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Theory of Network Communication

Fall 2004

Assignment 6

Problem 14 (5 points)**:**
Consider the supervised cycle network in the lecture notes.

(a) Prove Lemma 8.5 for isolated join and leave operations. Use a proof by induction for this, i.e. assume that the invariants have been fulfilled so far, and then show that they will also be fulfilled after executing a join or leave operation. (4 points)

(b) Suggest (in words) a way of efficiently handling concurrent join and leave operations without creating inconsistencies. (1 point)

Problem 15 (5 points)**:**
Implement the supervised tree network in the lecture notes in the E language so that nodes can join the tree, leave the tree, and send a broadcast message to all other nodes that are currently members of the tree.
Every node can choose a name that is specified when initializing it. We only consider broadcast messages that are text strings. Every time a node sends a broadcast message, it adds its name to it, and every node receiving the broadcast message is supposed to print it out. In this way, we create a simple instant messaging system.

Notice that the newContact() and Ref() methods can be realized in E by passing around remote references to the given objects. NewContact() is more general in a sense that it allows an object to create multiple references to it (each call creates a new reference), but we have not shown yet how to do this in E, and therefore we can ignore this feature for now.