CS 4760	**Operating Systems**	Test 1
Name:	Fall 2013	Max Pts: 44

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 and e-books. *Do not log into the computer during the test. Switch off your cell phones. Any device with an* ON-OFF *switch should have its switch in the* OFF *position.* 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 type of hardware support is required to implement cycle stealing?

2. [6 pt] Explain why does the use of DMA result in the CPU memory accesses to slow down?

3. [6 pt] What is the difference between synchronous and asynchronous interrupts? Given an example of each of them.

4. [6 pt] Two processes execute the following command on the semaphore `mutex` concurrently:

```
signal ( mutex );
```

What will be the effect of the conconcurrent signal on `mutex` by those two processes?

5. [6 pt] Explain what happens during a context switch by enumerating the steps starting from the cause to the completion.

6. [6 pt] We described a few algorithms for mutual exclusion (for example, the hardware-based solution) where we suggested that we may not have the bounded-wait condition for our protocol to be satisfied. Yet, we said that we'll be satisfied with the solution. Why?

7. [8 pt] We added two states – "Blocked Suspended" and "Ready Suspended" in our process state transition model. Explain the need for those two states. How do the different states in our model compare with the process states in Linux?