

(GC310): Applied Operating Systems

1. Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212K, 417K, 112K, and 426K (in order)? Which algorithm makes the most efficient use of memory?

Solution:

First-Fit:

212K is put in 500K partition.
417K is put in 600K partition.
112K is put in 200K partition.
426K must wait.

Best-Fit:

212K is put in 300K partition.
417K is put in 500K partition.
112K is put in 200K partition.
426K is put in 600K partition.

Worst-Fit:

212K is put in 600K partition.
417K is put in 500K partition.
112K is put in 300K partition.
426K must wait.

In this example, Best-Fit turns out to be the best.

2. Consider a paging system with the page table stored in memory. If a memory reference takes 200 nanoseconds, how long does a paged memory reference take?

Solution:

A paged memory reference would take **400** nanoseconds; 200 nanoseconds to access the page table and 200 nanoseconds to access the word in memory.

(GC310): Applied Operating Systems

3. Assume a program P1 is loaded into memory with the following SMT:

Segment	Limit	Base
0	4000	1000
1	8000	2000

Translate the address (1,50) to an absolute address.

Solution:

<#segment, Offset> \longrightarrow <1, 50>
offset is less than limit \longrightarrow 50 < 8000 (OK)
<base, offset> \longrightarrow <2000, 50> \longrightarrow 2000 + 50 = 2050.