CS 4760	**Operating Systems**	Test 3
Name:	Spring 2016	Max Pts: 58

Important: This is an open book test. You can use any books, notes, or paper but no electronic device. *Do not log into the computer during the test, or use any electronic or communications device. Change your cell phones to silent mode*. Any calculations and rough work can be done on the back side of the test pages. If there is a syntax error in any program segment, just write it down and you will get full credit for the problem. Please write legibly; if I cannot read what you wrote, I'll give you a zero. You will lose five points for not writing your name.

1. [6 pt] Why do we need the capability to relocate processes?

2. [6 pt] Consider a fixed partitioning memory management scheme with equal size partitions of 2^{16} bytes and a total main memory size of 2^{24} bytes. A process table is maintained that includes a pointer to a partition for each resident process. How many bits are required for the process?

3. [6 pt] Briefly describe the elements found in a page table entry.

4. [10 pt] Consider a machine with the memory access time for RAM to be 100ns. You are running processes that, on an average, have 1 page fault in 20,000 memory accesses. Out of these page faults, 1 in 3 pages turn up with their dirty bit set. The disk has a seek time of 11ms and is spinning at 14,400 rpm. Consider about 1ms for transfer time for data. At any time, there are, on an average, two processes in the device queue. Compute the effective memory access time for this system.

5. [18 pt] Consider a disk with 256 cylinders, indexed from 0 to 255, with 0 being the innermost and 255 being the outermost cylinder. The system receives disk requests on the following tracks in the specified order

   100, 69, 147, 77, 159, 52, 51, 132

   The head is currently on cylinder 164, and is moving towards inner cylinder (cylinder 0). Give the total number of tracks traversed for the given requests using each of the following algorithms.

   (a) FCFS scheduling

   (b) SSTF scheduling

   (c) SCAN scheduling

   (d) C-SCAN scheduling, servicing requests as head moves outwards

   (e) LOOK scheduling

   (f) C-LOOK scheduling, servicing requests as head moves outwards

6. [6 pt] What is the difference between block-oriented devices and stream-oriented devices from OS perspective? Give two examples of each.

7. [6 pt] Why is the average search time to find a record in a file less for an indexed sequential file than for a sequential file?