

## Theory of Network Communication

Fall 2003

### Assignment 8

**Problem 17** (4 points):

Suppose that the current number of nodes in the supervised DeBruijn network is  $2^k$  for some integer  $k$ , and that this is known to all nodes. Suggest a search method for this case that allows a node to locally compute where a data item is currently stored, and argue why this method works.

Hints: You may use a cut-and-paste related approach or even try to come up with a closed formula for computing the node. It may be helpful to go through some examples.

**Problem 18** (6 points):

Write a C++ program in the Spheres environment that has an implementation of JOIN and LEAVE for the supervised overlay network in the lecture organizing the peers in a linked list that is robust against concurrent JOIN and LEAVE requests. Explain your approach in words and/or pictures, print out the program, and test your program with an initial situation of a linked list of 10 peers where additional 3 peers want to join and 3 of the 10 peers want to leave at the same time.