Sub Code: RCS701

Paper Id: 110729 Roll No:

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?

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