

Memory Management

* Requirements of memory management system

Requirements are:

① Relocation:

The available memory is generally shared among a number of processes in a multiprogramming system, so it is not possible to know in advance which other programs will be resident in main memory at the time of execution of his program.

Swapping the active processes in and out of the main memory enables the operating system to have a larger pool of ready to execute process.

When a program gets swapped out to disk memory, then it is not always possible that when it is swapped back into main memory then it occupies the previous memory location, since the location may still be occupied by another process. He may need to relocate the process to a different area of memory. Thus there is a possibility that program may be moved in main memory due to swapping.

② Protection:

There is always a danger when we have a multiple programs at the same time as one program may write to the address space of another program, so every process must be protected against unwanted

interference when other process tries to write in a process whether accidental or ~~ind~~ incidental.

Between relocation and protection requirement a trade-off occurs as the satisfaction of relocation requirement increases the difficulty of satisfying the protection environment.

⑥ sharing :

A protection mechanism must have allow several processes to access the same portion of main memory.

Allowing each processes access to the same copy of the program rather than have their own separate copy has an advantage.

For eg. multiple processes may use the same system file and it is natural to load one copy of the file in main memory & let it shared by those processes. It is the task of memory management to allow controlled access to the shared areas of memory without compromising the protection. Mechanisms are used to support relocation supported sharing capabilities.

④ Logical organization

Main memory is organized as linear or it can be a one-dimensional address space which consists of sequence of bytes or words.

⑤ Physical organization

The structure of computer memory has two levels referred to as main memory and secondary memory. Main memory is relatively very fast and costly as compared to the secondary memory.

Main memory is volatile. Thus secondary memory is provided for storage of data on a long-term basis while main-memory holds currently used programs.

The major system concern between main memory and secondary memory is the flow of information and it is impractical for programmers to understand this for two reasons:

- The programmer may engage in a practice known as overlaying when the main memory available for a program and its data may be insufficient. It allows different modules to be assigned the same region of memory.
- In a multiprogramming environment, the programmer does not know how much space will be available at the time of coding and where that space will be located inside the memory.