Dept. Comp. Sc.	Distributed Systems
Vrije Universiteit	26.01.2004

Part I

This part covers the same material as the midterm exam.

1a Explain what is meant by a *remote-object model.* *5pt*

1b What happens when two clients simultaneously invoke a *synchronized* method of a Java remote object? *5pt*

1c Consider a Java remote object mutex that provides two methods: lock() and unlock(). This object could be used, for example, to serialze access to shared objects. Sketch an implementation of mutex. *5pt*

2a What is the advantage of using a true identifier as a reference to mobile or replicated objects? *5pt*

2b Tracking mobile objects can be done by means of forwarding pointers. What are the drawbacks of this scheme? *5pt*

2c Home-based approaches for locating objects have the drawback that, in principle, the reference to the home location may never change. Give a workable DNS-based solution for this problem. *5pt*

3a What is the difference between a nested and distributed transaction? *5pt*

3b Explain how primary two-phase locking works. *5pt*

3c Consider a transaction consisting of invocations on several Java *remote objects.* Each object is protected by its associated object adapter against concurrent access by multiple clients. Do we still need a scheduler for T? Explain your answer. *5pt*

Part II

6a Explain the difference between data-centric and client-centric consistency. *5pt*

6b What is read-your-writes consistency, and what would a simple implementation look like? *5pt*

6c Give five different examples of replication strategies that implement sequential consistency. *5pt*

7a Explain the scalability problem in reliable multicasting. *5pt*

7b How can epidemic protocols help in achieving scalable reliable multicasting? Which assumptions do we need to make? *5pt*

7c What is the problem that the 3-phase commit protocol solves? *5pt*

8a Explain how mounting works in NFS. *5pt*

8b What is the main difference between NFS versions 3 and 4, and why did the designers make this distinction? *5pt*

8c What are share reservations in NFS? *5pt*

Final grade: *(1) Add, per part, the total points. (2) Let T denote the total points for the midterm exam ($0 \leq T \leq 45$); $D1$ the total points for part I; $D2$ the total points for part II. The final number of points E is equal to* $\max\{T, D1\} + D2 + 10$.