

CS 186 - Fall 2024

Exam Prep Section 12

Consensus

1 Paxos Timing

Suppose there are five nodes P1, P2, P3, P4, and P5. We have the following information about the network:

- Nodes can broadcast messages to other nodes simultaneously.
- Each node takes 20 seconds to send a message to another node.
- Each node takes 10 seconds to flush a log record.

Suppose P1 multicasts a PREPARE(1) at $t=0$ seconds to P3, P4, P5. Suppose P2 multicasts a PREPARE(2) at $t=15$ seconds to P3, P4, P5. Answer the following questions about the Paxos execution.

1. How many PROMISE messages are sent?
2. How many PROPOSE messages are sent?
3. How many ACCEPT messages are sent?
4. How many COMMIT messages are sent?

5. How many log flushes occur?

6. How long does the Paxos execution take?

7. Suppose P3 multicasts a PREPARE(3) to a majority of participants at $t=100$ seconds. What happens?