Exam Date & Time: 25-Jul-2022 (09:00 AM - 12:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

SIX SEMESTER B.TECH END SEMESTER MAKE UP EXAMINATIONS, JULY 2022

DISTRIBUTED SYSTEMS [CSE 3251]

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

A

Answer all the questions.

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

1) Based on 3 logical levels, a client server application can be physically distributed across several machines in different ways. How are multi-layered architectures made from three logical levels? Explain with a diagram. (4)

A)

B) Distributed system is often organized as an overlay network. What are two types of overlay networks? Being scalable in a distributed system means addition and removal of nodes. What are the three different dimensions of scalability? Explain. (3)

C) Big data is handled by HDFS architecture. Describe name nodes and data nodes in HDFS architecture with diagram. (3)

2) With Lamport clocks, nothing can be said about the relationship between two events a and b by merely comparing their time values C(a) and C(b), respectively. Describing the steps, give one example of vector clocks, which is an improvement over Lamport's clock. (4)

A)

B) A token ring algorithm is one approach to achieve mutual exclusion in a distributed system. If one token is assigned to a system, shown how the token is used to share the resources in a logical ring. (3)

C) MapReduce is a programming model which allows you to process huge data stored in Hadoop. Show how map-reduce functions are implemented with a diagram. (3)

3) How Remote Procedural Call is used in a multicast environment? Show the procedure with a block diagram. (4)

A)

B) What is the role of Advanced Message Queuing Protocol (AMQP) in a distributed systems? Explain the concept with the diagram. (3)

C) How clock synchronization is performed in Berkeley algorithm. Illustrate with a neat diagram. (3)

4) What is mounting in structured naming? What information are required to mount a foreign name space in a distributed system? Explain with an example along with necessary diagram. (4)

A)

B) What approach is used to support mobile entities, when mobile host moves to another network in the large-scale distributed system? How it keeps track of the current location of an entity? Explain the process with necessary diagram. (3)

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

a. Updating a program at server S2, and ensuring that all components on which compilation and linking depends, are also placed at S2.

b. Updating your Web page and guaranteeing that your Web browser shows the newest version instead of its cached copy..

c. Automatically reading your personal calendar updates from different servers.

(3)

5) What is blocking and non-blocking approach with respect to primary backup protocols? Explain primary based remote write protocol with a neat diagram and mention whether it is following blocking or non-blocking approach. (4)

A)

B) What is lease with respect to the propagation of content to relevant replica server? What are the different types of leases available in update propagation? Explain. (3)

C) What is hierarchical approach in naming? How look up request is performed to find a location in a hierarchically organised location service? Explain with a necessary diagram. (3)

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