B.Tech.
(SEM. VIII) EVEN THEORY EXAMINATION 2012-13
DISTRIBUTED SYSTEMS

Time : 3 Hours
Total Marks : 100

1. Attempt any two questions : \(10 \times 2 = 20\)

(a) What are the inherent limitations of distributed system? What could be the impact of absence of global clock and shared memory?

(b) Define global state and consistent global state. Give the Chandy-Lamport's global state recording algorithm.

(c) Discuss following with suitable example:
   (i) Causal order
   (ii) Total order.

2. Attempt any two questions : \(10 \times 2 = 20\)

(a) With reference to the token based algorithm, explain how Raymond tree based algorithm works?

(b) Show that in Ricart-Agrawala algorithm the critical section is accessed according to increasing order of timestamps. Does the same hold true in Maekawa’s algorithm?
(c) Suppose all the processes in the system are assigned priorities that can be used to totally order the processes. Modify edge chasing algorithm so that when a process detects a deadlock, it also knows the lowest priority deadlock process.

3. Attempt any two questions: \[ (10 \times 2 = 20) \]
   (a) Discuss the Oral Message algorithm OM(m), where m > 0. With the help of suitable example show that it solves the Byzantine agreement problem for \( 3m + 1 \) or more processors in the presence of at most m faulty processors.
   (b) In the context of distributed file system explain following:
       (i) Mounting
       (ii) Caching
       (iii) Bulk Data transfer.
   (c) Explain the read replication and full replication algorithm for implementing distributed shared memory.

4. Attempt any two questions: \[ (10 \times 2 = 20) \]
   (a) Describe any checkpointing and recovery algorithm that takes a consistent set of checkpoints and avoids livelock problems.
   (b) Discuss the majority based dynamic voting protocol.
   (c) Discuss following with suitable example:
       (i) Consistent set of checkpoints and Strongly consistent set of checkpoints.
       (ii) Orphan messages and Lost messages.
5. Attempt any two questions: (10x2=20)

(a) Describe two-phase commit protocol. Give the state transition diagram of this protocol. What are the demerits of this protocol?

(b) Discuss the optimistic methods for distributed concurrency control. What are the different validations conditions for optimistic concurrency control? Explain it.

(c) Write short notes on any one of the following:

(i) Flat and Nested transaction

(ii) 2PL and strict 2PL.