COMP SCI 3004/7064 Operating Systems

Tutorial III-a

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?

2. Consider a paging system with the page table stored in memory.

a. If a memory reference takes 200 nanoseconds, how long does a paged memory reference take?

b. If we add associative registers, and 75 percent of all page-table references are found in the associative registers, what is the Effective memory Access Time (EAT)? (Assume that finding a page-table entry in the associative registers takes 20 nanoseconds.)

3. What is the effect of allowing two entries in a page table to print to the same page frame in memory? Explain how this effect could be used to decrease the amount of time needed to copy a large amount of memory from one place to another. What could the effect of updating some byte in one page be on the other pages?

4. Why are segmentation and paging sometimes combined into one scheme?

5. Consider the following segment table:

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

What are the physical addresses for the following logical addresses?

a. 0,430

b. 1,10

c. 2,500

d. 3,400

e. 4,112

6. In the IBM/370, memory protection is provided through the use of *keys*. A key is a 4-bit quantity. Each 2K block of memory has a key (the storage key) associated with it. The CPU also has a key (the protection key) associated with it. A *store* operation is allowed only if both keys are equal, or if either is zero. Which of the following memory-management schemes could be used successfully with this hardware?

a. Bare machine

b. Single-user system

c. Multiprogramming with a fixed number of processes

d. Multiprogramming with a variable number of processes

e. Paging

f. Segmentation