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Exercise No. 8

Peer-To-Peer Networks

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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.