BG/K/TX

Reg. No: 21BIT0174

VIT
Vellore Institute of Technology

Final Assessment Test – November 2024

Course: BITE402L - Distributed Computing

Class NBR(s): 3461 Slot: B1+TB1

Time: Three Hours Max. Marks: 100

- KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

Answer ALL Questions

(10 X 10 = 100 Marks)

1. A user arrives at an Airport that he has never visited previously, carrying a smart PDA that is capable of wireless networking. In the context of this real time scenario, to what extent the needs of openness differ from those of heterogeneity and outline the possible interaction model with an assumption of time bound interaction, with no bounds on time and for time bound service what are the possible issues. The user can utilize the PDA's wireless networking capabilities to access a location-based service app that automatically detects the station's location and provides real-time information about local services and amenities.

2.a) Consider a scenario where a financial institution is aiming to implement a distributed banking system using Java RMI. The goal is to create a scalable and fault-tolerant system that enables clients to perform banking transactions seamlessly across multiple servers. The system should support functionalities such as account balance inquiries, fund transfers, and transaction history retrieval. Additionally, it must ensure data consistency and reliability even in the face of network failures or server crashes. Design a Java RMI-based solution that addresses these requirements, discussing the key components, communication protocols, and fault-handling mechanisms to ensure the robustness and efficiency of the distributed banking system.

OR

2.b) By using the WiFi technology we can exchange information between two or more devices. Wi-Fi has been developed for mobile computing devices, such as laptops, but it is now extensively using for mobile applications and consumer electronics like televisions, DVD players, and digital cameras. There should be two possibilities in communicating with the Wi-Fi connection that may be through an access point to the client connection or client to client connection. How does the Request Reply Protocol functions in the given network? Narrate the consequences faced during timeouts, handling duplicates and lost reply messages.

3. Online trading involves buying and selling stocks, commodities, currency pairs, cryptocurrencies, or other instruments through a trading platform or mobile app. The goal is to generate returns that outperform buy-and-hold investing. Explain how SOAP enables both client-server and asynchronous interaction over the Internet. How it defines a scheme for using XML to represent the contents of request and reply messages as well as a scheme for the communication of documents?

4.a) Every live recording experience is going to be different, and the keys to successful live recording are to remain flexible, communicate well, and plan for the unexpected. The perfect capturing of a stereo mix and tossing it up on YouTube becomes more challenging. Before we get into the details of different live sound recording setups, let's take a look at some of the essential considerations you'll want to apply to any live recording session. Discuss the factors to be taken into account when deciding to which NTP server a client should synchronize its clock.

OR

4.b) Distinguish between Christian and Berkley method of clock synchronization. Discuss how it is possible to compensate for clock drift between synchronization points by observing the drift rate over time. Discuss any limitations to your method.

5. The IT infrastructure allows its company staff to access virtual desktops and applications via Web, both in campus at the office, and for self-working at home. Recommend a suitable architecture for this virtualization and outline the functions of the infrastructure to support multiple operating system instances to run in complete isolation on conventional hardware with minimal performance overhead introduced by the associated virtualization.

6. Which features of the AFS design make it more scalable than NFS? What are the limits on its scalability, assuming that servers can be added as required? Which recent developments offer greater scalability? Depict and explain the distribution of processes in the Andrew File System.

7. Extend the definition of two-phase locking to apply to distributed transactions. Explain how this is ensured by distributed transactions using strict two-phase locking locally.

8. Consider the edge-chasing algorithm (without priorities). Give examples to show that it could detect phantom deadlocks.

9. Shopify is a user-friendly e-commerce platform that helps small businesses build an online store and sell online through one streamlined dashboard. Shopify merchants can build a modern online store and sell on social media sites, seller marketplaces, other blogs and websites and via email, text and chat. Identify the transparency feature and its types that acts as the concealment from the user and the application programmer of the separation of components, so that the system is perceived as a whole rather than as a collection of independent components in the given e-commerce application.

10. Give a comprehensive description of various Security models utilized in a distributed computing environment, highlighting their key features and how they contribute to the overall functionality and efficiency of distributed systems?

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