

****Lab Practice - V (Distributed Computing System)****

****Question Bank****

****Assignment 1: RMI (Remote Method Invocation)****

1. What is Remote Method Invocation (RMI)?
2. Explain the concept of stub and skeleton in RMI.
3. Write steps to implement RMI based application.

4. Write a program to create a simple RMI server and client.
5. What are the advantages of using RMI in distributed applications?
6. Explain how to start the rmiregistry and why it is necessary.
7. Differentiate between local method calls and remote method calls.
8. How do you handle RemoteExceptions in RMI?
9. What role does the Naming service play in RMI?
10. Explain the lifecycle of a remote method call in RMI.

****Assignment 2: CORBA (Common Object Request Broker Architecture)****

11. What is CORBA?

12. Explain the concept of IDL (Interface Definition Language) in CORBA.

13. Write the steps involved in creating a CORBA-based application in Java.

14. What is the role of the ORB (Object Request Broker) in CORBA?

15. Differentiate between CORBA and RMI.

16. Write a program to create a simple CORBA server and client for a Calculator application.

17. What is IIOP in CORBA?

18. What is Portable Object Adapter (POA) in CORBA?

19. Explain the role of the Naming Service in CORBA.

20. How does Java support CORBA integration?

****Assignment 3: MPI or OpenMPI (Message Passing Interface)****

21. What is Message Passing Interface (MPI)?
22. Write the steps to install and configure MPJ Express.
23. Write a Java program using MPI to distribute array elements among processors.
24. How does MPI help in achieving parallelism?
25. Differentiate between MPI and OpenMP.
26. What is the significance of MPI_COMM_WORLD communicator?

27. Explain the use of MPI_Send and MPI_Recv functions.

28. What is the difference between Scatter and Gather in MPI?

29. How are the intermediate sums calculated in distributed array sum using MPI?

30. Explain Single Program Multiple Data (SPMD) model with respect to MPJ Express.

****Assignment 4: Berkeley Algorithm (Clock Synchronization)****

31. What is Berkeley's algorithm?

32. Write steps involved in Berkeley clock synchronization.

33. How is the master node selected in Berkeley's algorithm?
34. Explain the importance of clock synchronization in distributed systems.
35. Differentiate between Cristian's algorithm and Berkeley's algorithm.
36. How is the average clock offset calculated in Berkeley's algorithm?
37. What are the features of Berkeley's algorithm?
38. How does Berkeley's algorithm handle faulty nodes?
39. What is the role of master and slave nodes in Berkeley's algorithm?
40. Illustrate Berkeley's algorithm with an example.

****Assignment 5: Token Ring Based Mutual Exclusion Algorithm****

41. What is the token ring algorithm?

42. Write a program to implement token ring mutual exclusion.

43. How is the token passed in a token ring algorithm?

44. What happens if the token is lost in a token ring system?

45. How does token ring ensure mutual exclusion?

46. Explain the advantages of token ring algorithm.

47. What are the drawbacks of the token ring method?

48. Describe the message complexity in token ring algorithm.

****Assignment 6: Bully and Ring Algorithm (Leader Election)****

49. What is the Bully algorithm for leader election?

50. What is the Ring algorithm for leader election?

51. Write a program to implement Bully algorithm.

52. Write a program to implement Ring algorithm.

53. How does a node initiate an election in Bully algorithm?

54. What are the assumptions made in Bully algorithm?

55. Compare Bully and Ring election algorithms.

56. How does the Ring algorithm ensure fairness during election?

****Assignment 7: Web Services (SOAP and REST)****

57. What is a web service?

58. Differentiate between SOAP and REST web services.

59. Write steps to create a simple SOAP-based web service in Java.

60. What is WSDL?

61. Explain the basic architecture of a SOAP-based web service.

62. What is UDDI?

63. How does RESTful web service differ from traditional web services?

64. Write steps to create a simple RESTful web service.

65. What are the HTTP methods used in RESTful web services?

66. Explain how to consume a web service in a Java client application.

****Extra Questions****

67. What is distributed computing?

68. Why is fault tolerance important in distributed systems?

69. Explain the challenges in designing distributed systems.

70. What is scalability in distributed systems?

****End of Question Bank****