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B. TECH.
(SEM VII) THEORY EXAMINATION 2019-20
DISTRIBUTED SYSTEM

Time: 3 Hours**Total Marks: 70****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief.****2 x 7 = 14**

- a. Where can distributed transactions be used?
- b. Define fault and failure.
- c. Define global state and consistent global state.
- d. Define Causal order and Total Order.
- e. Explain token-based algorithm.
- f. State Byzantine agreement problem.
- g. Define transparency. List various types of transparencies in Distributed systems.

SECTION B**2. Attempt any three of the following:****7 x 3 = 21**

- a. Describe Lamport- Shostak-Pease algorithm. How does vector clock overcome the disadvantages of Lamport clock? Explain with an example.
- b. Give the deadlock handling strategies in distributed systems. What are the differences in centralized, distributed and hierarchical control organizations for distributed deadlock detection?
- c. Write short note on any one of the following:
 - (i) Flat and Nested transaction.
 - (ii) Timestamp ordering for Transaction Management.
- d. Define forward and backward recovery. List advantages and disadvantages of forward recovery. Explain two approaches of backward error recovery.
- e. What is agreement protocol? Discuss the general system model where agreement protocols are used. Give the applications of agreement protocols.

SECTION C**3. Attempt any one part of the following:****7 x 1 = 7**

- (a) What are vector clocks? Explain how vector clocks are implemented using implementation rule of vector clocks? Give the advantages of vector clock over Lamport clock.
- (b) What are distributed systems? What are significant advantages, applications & limitations of distributed systems? Explain with examples, what could be the impact of absence of global clock & shared memory?

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4. Attempt any *one* part of the following:**7 x 1 = 7**

- (a) What is Mutual exclusion? Describe the requirements of mutual exclusion in distribute system. Is mutual exclusion problem more complex in distributed system than single computer system? Justify your answer.
- (b) What do you mean by deadlock avoidance? Explain in brief. Describe edge chasing deadlock detection algorithm.

5. Attempt any *one* part of the following:**7 x 1 = 7**

- (a) Describe mechanism for building distributed file system. Explain data access actions in distributed file system.
- (b) Discuss the architecture of distributed shared memory and various design issues related to this memory.

6. Attempt any *one* part of the following:**7 x 1 = 7**

- (a) What is checkpoint in message passing system? Show that when checkpoints are taken after every K ($K > 1$) message sent, the recovery mechanism suffers from domino effect. Assume that a process takes a checkpoint immediately after sending the K^{th} message but doing nothing else.
- (b) What is voting protocol? Compare and contrast Static and dynamic voting protocol.

7. Attempt any *one* part of the following:**7 x 1 = 7**

- (a) What do you mean by atomic commit in distributed database system? Also explain the two-phase commit protocol used for realizing atomicity in distributed system.
- (b) Discuss the optimistic methods for distributed concurrency control. Explain what are the different validations conditions for optimistic concurrency control?