CS 4760	**Operating Systems**	Test 1
Name:	Spring 2010	Max Pts: 40

Important: This is an open book test. You can use any books, notes, or paper, but not exchange anything with other students. You are not allowed to use any electronic/communication devices, including a calculator. *Do not log into the computer during the test. Switch off your cell phones.* Any calculations and rough work can be done on the back side of the test pages. You will lose five points for not writing your name.

1. [6 pt] What is the difference between spatial locality and temporal locality in the context of program execution?

2. [6 pt] The programmed I/O typically wastes a lot of CPU time due to mismatch of speed with the I/O devices. However, it is very simple to program. Give an instance where it may not matter that we waste so many CPU cycles by using programmed I/O.

3. [6 pt] What is the procedure to change a running program without changing the process? Give the name of the system call involved in the operation.

4. [6 pt] What is the difference between an interrupt and a trap?

5. [6 pt] What are *daemons* and *zombies* in Unix? Can we perform some meaningful task through zombies? Explain your answer.

6. [6+4 pt] Explain the three requirements in the protocol to solve the problem of race conditions in the concurrent environment. Define them and give an example. Does the following code completely satisfy our protocol?

```
extern bool lock ( false );        // In shared memory

void process ( const int i )       // Code for ith process
{
    do
        while ( test_and_set ( lock ) );
        critical_section();
        lock = false;
        remainder_section();
    while ( 1 );
}
```