Expected - 25

Department of Computer Science and Engineering, SVNIT, Surat

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B Tech III(CSE) - VI Semester

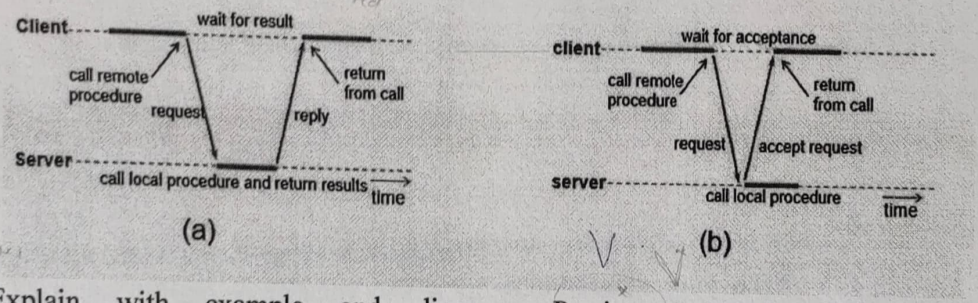
Course: Distributed Systems(CS304)

Date: 04-05-2022 **Time**: 12.00 hrs to 15.00 hrs **Marks**: 50

Q.1 a) Explain application layering using the example of Internet Search Engine. [6]

b) Do the comparison between Distributed OS(Multiproc. & Multicomp.), Network OS and Middleware based OS with respect to following parameters: Degree of Transparency, Same OS on all nodes, Number of copies of OS, Basis for Communication, Resource Management, Scalability, Openness. Explain any one of the comparative parameters with proper justification.

Q.2 a) Write your observations for the following: [6]



b) Explain with example and diagram: Persistent Asynchronous and Transient Synchronous(Delivery based) communications.

Q.3 a) Differentiate between preemptive and non-preemptive process migration. What are their relative advantages and disadvantages? Suppose you have to design a process migration facility for a distributed system, what factors will influence your decision to design a preemptive or a non-preemptive process migration facility? [6]

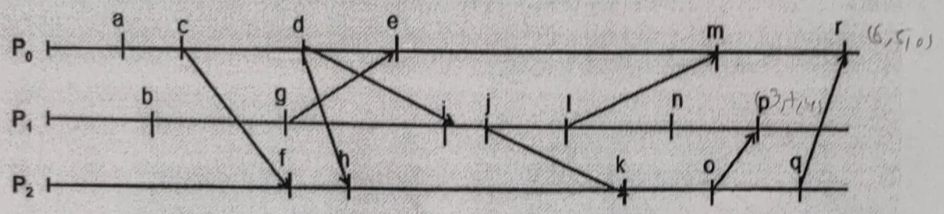
b) The goal of distributed scheduling is to distribute a system's load across available resources in a way that optimizes overall system performance while maximizing resource utilization. Discuss any one load distribution algorithms with (a)Transfer policy (b)Selection Policy (c)Location Policy (d)Information Policy.

OR

b) Write a centralized mutual exclusion algorithm. Discuss and compare its advantages and disadvantages.

Q.4 a) Consider a network consisting of 6 computers, A(coordinator), B, C, D, E and F. At 16:00, the coordinator decides to synchronize the clock of all the computers in the network. At 16:00, the clock of every computer in the network is given as: **A-16:00, B-15:57, C-16:05, D-16:10, E:16:30, F-15:45.** Apply the Berkeley clock synchronization algorithm to this scenario and calculate (using appropriate steps) the clock readings of all the computers. [6]

b) Below figure shows the execution of three processes named P0, P1and P2. Events that occur on each process are marked with vertical bars and labeled a,b,c,....r. Arrows between processes denote a message exchange. Write down lamport clock and vector clock values at each event.



Q.5 a) Data-Centric Consistency Models define how updates are propagated across the replicas to keep them consistent. Write your observations on strong consistency models of data centric consistency with example. [4 marks] [6]

b) How to know that the system is dealing with deadlock or distributed computation has correctly terminated? [2 marks]

Q.6 a) What are the different types of failures? Identify the following failures (1) Operating system comes to a grinding halt (2) Unnoticed event handler closing a word file [2 marks] [5]

b) Explain the following with diagram: (1) Orphan message and domino effect (2) Lost message [3 marks]

Q.7 a) Draw and explain the file system hierarchy in Sprite File System. [3 marks] [5]

b) Write advantages of 1) Cache in the main memory and 2) Cache in the local disk [2 marks]

Q.8 a) Why do persistent connections generally improve performance compared to non-persistent connections? [2 marks] [5]

b) Write short notes on (1) Common Gateway Interface and (2) Web Proxy [3 marks]

Q.9 a) List several ways to invoke a method on a remote object. [2 marks] [5]

b) Explain in detail: Enterprise Java Beans [3 marks]