Systems Programming and Operating Systems	**Assignment 4**
CS414, Summer 1996	**August 1, 1996; Due on Aug 8, 1996**

Problem 1 (25 points)

Problem 12.2 from the book. Reproduced here for convenience:

Let the head of a moving-disk head with 200 tracks numbered 0 to 199 be currently serving a request on track 143, and has just finished servicing a request at track 125. Suppose that the queue of pending requests kept in FIFO order is

86, 147, 91, 177, 94, 150, 102, 175, 130

What is the total number of head movements (i.e. tracks covered) to service the requests using each of the following disk scheduling mechanisms?

1. FCFS
2. SSTF
3. SCAN
4. LOOK
5. C-SCAN

Problem 2 (20 points)

Assume that for your machine, there is a 32-bit virtual address space and 1MBytes of physical memory.

1. Suppose that you use segmentation, with p bits for the segment number and the remaining bits for the segment offset. What is the size of the largest segment? If at any time memory utilization is at least 50%, what is the minimum size of the segment table?
2. Suppose that you use paging instead and the page size of the memory is 1KByte. How many bits of the virtual address would be used for the offset into the page table? What is the size of each entry in the page table? How large is the page table?

Problem 3 (15 points)

Problem 8.5 of the book, reproduced here for convenience.

Given memory partitions of size 100K, 200K, 300K, and 600K (in order), how would a memory system process requests (in order) 212K, 417K, 112K and 426K according to each of the following algorithms? In each case, what is the memory utilization?

1. Best-fit
2. First-fit
3. Worst-fit