Exercise No. 8

Peer-To-Peer Networks

Winter 2015

Exercise 1  1-Flipper

1. Give an example of a $d$-regular graph, where $d \geq 4$ is an even natural number of your choice.

2. Apply a 1-Flipper operation to the graph. Does it preserve the $d$-regularity?

3. How can a node be added to such a network preserving the $d$-regularity?

4. How can a node be removed from the network preserving the $d$-regularity? Discuss possible problems of your algorithm.

Exercise 2  Push & Pull

1. Give an example of a multiple $d$-outdegree regular digraph with $d \geq 3$.

2. Apply a Pointer-Push&Pull operation to your graph. Does it preserve the out-degree?

3. How can a node be added to the network preserving the out-degree?

4. How can a node be removed from the network preserving the out-degree?

5. Consider a multiple $d$-outdegree regular digraph with the same number of nodes, where all edges are pointing towards the same node. Show how your graph can be transformed into this graph by a series of Pointer-Push&Pull-operations.