

Fragmentation:

In a computer storage system, as processes are loaded and removed from memory, the free memory space is broken into small pieces. In this way memory space is used inefficiently, so the capacity or performance of the system may degrade.

The conditions of the **fragmentation** depend on the system of memory allocation. In most of the cases, memory space is wasted.

Sometimes it happens that memory blocks cannot be allocated to processes due to their small size and memory blocks remain unused. This problem is known as **Fragmentation**.

Cause of fragmentation

User processes are loaded and removed from the main memory, processes are stored in the blocks of main memory. At the time of process loading and swapping there are many spaces left which are not capable to load any other process due to their size.

Due to the dynamical allocation of main memory processes, main memory is available but its space is not sufficient to load any other process.

Types of fragmentation

1. External fragmentation
2. Internal fragmentation

1) External fragmentation

External fragmentation exists when adequate total memory space exists to satisfy a request, but it is not contiguous; storage is fragmented into a large number of holes.

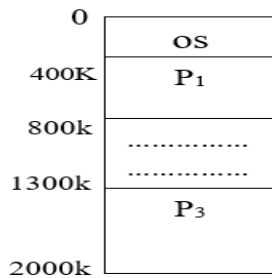


External fragmentation

2) Internal fragmentation

An approach is to allocate very small holes as part of the larger request. Thus the allocated memory may be larger than the requested memory.

The difference between these two numbers is **internal fragmentation** - the memory that is internal to any partition but is not being used.



Internal Fragmentation

There is a hole of 500k. Suppose that next process request 450k. If we allocate the requested block, so there is a hole left which is 50k. This type of condition raises **internal fragmentation**.

Difference between Internal & External Fragmentation:

S.NO	INTERNAL FRAGMENTATION	EXTERNAL FRAGMENTATION
1.	In internal fragmentation fixed-sized memory, blocks square measure appointed to process.	In external fragmentation, variable-sized memory blocks square measure appointed to method.
2.	Internal fragmentation happens when the method or process is larger than the memory.	External fragmentation happens when the method or process is removed.
3.	The solution of internal fragmentation is best-fit block.	Solution of external fragmentation is compaction, paging and segmentation.
4.	Internal fragmentation occurs when memory is divided into fixed sized partitions.	External fragmentation occurs when memory is divided into variable size partitions based on the size of processes.
5.	The difference between memory allocated and required space or memory is called Internal fragmentation.	The unused spaces formed between non-contiguous memory fragments are too small to serve a new process, is called External fragmentation .