Quiz 11: Paxos

Due Aug 3 at 11:59pm **Points** 100 **Questions** 4
Available Jul 28 at 8am - Aug 3 at 11:59pm 7 days **Time Limit** 60 Minutes

This quiz was locked Aug 3 at 11:59pm.

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	16 minutes	44 out of 100

Score for this quiz: **44** out of 100
Submitted Aug 3 at 1:48pm
This attempt took 16 minutes.

Question 1 — 0 / 25 pts

When is the value V chosen by the Paxos algorithm?

- When leader receives a majority prepare-ok and proposes V
- When a majority of nodes accept V

orrect Answer

ou Answered

- When the leader receives a majority accept-ok for value V

The algorithm still works if the leader crashes.

Question 2 — 19 / 25 pts

Assuming fail stop failures with up to F failures, the Paxos algorithm requires at least 2F + 1 replicas with at least N - F votes from acceptors. For Byzantine failures, the Byzantine broadcast protocol (PBFT) requires at least 3f + 1 replicas with at least 2f+ 1 votes from acceptors.

Answer 1:

ou Answered 2F + 1

orrect Answer 2F+1

Answer 2:

ou Answered N - F

orrect Answer F+1

Answer 3:

ou Answered 3f + 1

orrect Answer 3F+1

Answer 4:

ou Answered 2f+ 1

orrect Answer 2F+1

Question 3

10 / 25 pts

Why is the "propose" stage in the Paxos algorithm required? Is it always necessary?

Your Answer:

The propose stage in the Paxos algorithm is required because its the crux of the algorithm. The proposal effectively starts or restarts, the protocol by issuing a new proposal on a decision value by collecting acceptances from a majority of acceptors.

"Propose" is in case there is more than one primary running. It is not necessary if there is only one primary.

Question 4

15 / 25 pts

Protocols like Paxos and Viewstamp rely on a primary to drive the protocol.

1. What is the challenge with relying on a primary with Byzantine failures?
2. PBFT adds an extra phase to the viewstamp protocol, when updating a value, to deal with this. Explain.

Your Answer:

1. The challenge of relying on a primary with Byzantine failures is that the primary might send illegal messages or trick the other nodes. So a malicious primary could change the value of a key, acknowledge and then discard an operation, or send different messages to different replicas. Since its the primary, the acceptor and listener nodes will follow it.

2. PBFT adds an extra phase to the viewstamp protocol to deal with potential Byzantine failures by having the replicas watch the primary and do a view change if the primary fails.

2. PBFT adds a pre-prepare phase, where the primary broadcasts an update. In the prepare phase, the replicas broadcast the update to each other to make sure the primary is proposing the same update to all replicas.

Quiz Score: **44** out of 100