

# SLR210 project: report

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## High-level description

The system consists of a number of processes, communicating with each other to come to an agreement about a value, 0 or 1, using a version of the Paxos protocol.

This protocol works in two main steps:

1. Prepare phase:

- first, a process sends a ballot number to all the other processes, acting as a sort of priority number.
- When a process receives this ballot number, if it has not received a demand with a higher ballot number, it must promise the sender not to accept proposals for demands with smaller ballot numbers. Moreover, if it is about to decide on a value, the receiving process must send the almost decided value to the sender. If the received ballot is smaller than the ballot the receiver is already committed to, the process sends an abort message so that the sender can restart a proposal with a new ballot number.

2. Accept phase:

- When the proposer receives promises from at least half of the processes, it first determines the value it must propose for acceptance. This value is the one associated to the highest ballot number among the proposal about to be decided. If no such value exists, the proposer proceeds with its own value.
- Upon receiving an accept demand, a process verifies once more that it has not committed to a process with a higher ballot number, or accepted the value with a higher ballot number. In that case, the process sends abort to the sender. Otherwise, the receiver sends back an acknowledgment to the sender.
- Finally, when the proposer receives acknowledgments from at least half the processes, the value is decided, and a decide message is sent to all.

This protocol has the advantage of still being able to produce results even though some processes (no more than half of them) are fault-prone.

Pseudo-code

Proof of correctness

Performance analysis