Question Paper

Exam Date & Time: 04-May-2024 (02:30 PM - 05:30 PM)

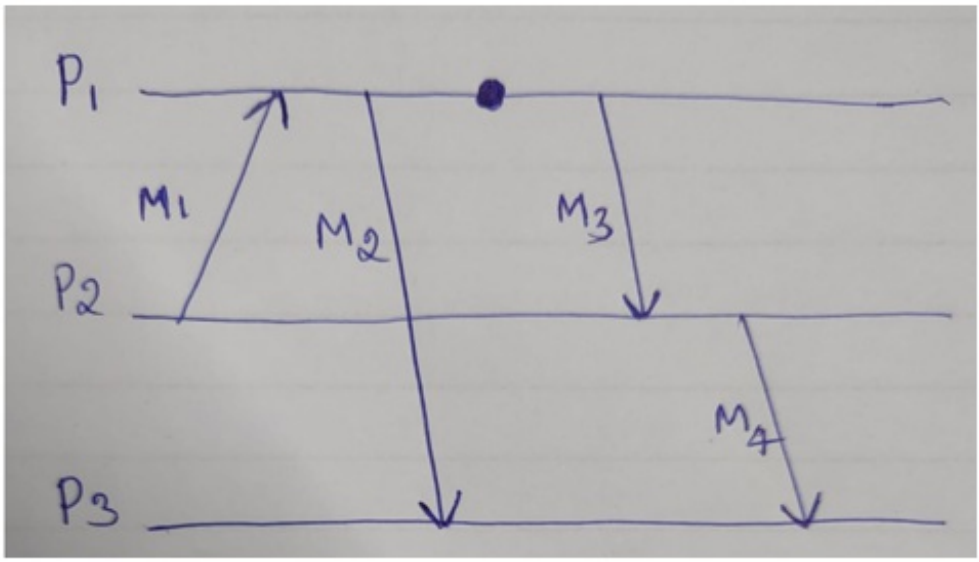
MANIPAL ACADEMY OF HIGHER EDUCATION

SIXTH SEMESTER B.TECH. (COMPUTER SCIENCE AND ENGINEERING) DEGREE EXAMINATIONS - APRIL / MAY 2024
SUBJECT: CSE 3251/CSE_3251 - DISTRIBUTED SYSTEMS

Marks: 50 **Duration: 180 mins.**

Answer all the questions.

1A)	Categorise the scaling techniques for performing scaling out and illustrate the Partitioning and distribution technique with suitable diagrams and an example.	(4)
1B)	Apply the three logical levels of application layering to explain the working mechanism of Internet search engines.	(3)
1C)	Explain Simple client-server architecture with neat diagram. Draw an example scenario of three tiered-architecture in which a server will be acting as a client.	(3)
2A)	Differentiate Physical and Logical clock in distributed systems. Analyse the given diagram of Capturing potential causality and interpret the updated logical time using Vector Clocks at processes P1, P2, and P3 following each event. Initially, before any events occur, the logical time at all processes is set to zero (0,0,0). In figure "Dot indicates some internal event has occurred".	(4)



2B)	By using Lamport's original solution for distributed mutual exclusion, illustrate with suitable figures the working mechanism of a distributed algorithm when a process wants to access a shared resource.	(3)
2C)	Explain the working mechanism of the bully election algorithm with a suitable diagram.	(3)
3A)	Assume a procedure doit (a, b) that must be implemented by a remote server. To communicate messages between client and a remote server, how remote procedure call is utilized for request and reply in the distributed environment? Illustrate this with a necessary diagram.	(4)
3B)	In IBM's WebSphere message queuing system how alias table, routing table, message channel and message channel agent play a role in transferring a message. Demonstrate the schematic overview of this message queueing system with necessary diagrams.	(3)

3C)	How epidemic behavior is related to gossip-based information dissemination? Demonstrate the two popular propagation model used in information dissemination in large-scale distributed systems.	(3)
4A)	Discuss the role of flat naming and structured naming in a distributed system with an example for each. What type of naming is used in the home-based approach? With a neat diagram, Illustrate, how this approach supports mobile entities in large scale network.	(4)
4B)	Name spaces for a large-scale, possibly worldwide distributed system, are usually organized hierarchically. To effectively implement such a name space, it is convenient to partition it into logical layers. Analyze the three logical layers. Illustrate an example partitioning of the DNS name space, including Internet-accessible files, into three layers.	(3)
4C)	When it comes to content replication and placement, three different types of replicas can be distinguished and logically organized. Explain the three types of replicas.	(3)
5A)	Replica management deals with propagation of updated content to the relevant replica servers. An important design issue concerns what is actually to be propagated. Basically, there are three possibilities to do it. Illustrate the three types of possibilities for update propagation.	(4)
5B)	Analyze ***Writes follow reads*** consistency model with an example scenario.	(3)
5C)	An HDFS client trying to access/read a HDFS file, will get block information from Name Node first, and then based on the block id's and locations, data will be read from corresponding data nodes. Illustrate the name nodes and the data nodes, which are the main components in a HDFS architecture.	(3)

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