

VII SEMESTER BE (COMPUTER SCIENCE AND ENGINEERING) DEGREE
END-SEMESTER EXAMINATION-DECEMBER 2013
SUBJECT: DISTRIBUTED COMPUTING SYSTEMS (CSE 401)
DATE: 11-12-2013

TIME: 3 HOURS

MAX.MARKS: 50

Instructions to Candidates

- **Note:** Answer any **FIVE** full questions.

- 1.A. Explain Java object serialization with an example.
- 1.B. In the Sun Network File System, discuss the timestamp-based method used to validate cached blocks before they are used.
- 1.C. Distinguish between location transparency and relocation transparency with examples.

(5+3+2)

- 2.A. With a diagram, explain Remote Procedure Call in the context of a procedural language.
- 2.B. Explain the implementation of threads using lightweight processes.

(5+5)

- 3A. Explain the Network Time Protocol for Clock Synchronization.
- 3B. A distributed system may have multiple, independent critical regions. Imagine that process 0 wants to enter critical region A and process 1 wants to enter critical region B. Can the Distributed Algorithm for Mutual Exclusion lead to deadlocks? Explain your answer.
- 3C. In the ring algorithm for electing a coordinator, if two or more Election messages are circulating simultaneously, what is the reason for this? What is the maximum number of times one Election message can circulate? Devise an algorithm for killing the extra Election messages without affecting the operation of the basic election algorithm.

(4+2+4)

- 4A. What is Causal Consistency? Explain with an example.
- 4B. Suppose a user reads his mail in city 1. Assume reading the mail does not affect the mailbox in any fashion. Subsequently the user travels to city 2 and again reads his mail. Which specific consistency model will guarantee that the mails that were there in the mailbox in city 1 will also be there in the mailbox when it is opened in city 2? Justify your answer.
- 4C. Explain the mechanism by which specific files on a server can be migrated or replicated to servers placed in the proximity of clients that issue many requests for those files.

(4+2+4)

- 5A. With a diagram, explain Hierarchical Feedback Control.
- 5B. With state diagrams, explain Three-Phase Commit.
- 5C. Explain how the Coordinated Checkpointing algorithm can be improved.

(3+5+2)

- 6A. Give an example of a situation where both client-controlled and non-recursive server-controlled navigation are inappropriate and recursive server-controlled navigation must be used.
- 6B. Explain the role of the DNS name servers.
- 6C. Explain Authentication Based on a Shared Secret Key.

(2+4+4)
