Operating Systems Course	**Deadline**: 19 May 2012
Assignment 7: Deadlock& Disk Management	**Instructor**: Hossein Momeni
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Problem 1.

A computer has *six* tape drives, with *n* processes competing for them. Each process may need *two* drives. For which values of *n* is the system deadlock free?

Problem 2.

Can a system be in a state that is neither *deadlocked* nor *safe*? If so, give an example. If not, prove that all states are either deadlocked or safe.

Problem 3.

The banker's algorithm is being run in a system with *m* resource classes and *n* processes. In the limit of large *m* and *n*, the number of operations that must be performed to check a state for safety is proportional to $m^a n^b$. What are the values of *a* and *b*?

Problem 4.

Consider the following snapshot of a system:

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following questions using the banker's algorithm.

- Is the system in a safe state?
- If yes, mention the sequence in which the processes can finish their job.

Problem5.

Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is

86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms?

A) FCFS
B) SSTF
C) SCAN
D) LOOK
E) C-SCAN
F) C-LOOK