CS 4760	**Operating Systems**	Test 3
Name:	Fall 2011	Max Pts: 40

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. Switch off your cell phones*. 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. You will lose five points for not writing your name.

1. [6 pt] How does the Unix kernel optimize memory usage when it creates a new process using `fork(2)`?

2. [8 pt] Contrast the use of magic number and file extension to determine file type by the kernel. Describe at least one advantage of each. Also give one disadvantage of each.

3. [6 pt] Why cannot we assign CPU to another process in programmed I/O?

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 25,000 memory accesses. Out of these page faults, 1 in 5 pages turn up with their dirty bit set. The disk has a seek time of 15ms and is spinning at 14,400 rpm. Consider about 1ms for transfer time for data. At any time, there are two processes in the device queue. Compute the effective memory access time for this system.

5. [10 pt] Consider a machine with disk blocks of 4K bytes. You have a new disk of size 2TB. What is the theoretical maximum file size possible using the UFS scheme of file allocation?