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**#207, Kambipura, Mysore road, Banglore-74**

**Department of Computer Science & Engineering**

**MODULE -3**

**DEADLOCKS**

1. Define deadlock. What are the necessary conditions for deadlock? Explain different methods for deadlock detection and recovery from deadlock.
2. Describe resource allocation graph
3. With deadlock ii) With a cycle but no deadlock
4. What is wait for graph? Explain how it is useful for detection of deadlock.
5. What are the different methods to handle deadlocks? Also explain Deadlock prevention and deadlock avoidance.
6. 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

1. Find out need matrix.
2. Is the system in a safe state?
3. If a request from process P2 arrived for (0,4,2,0) can it be granted immediately?
4. Consider the following snapshot of a system:

Allocation Max Available

A B C A B C A B C

P0  0 0 2 0 0 4 1 0 2

P1 1 0 0 2 0 1

P2 1 3 5 1 3 7

P3 6 3 2 8 4 2

P4 1 4 3 1 5 7

1. Find the need matrix and calculate safe sequence using Banker’s algorithm. Mention the above system is safe or not safe.
2. If a request from process P2 arrives for (002), can the request be granted immediately?
3. Consider the following snapshot of resource allocation at time t1

Allocation Request Available

A B C A B C A B C

P0  0 1 0 0 0 0 0 0 0

P1 2 0 0 2 0 2

P2 3 0 3 0 0 0

P3 2 1 1 1 0 0

P4 0 0 2 0 0 2

1. Show that the system is not deadlocked by generating one safe sequence.
2. At instance t2, P2 makes one additional request for instance of type C. Show that the system is deadlocked if the request is granted. Write down the deadlocked processes.
3. State and explain banker’s algorithm for deadlock avoidance.
4. Explain the multistep processing of a user program with a neat block diagram.
5. What is the principle behind paging? Explain its operation, clearly indication how the logical addresses are converted to physical addresses.
6. What is paging? Explain paging hardware with translation look-aside buffer.
7. Explain the structure of page table with respect to hierarchical paging.
8. Explain segmentation with an example.
9. Given the 5 memory partitions 100 KB, 500 KB, 200 KB, 300 KB and 600 KB, how each of the first fit, best fit and worst fit algorithms place processes of 212 KB, 417 KB, 112 KB and 426 KB size. Which algorithm makes efficient use of memory?
10. What is locality of reference? Differentiate between paging and segmentation.
11. Explain the differences between:
12. Logical and physical address space
13. Internal and external fragmentation.