

In addition to the responsibility of managing processes, the operating system must efficiently manage the primary memory of the computer. The part of the operating system which handles this responsibility is called the memory manager. Since every process must have some amount of primary memory in order to execute, the performance of the memory manager is crucial to the performance of the entire system.

"The memory manager is responsible for allocating primary memory to processes and for assisting the programmer in loading and storing the contents of the primary memory. Managing the sharing of primary memory and minimizing memory access time are the basic goals of the memory manager."

While various different strategies are used to allocate space to processes competing for memory, three of the most popular are Best fit, Worst fit, and First fit.

Best fit: The allocator places a process in the smallest block of unallocated memory in which it will fit.

The best fit deals with allocating the smallest free partition which meets the requirement of the requesting process. This algorithm first searches the entire list of free partitions and considers the smallest hole that is adequate. It then tries to find a hole which is close to actual process size needed.

Advantage

Memory utilization is much better than first fit as it searches the smallest free partition first available.

Disadvantage

It is slower and may even tend to fill up memory with tiny useless holes.

Worst fit: The memory manager places a process in the largest block of unallocated memory available. The idea is that this placement will create the largest hold after the allocations, thus increasing the possibility that, compared to best fit, another process can use the remaining space.

In worst fit approach is to locate largest available free portion so that the portion left will be big enough to be useful. It is the reverse of best fit.

Advantage

Reduces the rate of production of small gaps.

Disadvantage

If a process requiring larger memory arrives at a later stage then it cannot be accommodated as the largest hole is already split and occupied.

First fit: There may be many holes in the memory, so the operating system, to reduce the amount of time it spends analyzing the available spaces, begins at the start of primary memory and allocates memory from the first hole it encounters large enough to satisfy the request.

In the first fit approach is to allocate the first free partition or hole large enough which can accommodate the process. It finishes after finding the first suitable free partition.

Advantage

Fastest algorithm because it searches as little as possible.

Disadvantage

The remaining unused memory areas left after allocation become waste if it is too smaller. Thus request for larger memory requirement cannot be accomplished.