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Exercise: Consensus and fault tolerance

1. Discuss the need for fault tolerant systems and how fault tolerance is achieved in distributed systems
2. Discuss the fault consequences related to: i) availability, ii) reliability, iii) safety, iv) maintainability
3. Discuss the failure types: i) crash failure, ii) omission failure, iii) timing failure, iv) response failure and v) arbitrary failure
4. What is "consensus" in relation to distributed systems and why is it desirable to be able to guarantee consensus?
5. What fundamental property is typically needed in order to reach consensus (e.g. in terms of quorum)?

Exercise: RAFT

1. What is a "term" in RAFT and what are "terms" used for?
2. How is leader election done in RAFT?
3. What does RAFT do, if there is a split vote in a term?
4. How is log replication done in RAFT?
5. How does RAFT guarantee logs to be replicated correctly?
6. How does RAFT resolve log inconsistencies and what role does the "log matching property" play?
7. What criterion needs to be fulfilled for a node to become leader in RAFT?
8. How does RAFT reach consensus in a distributed system (what criterion needs to be fulfilled)?
9. How can RAFT help provide fault tolerance in distributed systems?
10. What does the RAFT acronym stand for and who developed RAFT?