**Operating Systems (16CS304)**

**UNIT-II**

**[One Mark Questions]**

1. Define a semaphore?
2. What is monitors?
3. What is binary semaphore?
4. What is counting semaphore?
5. What are operations performed on semaphore?
6. What is busy waiting?
7. What is spinlock?
8. What is mutex locks?
9. Define priority inversion.
10. What are the data structures of reader-writer problem?
11. What are the data structures of bounded buffer problem?
12. What are the data structures of Dining-Philosophers Solution Using Monitors.
13. Write the syntax of monitor.
14. The operations that can be invoked on a condition variable are \_\_\_\_\_\_\_\_\_\_\_ .
15. Write definition of wait().
16. Write definition of signal().
17. Define semaphore as a structure.
18. What is indefinite blocking?

**[Ten Mark Questions]**

1. Explain in detail on Semaphores.
2. State the dining philosopher’s problem and give a solution using monitors.
3. Give a solution to producer consumer problem using semaphores.

**UNIT-III**

**[One Mark Questions]**

1. Define deadlock.
2. Define starvation.
3. RAG stands for --------
4. What are the necessary conditions for a deadlock situation?
5. Define circular wait.
6. Define hold and wait.
7. Define no preemption.
8. What is request edge?
9. What is assignment edge?
10. What is claim edge?
11. How do we represent processes and resource types?
12. How do we represent claim edge?
13. What is safe state?
14. What is safe Sequence?
15. What is unsafe Sequence?
16. Define deadlock avoidance.
17. Define deadlock prevention.
18. Define deadlock detection.
19. Give the name of algorithm used for deadlock avoidance.
20. Name the data structures used in Banker’s algorithm.
21. What are the contents of Available vector in Banker’s algorithm?
22. What are the contents of Max matrix in Banker’s algorithm?
23. What are the contents of Allocation matrix in Banker’s algorithm?
24. What are the contents of Need matrix in Banker’s algorithm?
25. How do we calculate need in banker’s algorithm?
26. What is a wait-for graph?
27. How to wait-for graph is generated from RAG?
28. What are the possible ways to recover from deadlock?
29. What are the 3 issues addressed for resource preemption?
30. Define rollback.

**[Ten Mark Questions]**

1. a. Explain the necessary conditions for a deadlock to arise in a system.

b. With an example explain the concept of Resource-Allocation graph.

1. a. Explain the concept of safe, unsafe and deadlock state with an example.
   1. Explain deadlock prevention.
2. a. Explain deadlock detection.

b. How does recovery from deadlock is achieved in a system.

1. 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 Banker’s algorithm :

a) What is the content of the matrix Need?

b) Is the system in safe state?

c) If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately.

1. Write and explain safety algorithm and resource-request algorithm.

**UNIT-IV**

**[One Mark Questions]**

1. What are the various memory partitioning techniques?
2. Define internal fragmentation.
3. Define external fragmentation.
4. Define compaction.