



Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)



2M

2M

VII SEMESTER B.TECH (COMPUTER SCIENCE AND ENGINEERING) END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: DISTRIBUTED COMPUTING SYSTEMS [CSE 401]

REVISED CREDIT SYSTEM

Time: 3 Hours

28-11-2015

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ANY FIVE FULL questions.
- ✤ Missing data, if any, may be suitably assumed.
- 1A. With an example, explain CORBA's Common Data Representation. 5M
- 1B. What are Remote Object References? With a diagram, explain its representation. 3M
- 1C. Explain the working and use of Mobile Agents.
- 2A. A client makes remote procedure calls to a server. The client takes 5 milliseconds to compute the arguments for each request, and the server takes 10 milliseconds to process each request. The local operating system processing time for each send or receive operation is 0.5 milliseconds, and the network time to transmit each request or reply message is 3 milliseconds. Marshalling or unmarshalling takes 0.5 milliseconds per message. Calculate the lime taken by the client to generate and return from two requests: (i) if it is single-threaded, and

(ii) if it has two threads that can make requests concurrently on a single processor. You can ignore context-switching times. 5M

- 2B. Explain how the mounting of sub-trees of remote filesystems by clients is done in Sun NFS. Illustrate with an example. 3M
- 2C. Explain how multithreading results in performance improvement in a server.
- 3A. With a diagram, explain the working of Global Name Service. Also explain the mechanism for integrating the naming trees of two previously separate GNS Services. 5M
- 3B. Authentication based on a shared secret key using three messages can be defeated by Reflection attack. With a diagram, explain the Reflection attack. 3M
- 3C. List the different types of security threats and briefly explain each of them. 2M
- 4A. Explain Vector clocks. Also explain how vector clocks can be used to enforce causal communication. 5M
- 4B. Explain the Token Ring algorithm for mutual exclusion along with a diagram. 3M
- 4C. 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 the maximum clock skew that will occur? 2M
- 5A. Explain the different ways to compute the optimal placement of replica servers. 5M
- 5B. Explain Eventual Consistency. What is its disadvantage? How can it be alleviated? 3M

5C. Consider a nonblocking primary-backup protocol used to guarantee	sequential
consistency in a distributed data store. Does such a data store always provide	read-your-
writes consistency?	2M
6A. With state diagrams, explain the Three-Phase commit protocol.	5M
6B. Explain the implementation of a virtually synchronous reliable multicast.	3M
6C. Distinguish between Flat Groups and Hierarchical Groups.	2M
