POKHARA UNIVERSITY

Level: Bachelor | Semester: Fall | Year : 2021
Programme: BE | Full Marks: 100
Course: Distributed System | Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) How synchronous communication is different from asynchronous communication? Explain the major characteristic features of distributed system? 7
   b) What are the ways to perform Interprocess communication in distributed system? Explain the implementations issues of N-tier client server architecture. 8
2. a) What are the similarities and dissimilarities between RPC and RMI? Explain the term distributed object, remote object, remote interface, proxy and skeleton. 7
   b) How traditional RPC lacks in access transparency? Explain the detail of RPC semantics in presence of failure? What are the mechanisms to handle orphan message? 8
3. a) Explain Berkeley clock synchronization algorithm. 8
   b) Why is computer clock synchronization necessary? Describe the design requirements for a system to synchronize the clocks in a distributed system. 7
4. a) What are the basic requirements for the distributed mutual exclusion? Explain Ricart Agarwala token based algorithm for distributed mutual exclusion. 7
   b) Explain the necessity of leader process in distributed system. Consider the ring based leader election algorithm with 7 processes (P0, P1, P2, P3, P4, P5, and P6) are arranged in a logical ring such that the clockwise orientation of processes a P0→P5→P4→ P6→ P3→ P1→ P2→P0. Assume that process P6 is the leader and crashes. Further, assume that processes P1, P4 and P2 notice this crash and initiate simultaneous elections. Explain the optimized way to select the leader. 8

5. a) What is fault, failure and fault tolerance? Explain five phases performing a request by replication manager. 7
   b) What is forward and backward recovery? Explain naïve snapshot algorithm for recovery mechanism. 8
6. a) What is Atomic commitment protocol? Explain the locking rule for two phase locking. 7
   b) How deadlock are handled in distributed system? Discuss different deadlock detection algorithm. 8
7. Write short notes on: (**Any two**) 2×5
   a) Cloud computing
   b) DNS
   c) Byzantine agreement problem and solution algorithm