Exam Date & Time: 25-May-2023 (02:30 PM - 05:30 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

SIXTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, MAY 2023

DISTRIBUTED SYSTEMS [CSE 3251]

Marks: 50		Duration: 180 mins.
	Α	
Answer all	the questions.	
Instructions	to Candidates: Answer ALL questions Missing data may be suitably assumed	
1)	Illustrate the following design goals of Distributed Systems.	
	a) Making distribution transparent	
A)	b) Being scalable	(4)
B)	Explain how logical layering of applications is viewed at three	
	different layers with an example of internet search engine.	(3)
C)	Describe the view of middleware organization in a distributed	
	system with the diagrammatic representation of wrapper	(3)
	and broker.	(5)

2) The Figure 1 shows 5 messages exchanged between 4 processes. Identify the values of the vector clock for each of the messages, while sending & receiving. Also, using the value of the timestamps, find out if sending of m5 causally depends on sending of m4.



Figure 1:Diagram for Vector Clock

- B) Explain how total-ordered multicasting can be implemented in a group of processes.
- (3)
- C) While selecting super peers in a large peer-to-peer system, illustrate the role of gossiping protocol along (3) with a suitable diagram.

3) With diagrams, explain the different variations on RPC.

(4)

- B) What is the role of destination address in transferring messages from one queue manager to another (remote) queue manager in IBM's WebSphere message queue system? With a neat diagram, discuss the general organization of a message queueing network using routing tables and aliases. (3)
- C) How a node identifier of another name space can be associated with a node in a current name space? What is the role of foreign name space, mount point and mounting point in resolving names in the distributed systems? Discuss in detail with a necessary diagram.
- Assume chord ring with 4 highlighted nodes 1, 4, 7 and 10, which is shown in the below figure 2. Form a finger table with 2 entries per table for the highlighted nodes. Now try to resolve key 9 from node 1. Illustrate the procedure of resolving key 9 with necessary explanation.



A)



(4)

Figure 2: Chord System.

	B)	What is a naming graph in structured naming? How namespaces are represented in naming graph? What is the role of path name in naming graph and how is it related to hard link and symbolic link?	(3)
	C)	Illustrate Causal Consistency with an example. How Causal Consistency is different from Sequential Consistency?	(3)
5)		Analyze the differences between, Monotonic Read and Monotonic Writes? How Sequential writes and Concurrent writes happen?	(4)
	A)		
	B)	How does Cache Coherence Protocol work? Illustrate with an example.	(3)
	C)	Write a Map Reduce Program for finding Word Count in a document.	(3)

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