*Operating Systems*
Semester 1, 2005
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# 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.