

Exercise No. 5  
**Peer-To-Peer Networks**  
Winter 2016

**Exercise 1** *Pastry*

Consider peers with the following identification bits:

**0023**  
0113  
0133  
0322  
1002  
1010  
**1132**  
1223  
2000  
2112  
**2210**  
2231

1. Illustrate the Pastry network with  $M = \emptyset$  and  $l = 4$  for  $b = 2$  and  $B = 4$ . Do so by specifying the neighborhood (routingtable) of the nodes 0023, 1132, and 2210.
2. Insert a new node with id 3131 to the network. Update the neighborhood of the nodes you considered in the above task and give the neighbored nodes for the new node. Assume that the new node contacted node 0023 to join the network.

**Exercise 2** *Koorde*

Use the Chernoff bound to prove that in a Koorde network every node has at most  $O(\log n)$  incoming pointers with high probability.