Total No. of Questions : 12] [Total No. of Pages : 3

P1447

[3764]-422

B.E. (Computer Engineering)

DISTRIBUTED SYSTEMS

(410451)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates :

1) *Answers to the two sections should be written in separate books.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam table is allowed.*
5) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) Explain open middleware-based distributed system. **[6]**

b) Explain different types of problems for scalability in distributed system with possible solutions. **[6]**

c) Explain basic organizations of processors and memories in distributed computer systems. **[6]**

OR

Q2) a) Explain different transparencies in distributed system with suitable examples. **[8]**

b) Consider a simple server that carries out client requests without accessing other servers. Explain why it is generally not possible to set a limit on the time taken by such a server to respond to a client request. What would need to be done to make the server able to execute requests within a bounded time? Explain. **[6]**

c) Why is it sometimes so hard to hide the occurrence and recovery from failures in distributed system? **[4]**

Q3) a) Explain how quality of service can be achieved in stream oriented communication. **[10]**

P.T.O.

b) What are different elements involved in implementation of RPC mechanism? Explain the role of each in RPC mechanism. [6]

OR

Q4) a) How would you incorporate persistent asynchronous communication into a model of communication based on RMIs to remote objects? [6]

b) Explain general organization of a message broker in a message queuing system. [6]

c) What is MPI? Explain message passing primitives of MPI. [4]

Q5) a) Compare Coda and Plan 9 distributed file systems. [8]

b) Explain different approaches to locating mobile host in DNS. [8]

OR

Q6) a) Explain automounting in NFS. [6]

b) Explain the advantages of using stripe groups in xFS. [6]

c) Using self-certifying pathnames in SFS, is a client always ensured it is communicating with a nonmalicious server. Explain. [4]

SECTION - II

Q7) a) Explain Lamport's algorithm for logical clock synchronization with example. [8]

b) Explain bully and ring election algorithms. [6]

c) Give full algorithm for whether an attempt to lock a file should succeed or fail. Consider both read and write locks and the possibility that file was unlocked, read locked or write locked. [4]

OR

Q8) a) What is global state of a distributed system and explain how it can be represented? [8]

b) Explain clock synchronization algorithms. [6]

c) Consider the behavior of two machines in a distributed system. Both have clocks that are supposed to tick 1000 times per millisecond. One of them actually does, but the other ticks only 990 times per millisecond. If UTC updates come in once a minute, what is maximum clock skew that will occur? [4]

Q9) a) Explain the solutions for scalable reliable multicasting. **[8]**

b) What makes the fail-stop model in the case of crash failures so difficult to implement? **[4]**

c) To what extent is scalability of atomic multicasting important? Explain. **[4]**

OR

Q10) a) Explain virtual synchronous multicast with it's implementation. **[8]**

b) Explain different types of failures in distributed systems. **[4]**

c) Explain how the write-ahead log in distributed transactions can be used to recover from failures. **[4]**

Q11) a) Explain the following terms with suitable example. **[6]**

i) Portable Object Adapter in CORBA.

ii) Interoperable Object Reference (IOR) in CORBA.

b) Explain different types of Grid systems. **[6]**

c) Explain cluster computer architecture. **[4]**

OR

Q12) a) Explain CORBA's callback and polling model for asynchronous method invocation. **[6]**

b) Explain what is virtual organization and benefits provided by virtual organization in Grid. **[6]**

c) Compare Grid computing and Cluster computing. **[4]**

□□□□