

Memory Management Part-1



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Memory Management :-

Memory management schemes broadly divided into following categories :

Non-Contiguous Memory Allocation:- It implies that a single logical object may be placed in non-consecutive sets of memory location. Paging (System view) and segmentation (user view) are two mechanisms that are used to manage non-contiguous memory allocation.

Photo -1

Bare Machine (Single User):- It is one of the most simplest memory management method in which user has complete control over the memory while in other models OS has complete control over memory.

The advantage of using this method are:

- a. Flexible
- b. No hardware support is required
- c. No software is needed for OS

While the disadvantage of using this method is: As OS has no control over the memory, it does not provide any services and resources to the user. Such memory management method is used in user-dedicated systems.

Photo -2

Resident Monitor (Single Process Monitor):- It is also simplest memory management method in which memory is divided into two contiguous areas. One of them is usually permanently allocated to the resident portion of the OS (**Monitor**). The remaining memory is allocated to the so-called **transient processes**, which is loaded and executed one at a time, in response to user commands.

Processor and Memory utilization is reduced due to lack of multiprogramming support. Processor cycle wasted because there is no pending work that may be executed while the process is waiting for completion of **I/O operation**.

Multi Programming with fixed Partition:- To improve the performance of the computer system, the concept of multiprogramming was introduced, which states that "more than one processes are accessed at a single instant of time". But only one process is executed by **CPU** at a time in a uniprocessor which (PC) and at that particular time other process may be accessed by I/O process which process is executed and which order is decided by **CPU scheduler**.

Partitioned memory Management for contiguous memory allocating is one of that method in which physical memory is divided into various sectors called '**partitions**', each of which may be allocated at a different process. Depending on when and how partitions are created



and modified, memory partitioning may be fixed(static) or various(dynamic) . In fixed partition method , these partitions could be of different sizes, but once decided at time of system generation (at some time prior to the execution of user program), they could not be changed i.e. fixed . This method could be used with swapping or relocation or without them.

In static partition management, two major problems may occur :-

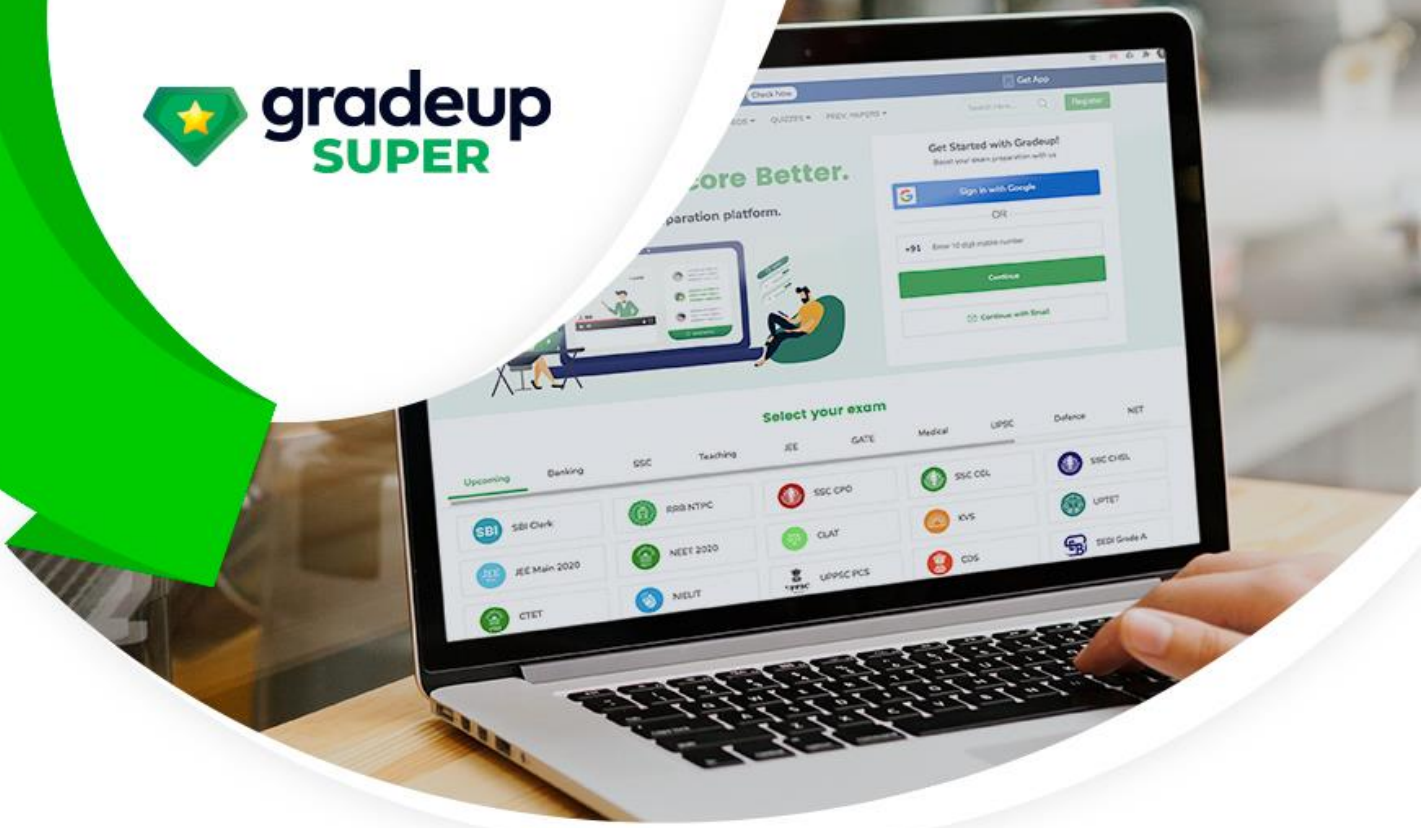
- a. How to select a specific partition for the given process.
- b. What is done when no suitable partition is available for allocation .

The first problem can be solved in several ways, for which first fit and best fit are probably the most common strategies .

The **first fit** approach basically consists of allocating the first fit free partition large enough to accommodate the process being created . For this, the process must be made known to the OS .

The **best fit** approach requires that the OS allocate the smallest free partition that meets the requirements of the process under consideration. By doing its work more thoroughly, best fit may achieve high utilization of memory by creating the smallest possible gap resulting from the difference in size between the process and its allocated partition. This difference in size is called **internal fragmentation** of memory which causes a primary problem in **static partitioned** .





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