CS 376	**Operating Systems**	Test 3
Name:	Fall 2K	Max Pts: 49

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. [10 pt] A minicomputer uses the first-fit system for memory management. Initially, it has one block of 256K at address 0. The requests come in the following order:

Arrival time	Burst time	Memory needed
0	4	248
6	4	19
13	14	105
18	7	230
25	6	56
28	2	152
31	16	193
36	1	13
37	14	98
43	2	181

   How many blocks are left at times 4, 10, 21, 33, and 48, and what are their sizes and addresses? Repeat the problem for best fit algorithm.

2. [15 pt] If FIFO page replacement is used with 3 page frames, how many page faults will occur with the reference string

6 5 2 6 1 0 7 0 1 0 1 5 2 1 4 0 4 6 0

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 4 under the working-set algorithm?

3. [18 pt] Disk requests come in to the disk driver for cylinders 73, 193, 221, 99, 244, 16, 177, 238, 33, and 252 in that order. A seek takes 2 msec per cylinder moved. The arm is currently at cylinder 171. 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

4. [6 pt] Consider a machine with disk blocks of 2K bytes. We just bought a new disk for this system with capacity 20 GB. 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?