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Question Paper Code : 90929

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2025.

Fifth Semester

Computer Science and Engineering

CS 3551 – DISTRIBUTED COMPUTING

(Common to : Computer Science and Design/Computer Science and Engineering
(Artificial Intelligence and Machine Learning)/Computer Science and Engineering
(Cyber Security)/Computer and Communication Engineering/Artificial Intelligence
and Data Science/Information Technology)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Outline the communication models used in distributed systems.
2. Compare message passing systems and shared memory system.
3. Define casual ordering and total ordering with reference to distributed systems.
4. What is logical clock in distributed system?
5. What are the requirements of mutual exclusion algorithms?
6. What is phantom deadlock?
7. What is domino effect in distributed system?
8. Define Consistent global state and consistent global checkpoint.
9. What is virtualization in cloud computing?
10. Why load balancing is important in cloud computing?

PART B — (5 × 13 = 65 marks)

11. (a) What is distributed system and how it is different from network of systems? Explain various primitives for distributed communication.

Or

- (b) Describe the major design issues and challenges in distributed systems.

12. (a) What is vector clock? Explain the Singhal-Kshemkalyani's differential technique for implementing vector clock

Or

- (b) What is snapshot in distributed system and what are the needs of taking snapshots the system? Illustrate Chandy-Lamport's snapshot recording algorithm.

13. (a) Explain the Suzuki-Kasami algorithm for achieving mutual exclusion in distributed systems.

Or

- (b) Explain Chandy-Misra-Haas deadlock detection algorithm for the AND model.

14. (a) Illustrate coordinated and uncoordinated check pointing rollback-recovery techniques with their relative advantages and disadvantages.

Or

- (b) Illustrate the algorithm for asynchronous check pointing and recovery and explain.

15. (a) Explain various cloud service models with their characteristics and advantages.

Or

- (b) Explain the major driving factors and challenges of cloud computing

PART C — (1 × 15 = 15 marks)

16. (a) Identify the different types of failure in distributed systems. What are the three major failures which are to be addressed promptly for the success of the distributed systems from your point of view? Give a solution to tackle any three failures. Clearly explain, how the suggested solution handle the failures.

Or

- (b) Identify the limitations of the path-pushing and edge-chasing algorithms for deadlock detection in distributed systems and suggest a technique to overcome the limitations. Clearly explain how the suggested technique overcomes the limitations.