Question Paper

Exam Date & Time: 14-May-2022 (10:00 AM - 01:00 PM)

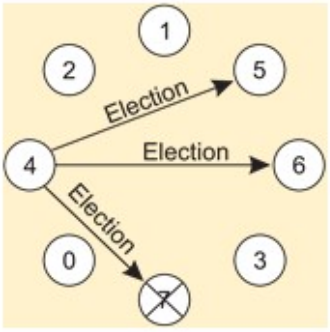
MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

SIXTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, MAY 2022

DISTRIBUTED SYSTEMS [CSE 3251]

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

Instructions to Candidates:
Answer ALL questions Missing data may be suitably assumed

1)		Resources may be added or removed by remote applications on the web. Describe the four characteristics of REST architecture for the above mentioned operations on resources.	(4)
	A)		
	B)	Define a distributed system. A distributed system tries to make the distribution of processes and resources transparent. Show in a tabular form different types of transparencies which can be applied to achieve distribution transparency.	(3)
	C)	Give the methodology using map-reduce function for counting words in a sentence.	(3)
2)		A distributed system is made up of 7 processes, where the 7th process is dead. Apply bully election algorithm, starting from 4th process to find the new coordinator.	(4)
	A)	 **Figure : 1**	
	B)	A centralized algorithm is a simulation of mutual exclusion in a distributed system in a one-processor system. Show with a diagram how centralized algorithm in mutual exclusion.	(3)
	C)	In HDFS, how data node's failure recovery is performed? Explain with the diagram.	(3)
3)		Consider a function, fn1(a, b), where there is a client side and a server side, show how Remote Procedural Call (RPC) is implemented with a block diagram.	(4)
	A)		
	B)	Message Passing Interfaces (MPI) are messaging operations to support transient communication, describe any six message passing interface commands.	(3)
	C)	The assumptions made by traditional election algorithms, such as reliable message passing and	(3)

unchanged topology, are not realistic in wireless environments. Explain elections in a wireless environment with an example.

4) What is Distributed hash table? Assume chord ring with 4 highlighted nodes 1, 3, 6 and 8, which is shown in the below figure 2. Form a finger table with atmost 2 entries for the highlighted nodes. Now try to resolve key 7 from node 1. Illustrate the procedure of resolving key 7 from node 1. Illustrate the procedure of resolving key 7 with necessary explanation. (4)

A)

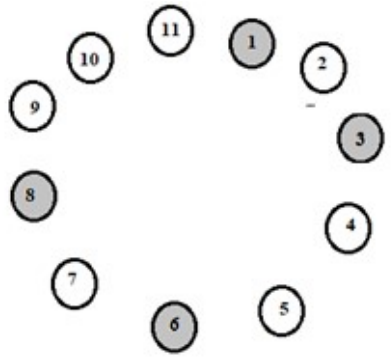


Figure : 2 Chord Ring

B) With an appropriate example and necessary diagram, explain iterative and recursive name resolution and compare this resolution methods with respect to communication cost. (3)

C) Identify the respective client centric consistency model for the following scenario with an appropriate diagram. (3)

a. Reading incoming mail while you are on the move. Each time you connect to a different e-mail server, that server fetches (at least) all the updates from the server you previously visited

b. Maintaining versions of replicated files in the correct order everywhere by propagating the previous version to the server where the newest version is installed.

c. See reactions to posted articles only if you have the original posting.

5) Assume a sudden burst of requests come in from an unexpected location far from the server. In that case, it may be worthwhile to install a number of temporary replicas in regions where requests are coming from. What type of replica is more appropriate for this scenario? What are the other necessary actions to be considered, when selecting a type of replica for this? Explain with an example. (4)

A)

B) Explain Gifford's Scheme of Quorum-based protocol and show the three different choices of selecting read and write quorum and identify the best choice with a necessary diagram. (3)

C) While associating a node identifier of another name space with a node in a current name space, what is the role of foreign name space, mount point and mounting point? Explain with an example. (3)

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