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CSCI 6140 – Operating Systems

Project 2 Analysis

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1) **What are the advantages and disadvantages of each of the four algorithms?**

Next Fit:

Advantages: Fast memory access times (no page table or TLB reference), quickest to place process in memory since it finishes scanning as soon as it finds a fit

Disadvantages: Defragmentation is necessary

Best Fit:

Advantages: Fast memory access times (no page table or TLB reference)

Disadvantages: Defragmentation is needed more frequently than in the next fit or worse fit case, must scan all memory to find fit location

Worst Fit:

Advantages: Fast memory access times (no page table of TLB reference)

Disadvantages: Defragmentation is necessary, must scan all memory to find fit location

Non-contiguous:

Advantages: No defragmentation required, faster placement times, since scanning all of memory is not necessary, allows for use of virtual memory, effectively increasing the memory capability of your system

Disadvantages: Slower memory access times due to page table lookup

2) **Which of the three contiguous memory schemes is actually the best?**

The Next fit algorithm appears to work the best. It uses space about as efficiently as Worst Fit, but it (usually) does not need to scan all of memory to find a fit location. However it is difficult to gauge how much extra time that takes, since it is very quick to scan memory in the simulation.

3) **Which of the three contiguous memory schemes is the worst?**

Contrary to what the name implies, the Best Fit algorithm actually performs the worst. This is because the partitions that processes are placed in tend to be slightly larger than the space required, and the leftover space is usually not large enough to fit another process. As a result, the memory space is quickly filled by blocks that are too small to fill any requests, and defragmentation is needed more often.

4) Are there variations to these algorithms that you can come up with to address the various disadvantages of these algorithms?

The best way to address the various disadvantages associated with each of these partitioning schemes is to use a combination of them and have the kernel dynamically decide how it should be done. You can use non-contiguous allocation and virtual memory to effectively increase available memory, while placing processes in physical memory using First Fit. Using a combination of allocation algorithms is the best way to achieve balance and is the way it is done in modern operating systems.