

OPERATING SYSTEM

Contiguous Memory Allocation

Definition

Contiguous memory allocation is a memory management technique in which **each process is allocated a single continuous block of memory**.

All the memory locations assigned to a process are **adjacent to each other** in physical memory.

Types / Algorithms of Contiguous Memory Allocation

Contiguous memory allocation mainly uses **two algorithms**:

1. **Fixed Partitioning**
2. **Variable Partitioning**

1. Fixed Partitioning

Definition

In **fixed partitioning**, the main memory is divided into a **fixed number of partitions of equal or unequal size** before processes are loaded.

Each partition can hold **only one process**.

How it Works

- Memory is divided at system start
- A process is placed into any partition large enough
- Unused memory inside a partition is wasted

Advantages

- Simple to implement
- Easy memory management

Disadvantages

- **Internal fragmentation**
- Limited number of processes
- Inefficient memory utilization

Example

If a partition is 200 KB and the process uses only 150 KB, the remaining 50 KB is wasted.

2. Variable Partitioning

Definition

In **variable partitioning**, memory is divided into **partitions of different sizes**, created dynamically according to the **size of the process**.

How it Works

- Memory is allocated exactly as needed
- Partition size changes based on process requirements
- Free memory becomes scattered over time

Advantages

- Better memory utilization
- No internal fragmentation

Disadvantages

- **External fragmentation**
- May require **compaction**

Allocation Algorithms Used

- **First Fit**
- **Best Fit**
- **Worst Fit**

Example

If a process needs 120 KB, the OS creates a 120 KB partition and allocates it.