22C: 196: 003 Peer-to-peer and Social Networks

Homework 2
100 points
Assigned 3/28/13 due 4/9/13

Background. The Symphony P2P network described in the paper:

> G. S. Manku, M. Bawa, and P. Raghavan. Symphony: Distributed hashing in a small world. Proc. 4th USENIX Symposium on Internet Technologies and Systems, 2003
> [Paper #32 in your reading list]

Recall that two students of this class have recently presented this paper in the class. You need to understand this paper and then answer the following questions.

Question 1 (20 points): What are the similarities between routing in Symphony and routing in Kleinberg's small world? What are the differences?

Question 2 (80 points): [Programming assignment] Construct a Symphony network with 1000 nodes. Assume that the nodes are arranged in a circular space in the ascending order of their key values 0-999. Each node maintains two *short links* with its immediate neighbors, and k long distance links chosen in a certain way as described in the paper.

Part 1. Assuming k =10, generate the short and long distance neighbors of each node, and store them in a data structure. Print the short and long distance links of the nodes 2, 200, 800.

Part 2. Assuming unidirectional routing (clockwise direction only) and a greedy routing protocol list the routes and compute the number of routing hops in the following cases:

Source	2	800	500	90	200
Destination	700	10	100	891	600

You can use any programming language of your choice to solve this part. Your program should accept as input the (source, destination) pair, and output the route from the source to the destination. You have to submit the following:

[1] A *readme* file explaining the essential components of your solution to an outside reader
[2] The program code for computing the links and the route

Put the solutions of the different parts into a zip file and submit it through ICON. [Caution: Start now. Otherwise you will not be able to finish everything in time.]