CS 4760	**Operating Systems**	**Test 2**
Name:	Spring 2012	Max Pts: 44

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 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 is the difference between turnaround time and response time?

2. [6 pt] How can you prevent the circular wait condition in to prevent a deadlock? How does Linux prevent circular wait in kernel spinlocks?

3. [6 pt] In a fixed partitioning scheme, what are the advantages of using unequal-sized partitions? Any disadvantages?

4. [6 pt] What are the advantages of early binding compared to late binding? What are the advantages of late binding compared to early binding?

5. [10 pt] Assume a system with four resource types, $C = \langle 11, 5, 9, 11 \rangle$ (this is the total number of resources in the system, and not what is currently available), and the maximum claim table shown below.

Process	R_0	R_1	R_2	R_3
p_0	5	4	2	3
p_1	2	4	2	3
p_2	4	0	1	4
p_3	3	2	2	3
p_4	1	3	3	4

The resource allocator is considering allocating resources according to the following table:

Process	R_0	R_1	R_2	R_3
p_0	1	2	2	2
p_1	2	0	2	2
p_2	4	0	1	4
p_3	3	1	2	3
p_4	1	2	0	0

Run the safety algorithm on this system to determine if this state is safe. If it is safe, give the sequence in which processes can be run. If it is unsafe, enumerate the processes that may get involved in a deadlock.

6. [10 pt] You have a physical memory of 64MB, starting at address 0. Your operating system requires at least 10MB all the time. Consider the arrival of processes as follows:

Process	Burst time	Arrival time	Memory needed
p_0	3	1	19MB
p_1	7	2	39MB
p_2	8	2	47MB
p_3	12	8	15MB
p_4	15	15	22MB
p_5	7	24	44MB
p_6	8	25	17MB
p_7	16	34	36MB

Show the layout of memory, using best-fit algorithm, at times 10, 20, 30, 40, and 50.