FRAGMENTATION AND SEGMENTATION

External fragmentation:

- free space divided into many small pieces
- result of allocating and deallocating pieces of the storage space of many different sizes
- one may have plenty of free space, it may not be able to all used, or at least used as efficiently as one would like to
- Unused portion of main memory

Internal fragmentation:

- result of reserving a piece of space without ever intending to use it
- Unused portion of page

Segmentation:

segmentation is another techniques of non-contiguous memory allocation method. Its different from paging as pages are physical in nature and hence are fixed in size, whereas the segments are logical in nature and hence are variable size.

It support the user view of the memory rather than system view as supported by paging. In segmentation we divide the he logical address space into different segments. The general division can be: main program, set of subroutines, procedures, functions and set of data structures(stack, array etc). Each segment has a name and length which is loaded into physical memory as it is. For simplicity the segments are referred by a segment number, rather than a segment name. Virtual address space is divided into two parts in which high order units refer to 's' i.e., segment number and lower order units refer to 'd' i.e., displacement (limit value).



Segmentation maintains multiple separate virtual address spaces per process. Allows each table to grow or shrink, independently.

Paging Vs Segmentation:

Sno.	Paging	Segmentation
1	Block replacement easy Fixed-length blocks	Block replacement hard Variable-length blocks Need to find contiguous, variable-sized, unused part
2	Invisible to application programmer	Visible to application programmer.
3	No external fragmentation, But there is Internal Fragmentation unused portion of page.	No Internal Fragmentation, But there is external Fragmentation unused portion of main memory.
4	Units of code and date are broken into separate pages.	Keeps blocks of code or data as a single units.
5	segmentation is a logical unit visible to the user's program and id of arbitrary size	paging is a physical unit invisible to the user's view and is of fixed size
6	Segmentation maintains multiple address spaces per process	Paging maintains one address space.
7	No sharing of procedures between users is facilitated.	sharing of procedures between users is facilitated.

Source : http://dayaramb.files.wordpress.com/2012/02/operating-system-pu.pdf