(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1039 Roll No. | | | | | | | | | | |

B.Tech.

EIGHTH SEMESTER EXAMINATION, 2004-2005

DISTRIBUTED SYSTEM

Time : 3 Hours *Total Marks : 100*

Note : *(i) Attempt ALL questions.*

(ii) All questions carry equal marks.

1. Attempt ***any four*** parts of the following : **(5x4=20)**

(a) What is a process ? Explain various states of a process through a state transition diagram. Illustrate the mechanism for interaction between two concurrent processes.

(b) Assume a system has a P processes and R identical units of a reusable resource. If each process can claim at most two units of the resource, show that the system will be dead lock free iff P<R-1.

(c) What are inherent limitations of a Distributed System ? Explain with example, what could be the impact of absence of global clock and shared memory.

(d) What are Lamports Logical clocks ? For Lamport clock system, prove that for any two events 'a' and 'b' ; if a $\longrightarrow$ b, then C (a) < C (b) but vice versa is not true.

(e) What do you mean by Distributed Mutual Exclusion ? Many distributed algorithms require the use of a coordinating process. To what extent can such algorithms actually be considered distributed ? Discuss.

(f) Show that in Lamport's algorithm if a site Si is executing the critical section, then Si's request need not be at the top of the request queue at another site Sj. In this still true when there are no message in transit ?

2. Attempt *any two* parts of the following : **(10x2=20)**

(a) (i) What are differences in communication and resource deadlocks ?

(ii) Explain the deadlock handling strategies in distributed system.

(iii) How is Hierarchical deadlock detection differ from the centralized deadlock detection ?

(b) What are agreement protocol ? What are Byzantine agreement problem, the consensus problem and Iteractive Consistency Problem ?

(c) Show that Byzantine agreement cannot always be reached among four processors if two processors are faulty.

3. Attempt *any two* parts of the following : **(10x2=20)**

(a) What are the communication models proposed for the communication between the distributed objects. Explain the concept of remote method invocation with a suitable example.

(b) Discuss how a public key scheme :

(i) Describe cryptography. Why it is assumed as the suitable method for securing the data in the environment having multiple users.

(ii) Discuss how a public key scheme can be used to solve the key distribution problem in a private key cryptographic scheme.

(c) What do you mean by Distributed File System in distributed system ? Discuss the architecture of a distributed file system. What are the mechanisms for building distributed file system ? Discuss mounting, cashing and hints in brief.

4. Attempt *any two* parts of the following : **(10x2=20)**

(a) Consist a system with three sites employing two phase commit protocols. Illustrate a situation wherein a site may not be able to arrive at a consistent decision concerning the outcome of the transaction in the event of site failures. Assume that a site can communicate with any other operating site to check the outcome of a transaction.

(b) What are Locks ? What are differences in Time stamp - based protocols and Lock - based protocols.

(c) What do you mean by Two - phase commit protocol ? In the two - phase commit protocol, why can blocking be completely eliminated, even when the participants elect a new coordinator ?

5. Attempt *any two* parts of the following : **(10x2=20)**

(a) What are wave algorithms ? Discuss the usage and application of wave algorithms. Give any three requirements satisfied by wave algorithm.

(b) What do you mean by Routing ? List and explain the requirements for a routing algorithms. What is destination based routing ?

(c) Write short notes on any two of the following :

(i) Deadlock Free Packet Switching

(ii) CORBA services

(iii) Balanced sliding window protocol

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