



Course Code: MCA-105

Course Name: Operating Systems with Linux

### Assignment - 3

*Marks*  
(3)

Q1. Consider the following snapshot of a system:

Process	Allocation	Claim	Available
	A B C D	A B C D	A B C D
P <sub>0</sub>	0 0 1 2	0 0 1 2	1 5 2 0
P <sub>1</sub>	1 0 0 0	1 7 5 0	
P <sub>2</sub>	1 3 5 4	2 3 5 6	
P <sub>3</sub>	0 6 3 2	0 6 5 2	
P <sub>4</sub>	0 0 1 4	0 6 5 6	

- a) Is the system in a safe state?  
b) If a request from process P<sub>1</sub> arrives for (0, 4, 2, 0), can the request be granted immediately?
- Q2. Explain the concept of Monitor for process synchronization. How it is different from the Semaphore? By considering appropriate example, demonstrate the working of Monitor towards mutual exclusion of processes. (3)
- Q3. Consider the following page reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. Determine the number of page faults for the following replacement algorithms, considering three, four and five frames. Remember all frames are initially empty, so your first unique pages will all cost one fault each. (3)
- (a) LRU replacement  
(b) FIFO replacement  
(c) Optimal replacement
- Q4. Discuss the use and importance of different levels of RAID structure. Could a RAID level 1 organization achieve better performance for read requests than a RAID level 0 organization (with non-redundant striping of data)? If so, how? (3)
- Q5. Consider a system that supports the strategies of contiguous, linked, and indexed allocation. Identify the criteria which should be used in deciding which strategy is best utilized for a particular file? (3)