**Operating Systems**

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Operating Systems Environments & Administration

1. Why would using fixed partitions in a current operating system (Windows, Mac OS, Linux, etc.) be a big mistake? Provide at least two (2) reasons.

**Answer:** The process of fixed partitions leads to less-than-complete used of memory space, a phenomenon called internal fragmentation. It’s use in current operating systems which may process multiple tasks of various sizes would be a big mistake. For example, if partition sizes are too small than large jobs will be forced to wait if large partitions are already in use, and they will be rejected outright if they’re too big to fit into the largest partition. Vice versa, if the task is small in comparison to it its partition than a large amount of memory will be wasted.

1. What are some advantages and disadvantages of fixed partitions and dynamic partitions? List at least one (1) advantage and disadvantage for **each**.

**Answer:** Fixed partitioning works well with jobs that are of similar sizes and who sizes are know beforehand. However, if sizes of jobs are more varying than it can lead to large tasks having to wait for large partitions to be free up or for small tasks taking up large partitions which they do not need. There is no internal fragmentation in dynamic partitions as memory is allocated strictly based on the need of the task. Implementation od dynamic partitioning is difficult as it involves allocation of memory during run time rather than system configuration.

1. What is the **primary** problem associated with fragmentation (internal or external)?

**Answer:** Blocks of memory are unused or unavailable which leads to a wastage of memory which could have been used to run other tasks.

1. Why might **internal** fragmentation be worse than **external** fragmentation? Provide at least two (2) reasons.

**Answer:** As long as there is enough memory, external fragmentation will not cause certain tasks to be denied. However, depending on the how large the largest partition is, internal fragmentation may cause a large task to be denied outright or force the task to wait for a necessary partition to become available. External fragmentation occurs when blocks of memory between tasks and are unused, and if these tasks were to be added up, they could be able to support another task. However, in internal fragmentation memory could go unused simply because a relatively small task was put into a large partition.

1. Can **internal** fragmentation occur when using **fixed** partitions?

**Answer:** Yes, the phenomenon of less-than-complete use of memory space in fixed partitions is known as internal fragmentation.

1. Can **external** fragmentation occur when using **fixed** partitions?

**Answer:** No, external fragmentation cannot occur in fixed size partitions because the leftover space cannot be used to run any other processes.

1. Can **internal** fragmentation occur when using **dynamic** partitions?

**Answer:** No, internal fragmentation cannot occur in dynamic partitions because the leftover space can be allocated to the tasks of the same or lesser size of the available space.

1. Can **external** fragmentation occur when using **dynamic**partitions?

**Answer:** Yes, external fragmentation arises when pockets of memory between allocated partitions go unused.

1. What are some advantages and disadvantages of the **First-Fit** memory allocation algorithm? List at least one (1) advantage and disadvantage.

**Answer:** An advantage of first-fit memory is that it allocates memory very fast. A disadvantage of first-fit memory is that space may not be allocated optimally as it does search or sort blocks of memory.

1. What are some advantages and disadvantages of the Be**st-Fit** memory allocation algorithm? List at least one (1) advantage and disadvantage.

**Answer:** An advantage of best-fit memory is that there is very little space that is wasted. A disadvantage of best-fit memory is that it is relatively slow since it takes time to search and sort the best-fir blocks of memory.