CS 376	**Operating Systems**	Test 3
Name:	Winter 2K	Max Pts: 51

Important: This is an open book test. You can use any books, notes, or paper. *Do not log into the computer during the test.* Any calculations and rough work can be done on the back side of the test pages.

1. [6 pt] A minicomputer uses the first-fit system for memory management. Initially, it has one block of 256K at address 0. After successive requests for 79K, 8K, 231K, 94K, 153K, 224K, 98K, 113K, 72K, and 163K come in, how many blocks are left and what are their sizes and addresses? Repeat the problem for best fit algorithm.

2. [2 pt] What is the purpose of the directories `lost+found` and `proc` in Unix?

3. [4 pt] NFS can support files from non-Unix systems. What is the property of NFS that allows it to do so? Can you name one disadvantage of using NFS?

4. [15 pt] If FIFO page replacement is used with 3 page frames, how many page faults will occur with the reference string

   3 6 2 6 4 6 2 4 3 8 9 8 3 4 8 3 7 9 7

   if the frames are initially empty. Now repeat this problem for OPT, LRU and second chance algorithm. How will it perform with a window size of 5 under the working-set algorithm?

5. [18 pt] Disk requests come in to the disk driver for cylinders 201, 98, 143, 129, 159, 250, 247, 222, 206, and 156 in that order. A seek takes 2 msec per cylinder moved. The arm is currently at cylinder 244. The cylinders are numbered from 0 to 255. How much seek time is needed for

   (a) FCFS scheduling

   (b) SSTF scheduling

   (c) Elevator algorithm (initially moving away from cylinder 0)

   (d) C-SCAN scheduling (initially moving away from cylinder 0) satisfying requests as the head moves away from cylinder 0

   (e) LOOK scheduling (initially moving towards cylinder 0)

   (f) C-LOOK scheduling (initially moving towards cylinder 0) satisfying requests as the head moves away from cylinder 0

6. [6 pt] Consider a machine with disk blocks of 1K bytes. The system can theoretically support a disk of size 4GB but no more. What is the maximum file size possible using the BSD scheme of 12 direct blocks, 1 single indirect block, 1 double indirect block, and 1 triple indirect block in the inode table? What happens if the machine gets a new disk with 2GB? Can this disk be supported? What will be the maximum file size for the disk?