Set Number - 2

1. Explain the concept of a thread-safe data structure, and provide an example of its implementation, including the benefits of using thread-safe data structures for concurrent programming?

2. Describe the working of the Priority Scheduling algorithm, and explain its advantages and disadvantages, including the impact on system performance and responsiveness?

3. What is a deadlock, and how can it be prevented in a system?

4. What is a network topology, and how does it affect network performance, including the use of different topologies such as bus, star, and mesh?

5. Consider a system with 5 processes (P1-P5) and 2 resource types (A, B). The available resources are A = 8, B = 4. Given the maximum need and allocated resources, determine whether a deadlock exists using the Banker's Algorithm, and explain the result, including the use of resource allocation graphs?

6. What is a cloud computing platform, and how does it provide on-demand resources, including the use of virtualization and containerization?

7. What is a page fault, and how is it handled by the operating system?

8. What are the possible methods to recover from a deadlock? Section C: Long Answer Questions (5 marks each) Consider a system with 5 processes (P1-P5) and 3 resource types (A, B, C). The available resources are A = 10, B = 5, C = 7. Given the maximum need and allocated resources, determine whether a deadlock exists using the Banker?s Algorithm. Discuss a real-world example where deadlock occurs (e.g., database transactions, operating systems, traffic systems) and suggest possible solutions to avoid it.

9. What is a socket, and how is it used in network programming?

10. Explain the working of the Round Robin (RR) scheduling algorithm, and provide an example of its implementation?

11. Describe the difference between a process and a thread, and explain their roles in multitasking?

12. Describe the working of the Rate Monotonic Scheduling (RMS) algorithm, and explain its advantages and disadvantages, including the impact on system performance and responsiveness?

13. Explain the difference between a paging and a segmentation system?

14. Explain the concept of a process migration, and provide an example of its use in load balancing, including the benefits of using process migration for distributed systems?

15. Describe a real-world example of a deadlock in an operating system, and suggest possible solutions to avoid it, including the use of deadlock prevention and avoidance techniques?

16. Explain the concept of caching, and provide an example of its use?

17. Consider a system with 3 processes (P1-P3) and 2 resource types (A, B). The available resources are A = 6, B = 3. Given the maximum need and allocated resources, determine whether a deadlock exists using the Banker's Algorithm, and explain the result, including the use of resource allocation graphs?

18. Explain the concept of a semaphore, and provide an example of its use in synchronizing access to a shared resource, including the benefits of using semaphores for mutual exclusion?