



**Universität
Zürich^{UZH}**

1237 - Blockchains and Overlay Networks

Exercise 2

8 March 2018

Due: 14 March 2018

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Students must send their solutions to scheid@ifi.uzh.ch up until the deadline. The solutions will be discussed the day after the deadline. Handing in all exercises is mandatory to receive credits and will be very useful for preparing the final exam. We encourage students to solve the exercises on their own and actively participate in the exercise discussions.

1 P2P Distributed Hash Tables

1 Tick the box with the right answer True (T), or False (F)::

A central point will be always required with distributed indexing

T	F
<input type="checkbox"/>	<input type="checkbox"/>

A distributed hash table requires that each node has a unique identifier

T	F
<input type="checkbox"/>	<input type="checkbox"/>

P2P applications generate low amounts of traffic (compared to client-server) since that is the main purpose of having an P2P overlay

T	F
<input type="checkbox"/>	<input type="checkbox"/>

An overlay on top of another overlay is possible

T	F
<input type="checkbox"/>	<input type="checkbox"/>

2 Cite and explain five key differences comparing the three strategies discussed in the lecture slides to store and retrieve data in P2P systems (Central server, Flooding search, Distributed indexing).

3 What is the complexity of each lookup strategy listed below? And give a brief explanation of the reasons. Give the complexity in big-O notation, e.g. $O(N^2)$.

Centralized

Flooding

DHT

4 How is addressing handled in DHTs? How are identifiers chosen (for nodes and content)?

5 What happens if one node that is responsible for a given DHT address space fails? Explain two possible techniques to overcome this problem.

6 Compare iterative routing with recursive routing. Give at least one advantage and one disadvantage for each technique.

7 Cite method names, parameters, and return values of the generic interface of distributed hash tables.

2 Challenge Task Preparation

- 1 To familiarize yourself with the Ethereum Blockchain you must transfer some Ether to our address. For this exercise we use the testing network (Ropsten).
 - Install the Geth client: <https://www.ethereum.org/cli>, make sure you use the "--fast", "--testnet" and "console" options when starting the client.
 - Create an Account: > `personal.newAccount()`
 - Get some Ether through mining or from a faucet (<http://faucet.ropsten.be:3001/>)
 - Transfer 0.<matriculation number> Ether to our address:
0x9f64362833237f7517c83f6e17f8cd60de191742
 - Send the transaction ID and your matriculation number with the other solutions to **scheid@ifi.uzh.ch**

P.S.: Remember to use the Ropsten testnet. Don't buy ether, in the testnet it is easy to get it for free. The Ropsten testnet may need some time to sync, so it is good to leave it syncing overnight.