CS 376	**Operating Systems**	Test 3
Name:	Fall 1998	Max Pts: 41

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. [5 pt] Why are the page size, the number of pages in the virtual address space, and the number of page frames in the physical address space all a power of 2 in computer systems?

2. [6 pt] Suppose a file system is based on the index allocation strategy for managing blocks. Assume each file has a directory entry giving the file name, first index block, and the length of the file. The first index block, in turn, points to 249 file blocks and to the next index block. Each subsequent index block is of the same structure as well. If the file is currently positioned at logical block 2010 and the next operation is to access logical block 308, how many physical blocks must be read from the disk? Explain your answer.

3. [12 pt] If FIFO page replacement is used with 3 page frames, how many page faults will occur with the reference string

2 3 4 3 2 4 3 2 4 5 6 7 5 6 7 4 5 6 7 2 1

if the four frames are initially empty. Now repeat this problem for LRU and second chance algorithm. How will it perform with a window size of 6 under the working-set algorithm?

4. [18 pt] Disk requests come in to the disk driver for cylinders 38, 158, 113, 115, 51, 27, 10, 19, 12, and 86 in that order. A seek takes 6 msec per cylinder moved. The arm is currently at cylinder 20. The cylinders are numbered from 0 to 199. 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)

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

   (f) C-LOOK scheduling (initially moving towards cylinder 0)