Total No. of Questions : 8]

SEAT No. :

PB-2333

[Total No. of Pages : 2

[6263]-181
B.E. (Information Technology)
DISTRIBUTED SYSTEMS
(2019 Pattern) (Semester - VIII) (414450)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Figures to the right side indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***

Q1) a) Explain external data representation (XDR), marshalling and unmarshalling. Why is XDR required? Discuss in brief the three alternative approaches to external data representation. **[8]**

b) Describe the overlay network and its benefits? Explain it with the help of Skype overlay architecture. **[9]**

OR

Q2) a) What are the advantages of logical clock over physical clock? Consider Figure 1 that shows four processes (P1, P2, P3, P4) with events a, b, c, ... and messages communicating between them. Assume that initial logical clock values are all initialized to 0. List the Lamport timestamps for each event shown in Figure 1. Assume that each process maintains a logical clock as a single integer value as a Lamport clock. Provide timestamps for each labeled event. **[8]**

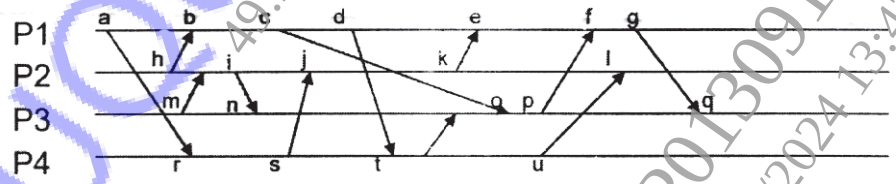

Figure 1 : Four Processes P1, P2, P3, P4 run events a, b, c, d ..... to send and receive messages

b) What is the need of mutual exclusion? Explain the permission-based centralized distributed mutual exclusion algorithm. **[9]**

P.T.O.

Q3) a) Why replication is important and how it relates with Scalability? How are replicas kept consistent? Explain the mechanism of Server-Initiated Replicas with suitable example. **[9]**

b) What is fault tolerance? Explain the transient, intermittent and permanent fault classes. Explain in brief, various types of failures. **[9]**

OR

Q4) a) What is check pointing in a distributed system? Explain the working of Coordinated checkpointing recovery mechanism. **[9]**

b) What are two primary reasons for replication? Explain the causal consistency model with suitable example using distributed shared database. **[9]**

Q5) a) Discuss the master-slave architecture of Hadoop Distributed File System along with functions of its key components. **[8]**

b) What Is a Directory Service? What is the difference between DNS and x.500? Describe in detail the components of X.500 service architecture. **[9]**

OR

Q6) a) Explain the Bandwidth, Latency and Loss rate parameters with respect to multimedia stream. Explain the QoS negotiation procedure and admission control scheme for distributed multimedia application. **[8]**

b) What are web services? Describe with a suitable diagram the general organization of the Apache web server. **[9]**

Q7) a) How wearable devices work in distributed systems? Discuss the problems involved with wearable computing. **[9]**

b) Explain with an application (e.g., Travel Booking Service) various key components of Service Oriented Architecture. **[9]**

OR

Q8) a) Compare the following tools for Distributed System Monitoring : **[9]**

Prometheus, Zabbix, Nagios.

b) Explain in brief following Microkernels **[9]**

i) Mach

ii) CHORUS

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