Swap-Space Management

- **Swapping** is a memory management technique used in multi-programming to increase the number of processes sharing the CPU.
- It is a technique of removing a process from main memory and storing it into secondary memory, and then bringing it back into main memory for continued execution.
- This action of moving a process out from main memory to secondary memory is called **Swap Out** and the action of moving a process out from secondary memory to main memory is called **Swap In**.

Swap-Space :
The area on the disk where the swapped out processes are stored is called swap space.

Swap-Space Management :

- Disk space is used as an extension of main memory by the virtual memory.
- Disk access is much slower than memory access, in the swap-space management disk space is used, so it will significantly decrease system performance.
- The goal of this swap-space implementation is to provide the virtual memory the best throughput.

A swap space can reside in one of the two places –

1. Normal file system
2. Separate disk partition

Normal file system:

- Let the swap-space is simply a large file within the file system.
- To create it, name it and allocate its space **normal file-system** routines can be used.
- This approach, through easy to implement, is inefficient.
- Navigating the directory structures and the disk-allocation data structures takes time and extra disk access.
- **External fragmentation** can greatly increase swapping times by forcing multiple seeks.

Separate disk partition

- Alternate to create the swap space in a separate **raw partition**.
- There is no presence of any file system in this place.

- A swap space storage manager is used to allocate and deallocate the blocks from the raw partition.
- It uses the algorithms for speed rather than storage efficiency, because the access time of swap space is shorter than the file system.
- **Internal fragmentation** increases, but it is acceptable, because the lifespan of the swap space is shorter than the files in the file system.
- Raw partition approach creates a fixed amount of swap space in case of the **disk partitioning**.