

Memory Management Schemes – I

Objective

To schedule the first fit, best fit and worst fit storage allocation algorithms for memory management.

Description

A set of holes of various sizes is scattered through the memory at any given time. when a process arrives and needs the memory, the system searches for a hole that is large enough for this process, the first fit, best fit and the worst fit are the strategies used to select a free hole from the set of available holes.

Implementation Details

Free space is maintained as a linked list of nodes with each node having the starting byte address and the ending byte address of a free block. Each memory request consists of the process id and the amount of storage space required in bytes. Allocated memory space is again maintained as a linked list of nodes with each node having the process id, starting byte address and the ending byte address of the allocated space.

When a process finishes (taken as input), the appropriate node from the allocated list should be deleted and this free disk space should be added to the free space list. Care should be taken to merge contiguous free block into one single block. This can result in deleting more than one node from the free space list and changing the starting and ending addresses in the appropriate node. For allocation, use first, best and worst fit schemes.

First-Fit

Allocate the first hole that is big enough. Searching can start either at the beginning of the set of holes or where the previous first-fit search ended. We can stop searching as soon as we find a free hole that is large enough.

Best-Fit

Allocate the smallest hole that is big enough. We must search the entire list unless the list is kept ordered by size. The strategy produces the smallest leftover hole.

Worst-Fit

Allocate the biggest hole

Lab Tasks

1. Write a program that asks the user the number of available blocks and their sizes. Then it asks the number of arriving processes and their sizes. Your program should result in allocating the memory block to the processes according to the required memory management scheme in the lab.