Exercise No. 2
Peer-To-Peer Networks
Winter 2016

Exercise 1  Given a CAN with a perfectly balanced distribution of \( n \) peers with two dimensions and two realities. Consider the greedy algorithm, which chooses the closest peer according to the distance metric in both realities.

1. How many peers are in distance \( r \) from a given peer, if one does not change the reality? Denote by \( L \) this set of peers.

2. How many random peers \( x \) have to be picked from the set of all peers, such that at least one node of \( L \) is picked, e.g. \( \frac{1}{2} \)? What if we want to achieve high probability?

3. Find the optimal \( L \) such that \( x + r \) are minimal.

4. What is the relationship between \( x + r \) and the duration of the greedy search?