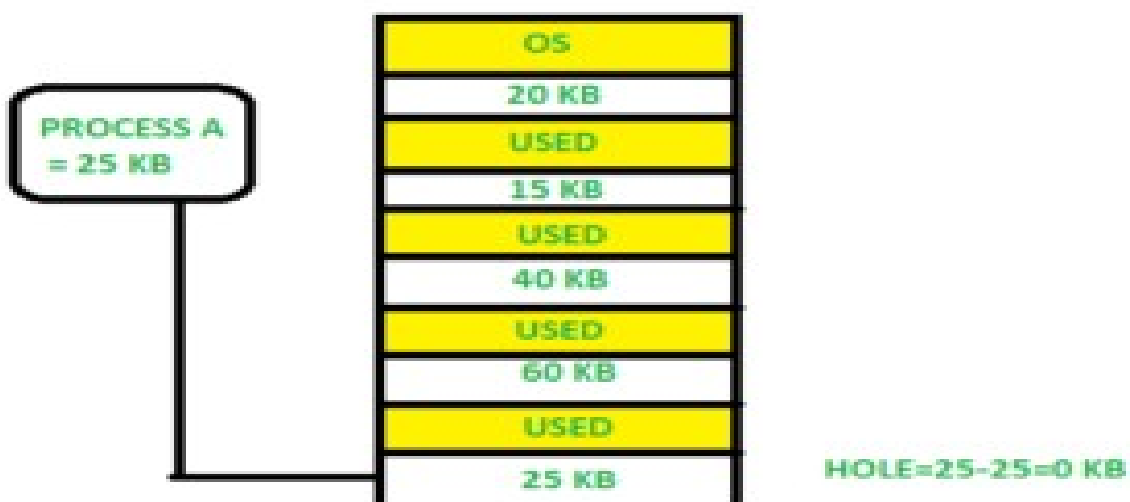
When it is time to load a process into the main memory and if there is more than one free block of memory of sufficient size then the OS decides which free block to allocate.

There are different Placement Algorithm:

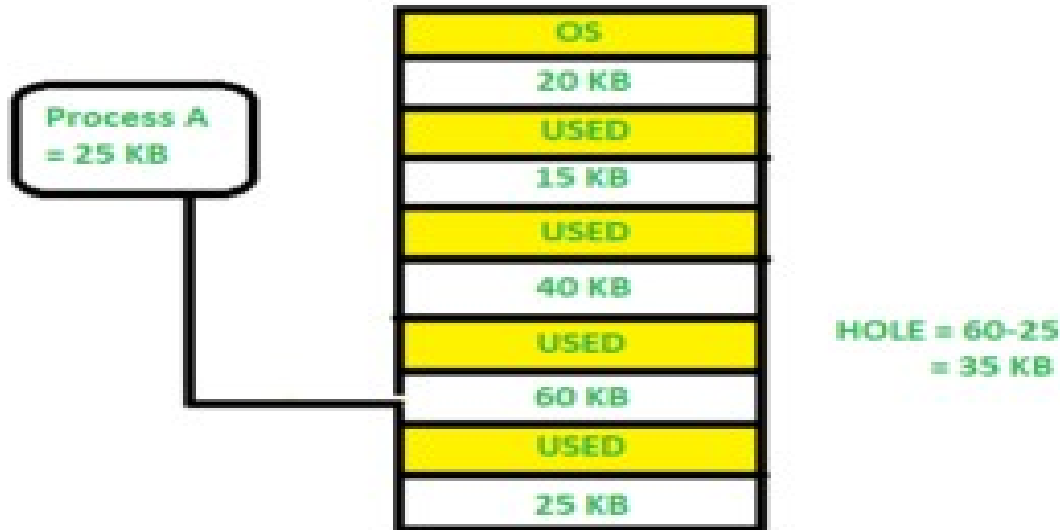
1. First Fit: In the first fit, the partition is allocated which is the first sufficient block from the top of Main Memory. It scans memory from the beginning and chooses the first available block that is large enough. Thus it allocates the first hole that is large enough.



2. Best Fit Allocate the process to the partition which is the first smallest sufficient partition among the free available partition. It searches the entire list of holes to find the smallest hole whose size is greater than or equal to the size of the process.



3. Worst Fit Allocate the process to the partition which is the largest sufficient among the freely available partitions available in the main memory. It is opposite to the best-fit algorithm. It searches the entire list of holes to find the largest hole and allocate it to process.



4. Next Fit: Next fit is similar to the first fit but it will search for the first sufficient partition from the last allocation point.

Comparison of Partition Allocation Methods:

Sl.No.	Partition Allocation Method	Advantages	Disadvantages
1.	Fixed Partition	Simple, easy to use, no complex algorithms needed	Memory waste, inefficient use of memory resources
2.	Dynamic Partition	Flexible, more efficient, partitions allocated as required	Requires complex algorithms for memory allocation
3.	Best-fit Allocation	Minimizes memory waste, allocates smallest suitable partition	More computational overhead to find smallest split
4.	Worst-fit Allocation	Ensures larger processes have sufficient memory	May result in substantial memory waste
5.	First-fit Allocation	Quick, efficient, less computational work	Risk of memory fragmentation

Exercise: Consider the requests from processes in given order 300K, 25K, 125K, and 50K. Let there be two blocks of memory available of size 150K followed by a block size 350K.

Which of the following partition allocation schemes can satisfy the above requests?

- A) Best fit but not first fit.
- B) First fit but not best fit.
- C) Both First fit & Best fit.
- D) neither first fit nor best fit.

Solution:

Best Fit:

300K is allocated from a block of size 350K. 50 is left in the block.

25K is allocated from the remaining 50K block. 25K is left in the block.

125K is allocated from 150 K block. 25K is left in this block also.

50K can't be allocated even if there is 25K + 25K space available.

First Fit:

300K request is allocated from 350K block, 50K is left out.

25K is allocated from the 150K block, 125K is left out.

Then 125K and 50K are allocated to the remaining left out partitions.

So, the first fit can handle requests.

So option B is the correct choice.

Assignment 6: Write a program to simulate the following contiguous memory allocation techniques.

i. Worst-fit

ii. Best-fit

iii. First-fit

iv. Next-fit