Operating Systems
Semester 1, 2004
Eike Ritter



## The University of Birmingham 1 December, 2004

## Exercise sheet 4

- 1. What are the main differences between capability lists and access lists?
- 2. Why is it difficult to protect a system in which users are allowed to do their own I/O?
- 3. Capability lists are usually kept within the address space of the user. How can the system ensure that the user cannot modify the contents of the list?
- 4. Assume you have a large network with workstations constantly switched on or off and you have to ensure mutual exclusion for access to a shared resource, say a printer. Which schema would you choose, with central co-ordinator or without?
- 5. (i) Describe the bully algorithm for electing a new coordinator.
  - (ii) Suppose that two processes detect the demise of the coordinator simultaneously, and both decide to hold an election using the bully algorithm. What happens?
  - (iii) Consider the following schema for ensuring atomic transactions in a network:
    - Elect a coordinator via the bully algorithm
    - As coordinator for permission to do transaction
    - Do transaction
    - Notify coordinator that transaction has happened.

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Assume that the coordinator has a way of ensuring that it gives permission to only one host at a time. Does this schema ensure that transactions are atomic? Justify your answer.