Question Paper

Exam Date & Time: 27-Jul-2022 (09:00 AM - 12:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

SIXTH SEMESTER B.TECH MAKEUP EXAMINATIONS, JULY 2022

DISTRIBUTED SYSTEMS [ICT 3254]

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

A

Answer all the questions.

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

1)	A)	Write two separate java programs (one for server and other for client) using socket APIs for TCP and UDP, to implement the File Server. The client program will send the name of the text file to the server. If the file is present at the server side, the server should send the contents of the file to the client along with the file size, number of alphabets number of lines, number of spaces, number of digits, and number of other characters present in the text file to the client. If the file is not present, then the server should send the proper message to the client. Note that the results are always displayed at the client side. Client should continue to send the filenames until the user enters the string 'stop'.	(5)
	B)	Suppose that the operations of the BLOB object are separated into two categories - public operations that are available to all users and protected operations that are available only to certain named users. State all of the problems involved in ensuring that only the named users can use a protected operation. Supposing that access to a protected operation provides information that should not be revealed to all users, what further problems arise?	(3)
	C)	Explain the difference between eager release consistency and lazy release consistency	(2)
2)		Discuss five different classes of failures that can occur in Remote Procedure Call (RPC) systems and their respective solutions.	(5)
	A)		
	B)	Explain why the RPC interface to early implementations of NFS is potentially insecure. The security loophole has been closed in NFS 3 using encryption. Explain in detail, which algorithm is used for security purpose?	(3)
	C)	A user visiting a new place with his PDA capable of wireless networking. Suggest how the user could be provided with information about the local services and amenities at that station, without entering the station's name or attributes.	(2)
3)	A)	Why is computer clock synchronization necessary? Describe the design requirements for a system to synchronize the clocks in a distributed system. Discuss how it is possible to compensate for clock drift between synchronization points by observing the drift rate over time. Discuss any limitations of the method.	(5)
	B)	Explain Cristian's method for synchronizing clocks using time server.	(3)
	C)	Specify and justify the call semantics used in the following operations:	(2)

a) Online banking transactions b) Compiling a program

4)		Explain in detail Maekawa's Voting Algorithm for Distributed Mutual Exclusion.	(5)
	A)		
	B)	How the validation gets performed in optimistic concurrency control? Write the difference between backward and forward validation w.r.t storage and time.	(3)
	C)	Suppose that the coordinator of a transaction crashes after it has recorded the intentions list entry but before it has recorded the participant list or sent out the canCommit? requests. Describe how the participants resolve the situation. What will the coordinator do when it recovers?	(2)
5)		With suitable example, explain how the two-phase commit protocol for nested transactions ensures that if the top-level transaction commits, all the right descendants are committed or aborted.	(5)
	A)		
	B)	Briefly explain the three designs of fault tolerance in distributed systems.	(3)
	C)	How is consistency management achieved in Chubby API of Google distributed system?	(2)

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