IN5420/IN9420 - Distributed Blockchain Technologies

Examinable material - Spring 2022

This document lists the examinable material, which is a subset of the reading material for the course. The introduction of the course (slides available in the course schedule) is an examinable material. It is based on the textbook "Bitcoin and Cryptocurrency Technologies". Please find below the examinable material for each topic studied during the course.

1) **Bitcoin:**
    - Data structure: Merkle tree 1, Merkle tree 2
    - Bitcoin mining: chapter 5 in the book

2) **Beyond Bitcoin:**
    - General perspectives: SoK: Research Perspectives and Challenges for Bitcoin and Cryptocurrencies

3) **Byzantine Fault Tolerance:**
    - Wikipedia page
    - The Quest for Scalable Blockchain Fabric: Proof-of-Work vs. BFT Replication

4) **Blockchain Networking:**
    - Survey on Blockchain Networking: Context, State-of-the-Art, Challenges (Sections 1 to 5)

5) **Ethereum:**
    - "Ethereum and Smart Contracts": chapter 10.7 in the book
    - Ethereum whitepaper
    - Trie database in Ethereum

6) **Hyperledger Fabric:**
    - Hyperledger Fabric: A Distributed Operating System for Permissioned Blockchains
    - Table 1 in Comparison of Ethereum, Hyperledger Fabric and Corda (ignore Corda)

7) **Alternative Consensus 1:** nothing

8) **Alternative Consensus 2:**
    - Bitcoin-NG: A Scalable Blockchain Protocol

9) **IOTA:**
    - Five parts illustrated tutorial by Alon Gal
    - The Tangle (ignore the mathematical proofs)

10) **Zerocash:**
    - zk-SNARKs

11) **Scaling Blockchain:**
    - Sidechains:
        - Chapter 10.6 of the book
        - Ethereum “layer 2”
        - The Bitcoin Lightning Network: Scalable Off-Chain Instant Payments

12) **Smart Contracts:**
    - Why Many Smart Contract Use Cases Are Simply Impossible

13) **Blockchain Storage:**
    - IPFS and Friends: A Qualitative Comparison of Next Generation Peer-to-Peer Data Networks

14) **Applications:**
    - Healthcare: MedRec: Using Blockchain for Medical Data Access and Permission Management
    - Supply chain: A Blockchain-Based Framework for Supply Chain Provenance
    - Machine Learning: A Blockchain-based Decentralized Federated Learning Framework with Committee Consensus