Dept. Math. & Comp. Sc.	**Midterm Distributed Systems**
Vrije Universiteit	**02.04.2001**

1 Give a practical solution to synchronizing multiple isochronous data streams. *5pt*

2a Explain how an object reference can be unmarshaled to a proxy. *5pt*

2b Consider a system with mobile agents. An agent is implemented as a process with a special Java communication object. Communication takes place through remote method invocation on on agent's communication object. Outline the design of an *agent reference* for this system. *10pt*

3a How does the distribution of the DNS name space across multiple name servers introduce a dependency between a name and a location? *5pt*

3b Explain the use of pointer caches in a hierarchical location service. *5pt*

4a Consider a collection of processes logically organized in a ring. A token circulates clockwise. When a process receives the token, it is allowed to enter its critcal section. The token is passed to the next process when done, or when the token holder has no critcal section of code to execute. Outline a simple scheme in which the token is circulated only if there is a process that wants to enter its critcal section. *5pt*

4b For you solution in (a), give an analysis of the total number of messages that are exchanged between all pairs of neighboring processes before a process can enter its critical section. *10pt*

Grading: *The final grade is calculated by accumulating the scores per question (maximum: 45 points), and adding 5 bonus points. The maximum total is therefore 50 points.*