LOKNAYAK JAI PRAKASH INSTITUTE OF TECHNOLOGY CHAPRA, BIHAR

Subject: Operating Systems **Assignment- 2** **Subject Code:** CS 1403

1. Define Deadlock. List four necessary conditions for occurrence of Deadlock. How deadlock can be prevented?
2. Elaborate upon the conditions necessary for a deadlock situation to arise.
3. A system contains 6 units of Resource and n processes that uses the resources. What is maximum value of n for which the system will be deadlock free if the maximum requirement of each process is 3.
4. Explain Bankers Algorithm. Considering a system with five processes P_0 through P_4 and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. Suppose at time t_0 following snapshot of the system has been taken:

Process	Allocation	Max	Available
	A B C	A B C	A B C
P_0	0 1 0	7 5 3	3 3 2
P_1	2 0 0	3 2 2	
P_2	3 0 2	9 0 2	
P_3	2 1 1	2 2 2	
P_4	0 0 2	4 3 3	

5.
   a. **What will be the content of the Need matrix?**.
   b. **Is the system in a safe state? If Yes, then what is the safe sequence?**
   c. **What will happen if process P_1 requests one additional instance of resource type A and two instances of resource type C?**
6. Discuss various Mechanisms for Deadlock Recovery.
7. Explain the usage of Resource Allocation Graph for Deadlock Avoidance.
8. Write the steps of Bankers Algorithm and Bankers Safety Algorithm with Examples.
9. A system has 4 processes and 5 allocatable resources. The current allocation and maximum needs are as follows-

	Allocated					Maximum				
A	1	0	2	1	1	1	1	2	1	3
B	2	0	1	1	0	2	2	2	1	0
C	1	1	0	1	1	2	1	3	1	1
D	1	1	1	1	0	1	1	2	2	0

If Available = [0 0 X 1 1], what is the smallest value of x for which this is a safe state?