Question Paper Code : 20874

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

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 and Information Technology)

(Regulations – 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   State the differences from synchronous and asynchronous communication along with the buffering strategy adapted in both.

2.   List the role of shared memory systems.

3.   How do you define the scalar time and the vector time?

4.   If the two events e_1 and e_2 of two different processes occur at same time, independently. What kind of relationship exist between e_1 and e_2?

5.   What are the various deadlock detection in distributed systems? State a common factor in detecting the deadlock.

6.   How beneficial is the Chandy-Misra-Haas algorithm in the AND model and OR model?

7.   What is a checkpoint in the recovery system? How is it useful?

8.   State the issues in failure recovery. State the means to identify the failure at an early stage.

9.   What is virtualization? Why is it required in the larger organization?

10. State the relation of compute service with storage service in a cloud environment.

PART B — (5 × 13 = 65 marks)

11. (a) Explain message passing systems and discuss on the message oriented middleware and its types. Also explain their functionality in distributed computing.

Or

(b) Analyze the concepts of heterogeneity, openness, security, scalability impact of the distributed systems. How is the standardization of them make them effective?

12. (a) Give a real time scenario where FIFO message queue is used. Write and describe the snapshot algorithms for FIFO channels.

Or

(b) Describe the physical clock synchronization and logical clock synchronization and explain the framework of a system of logical clock.

13. (a) State the Lamport's algorithm and its use and also the limitations and benefits. Compare this with any two token based algorithms.

Or

(b) Explain the system models with its preliminaries and how is it characterized in the models of deadlock.

14. (a) Explain the facts associated with agreement in failure-free systems of both synchronous and asynchronous systems.

Or

(b) What are the different check pointing based recovery systems available? Explain the coordinated check pointing algorithm with illustration.

15. (a) A company like to have an advanced collaboration services like video, chat and web conferences for their employees, but their system does not support any of the IT resources due to insufficient infrastructure. If they could leverage cloud computing technology in their system, suggest a suitable cloud type with proper justification. List the characteristic of cloud computing.

Or

(b) Explain the different cloud services and the platform that support these services. Give an example for application service adapted by any organization.

PART C — (1 × 15 = 15 marks)

16. (a) Consider an ABC IT company wanted to provide services like scientific converter, data converter, currency converter and some of the business logic as a server side component to the developer to tailor make the application. Explain the various adaptable technologies to implement in an distributed environment. State its merit and demerits.

Or

(b) An organization has planned to implement a client module that emulates a conventional file system interface for application programs, and server modules, that perform operations for clients on directories and on files. State the best distributed architecture to deploy and deliver the system. Also explain the suitable system model to avoid failures and adapt a recovery system for the same in case of unavoidable failures.