Lecture 5

Paging Problem

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Principles ofOperating System –Naresh chauhan

A process of size 200MB needs to be swapped into the hard disk. But there is no space in memory. A process of size 250 MB is lying idle in memory and therefore, it can be swapped out. How much swap time is required to swap-in & swap-out the process if: Average latency time of hard disk=10 ms, Transfer rate of hard disk= 60 MB/s

Solution:

The transfer time of the process to be swapped into hard disk

=200/60

=3.34 s **=3340ms**

Therefore, the swap time of 200 MB process **=3340+10=3350ms**

The transfer time of the process to be swapped –out from memory

=250/60 **=4.17 s**

=4170ms

Therefore, the swap time of 250 MB process **=4170+10=4180 ms**

Total swap time **=3350 + 4180 = 7530 ms**

A process is to be swapped-in at the location 20100 in memory. If logical addresses generated by the process are 200, 345, 440 and 550, what are the corresponding physical addresses?

Solution:
The relocation register will be loaded with the address 20100. so adding the logical addresses to the relocation register, the corresponding physical addresses are as follows:

20100 + 200 = 20300
20100 +345=20445
20100 +440=20540
20100 +550=20650

A process has re-locatable code of size of 900 K. The relocation register is loaded with 40020 K. If the processes generates a logical address 990, where will it be located in the physical memory?

Solution

The physical address corresponding to logical address 990

= re-location register address + logical address

=40020+990

=41010

But the process will **not be allocated**, because it is greater than the address in the limit register, hence violating the criterion for protection. Consequently, an **interrupt** will be generated.

Three processes P1, P2 and P3 of size 21900, 21950 and 21990 bytes, respectively, need space in the memory. If equal-sized partitions of 22000 bytes are allocated to P1, P2 & P3, will there be any fragmentation in this allocation?

Solution:

After allocating the partitions to the processes, the leftover space in each partition is estimated by the difference between partition size and process size. Hence,

The leftover space in 1st partition = 22000-21900=100 bytes

The leftover space in 2nd partition = 22000-21950=50 bytes

The leftover space in 3rd partition = 22000-21990=10 bytes

The leftover space in each partition is nothing but internal fragmentation,