**Module 3**

1.Illustrate Peterson’s solution and synchronization hardware for the critical section problem.

2.Define deadlock. Explain different methods to recover from deadlocks.

3.Consider the following snapshot of the system:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Allocation | | | | Max | | | | Available | | | |
|  | **A** | **B** | **C** |  | **A** | **B** | **C** |  | **A** | **B** | **C** |  |
| p0 | 0 | 1 | 0 |  | 7 | 5 | 3 |  | 3 | 3 | 2 |  |
| P1 | 2 | 0 | 0 |  | 3 | 2 | 2 |  |  |  |  |  |
| P2 | 3 | 0 | 2 |  | 9 | 0 | 2 |  |  |  |  |  |
| P3 | 2 | 1 | 1 |  | 2 | 2 | 2 |  |  |  |  |  |
| P4 | 0 | 0 | 2 |  | 4 | 3 | 3 |  |  |  |  |  |

Answer the following questions using Banker’s algorithm:

1. What is the content of the need matrix?
2. Is the system in a safe state? If yes, mention the safe sequence.

If a request from process P1 arrives for (1,0,2) can the request be granted immediately?

4. Consider the following snapshot of the system: Answer the following questions using Banker’s algorithm.

1. What is the content of the need matrix?
2. Is the system in a safe state? If yes, mention the safe sequence. If a request from process P1 arrives for (0,4,2,0) can the request be granted immediately?

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 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 |  |  |  |  |

**Module 4**

1.Discuss the structure of the page table with suitable diagram.

2.Explain the demand paging and discuss the steps in handling page fault using the appropriate diagram.

**Module 5**

1.What is a file? What are its attributes? Explain the file operations.

2.Discuss the various directory structures with neat diagrams.