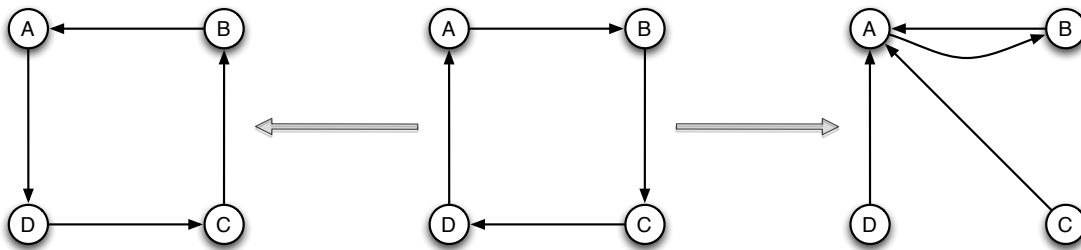


Exercise No. 4
Peer-To-Peer Networks
 Winter 2012/2013

Exercise 1 *Push & Pull & Push&Pull*

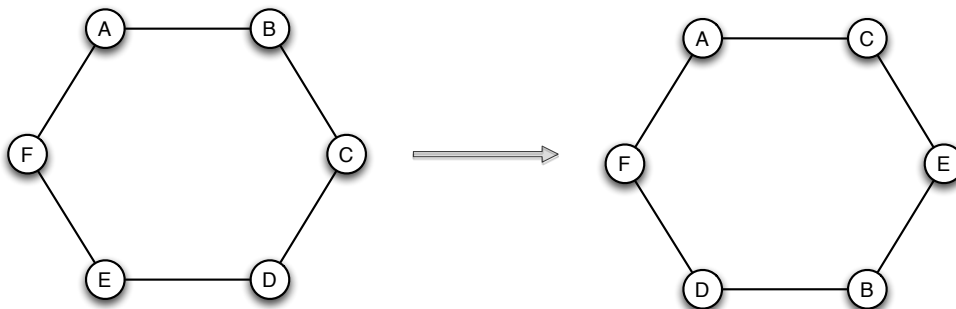


Starting with the middle graph, transfer it into the left and right graphs by using the

1. Push,
2. Pull,
3. Push&Pull

operation.

Exercise 2 *1-Flipper*



1. Transfer the left graph into the right graph by using the 1-Flipper operation.

2. How many different graphs can be reached by the 1-Flipper operation starting from the left graph?
3. Find an upper and lower bound for the number of 1-Flipper operations needed to transform one of these graphs into any another one.

Exercise 3 *Expander Graphs*

Show that an expander graph is 2-connected and has a diameter of $O(\log n)$!