Dept. Math. & Comp. Sc.	**Midterm Distributed Systems**
Vrije Universiteit	**29.10.2001**

1a What is the difference between synchronous and isochronous transmission mode? For each mode, give an example data stream. *5pt*

1b Complex data streams consist of multiple substreams (which are not complex) that require synchronization. Give an example of a complex stream consisting of continuous and discrete data streams, and explain how synchronization between those streams can take place. *5pt*

2a Consider a system that supports remote objects. What information do you need to store in a systemwide object reference to support remote-method invocation? *5pt*

2b Explain what needs to be done before a client can invoke a remote object, given it holds an object reference. *5pt*

2c Describe a simple and effective way to do automatic garbage collection in the remote-object system just described. *5pt*

3a What is two-phase locking and what does it achieve? *5pt*

3b How can we avoid cascaded aborts in a system of distributed transactions that uses pessimistic timestamp ordering to implement concurrency control? *5pt*

3c Letting each scheduler in a distributed transaction independently implement **strict** two-phase locking may not be very useful. Why not? *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.*