Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50907

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024

Fifth Semester

Computer Science and Design

CS 3551 – DISTRIBUTED COMPUTING

(Common to: Computer Science and Engineering/ 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. Distinguish between message passing systems and shared memory systems.

2. What are the motivations for distributed systems?

3. Define global state and consistent global state.

4. What are the limitations of logical clock?

5. List the advantages and limitations of token-based algorithms for implementing mutual exclusion.

6. What is a false deadlock and when does it occurs?

7. Outline the issues in failure recovery.

8. What are the advantages and disadvantages of asynchronous checkpointing?

9. What is virtualization in cloud computing?

10. List the characteristics of cloud computing.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the design issues and challenges in the design of distributed operating systems.

Or

(b) Explain blocking, non-blocking, synchronous and asynchronous primitives for distributed communication. Also summarize major libraries and standards for building distributed applications.

12. (a) What is snapshot and what are the needs of taking snapshot in distributed systems? Outline Chandy–Lamport algorithm for snapshot and illustrate the algorithm.

Or

(b) Explain various ways of ordering messages in group communications. Also illustrate distributed algorithm to implement total order and causal order of messages.

13. (a) Outline the Chandy–Misra–Haas algorithm to detect deadlock in OR model and illustrate the algorithm with an example.

Or

(b) Outline Ricart and Agrawala's algorithm for implementing mutual exclusion in distributed systems and illustrate the algorithm.

14. (a) What is check pointing and why it is needed in distributed systems? Illustrate the algorithm proposed by Juang and Venkatesan for asynchronous check pointing and recovery.

Or

(b) What is agreement in a failure free system? Explain how agreement is reached in message–passing synchronous systems with failures.

15. (a) Explain the types of cloud computing deployment models with their relative advantages and disadvantages.

Or

(b) Discuss about the Cloud storage services and Application services.

PART C — (1 × 15 = 15 marks)

16. (a) The management of an autonomous education institution decided to migrate its website and database from on-premises infrastructure to the Cloud. As an expert of cloud computing you are contacted by management to identify the best suited cloud deployment model and service model for the institution. Describe the important factors you can consider for selecting the cloud deployment model and service model for the institution. Also justify, in what way the selected models are best suited for the institution compared to other models.

Or

(b) Outline the Koo and Toueg coordinated check pointing and recovery technique and apply this algorithm to a specific case study to demonstrate how this algorithm avoids the domino effect and live lock problems during the recovery.

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