

Exercise No. 12  
**Peer-To-Peer Networks**  
Summer 2010

**Exercise 1** *Constant hop lookup*

Kelips performs a lookup in only two hops, but needs  $O(\sqrt{n})$  pointers. Outline a system that requires only  $O(\sqrt[3]{n})$  pointers for a three hop lookup!

**Exercise 2** *Rumor spreading*

Implement a simulation of rumor spreading for the random call model that uses push, pull, and push&pull. Simulate 10, 100, 1000, and 10000 nodes and give the diagram showing the ratio of infected nodes over the time (e.g. as an ASCII chart).