INFO8002 Large-scale database systems
Exercise session III

Instructions

For the main question, be ready to:

- Describe the architecture of your solution and its operations.
- Define all its components and their interactions.
- Motivate your design decisions.
- Make diagrams whenever necessary.
- **State clearly your choices and assumptions.**

Question 1.

You are tasked with the design of a key-value store that is accessible to a set of clients. Every process is able to read and write to the shared key-value storage concurrently. Make sure the transactions are linearizable. The storage should be persistent against at least a single failure until the termination of the algorithm. Assume a fail-stop setting.

- What is linearizability?
- Do the termination and validity properties hold?
- Are the transactions atomic?
- Can we improve performance (read throughput) if we drop the linearizability property, but instead only desire sequential consistency? What is sequential consistency?

Don't overthink or overengineer your solution.

Question 2. (theory)

- Can we reach consensus in asynchronous systems?
- What is the main intuition behind the FLP result?
- The FLP result exists, so why does Paxos work?
- Can you come up with a (simple) scenario where Paxos does not terminate?