Week 5 Activity 4

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**Which type of fragmentation is reduced by compaction? Explain.**

External fragmentation is reduced by compaction. The reason is that compaction moves and resizes the partitions to allow the free space to be utilized. This is part of the relocatable dynamic partitions memory management scheme.

External fragmentation arises when free memory is separated into small blocks and is interspersed by allocated memory. It is a weakness of certain storage allocation algorithms, when they fail to order memory used by programs efficiently. The result is that, although free storage is available, it is effectively unusable because it is divided into pieces that are too small individually to satisfy the demands of the application. The term "external" refers to the fact that the unusable storage is outside the allocated regions.

For example, consider a situation wherein a program allocates 3 continuous blocks of memory and then frees the middle block. The memory allocator can use this free block of memory for future allocations. However, it cannot use this block if the memory to be allocated is larger in size than this free block.

External fragmentation also occurs in file systems as many files of different sizes are created, change size, and are deleted. The effect is even worse if a file which is divided into many small pieces is deleted, because this leaves similarly small regions of free spaces.