Dept. Math. & Comp. Sc.	**Distributed Systems**
Vrije Universiteit	**04.06.1999**

1a What is a *scalable* distributed system? *10pt*

1b Give an example of an inherently nonscalable function, and explain what the scalability problem is. *10pt*

1c What is distribution transparency, and should it be aimed for at all costs? *5pt*

2a Explain in your own words what a distributed object is, and what it means for a client to bind to an object. *10pt*

2b What is the difference between a Remote Procedure Call and a Remote Method Invocation? *5pt*

2c What would an object-based (asynchronous) message-queuing system look like? *10pt*

3a Why is reference counting in a wide-area distributed garbage collector not such a good idea? What would your approach be, and why? *10pt*

3b To keep track of a mobile object we could let its "home" record the object's current location. Why is this a bad idea, but why is it applied so much? *5pt*

4a Explain what two-phase commit is. *5pt*

4b What problem does three-phase commit solve? *5pt*

4c Explain what virtual synchrony accomplishes. *5pt*

5a Why do entry consistency and distributed objects fit so well together? *5pt*

5b What is the basic idea behind client-centric coherence models, such as Bayou's session guarantees? *5pt*

6 **Note: this is an extra bonus question which you are not obliged to answer.** Think of a good question for an exam on distributed systems, and give hints to the answer. Be brief! *5pt*

Grading: *The final grade is calculated by accumulating the scores per question (maximum: 90 points), and adding 10 bonus points. The maximum total is therefore 100 points. The bonus question is counted separately.*