Operation-based observed-remove set CRDT

Large Scale Distributed Systems

Objectives

Implement an operation-based observed-remove set CRDT, using the previously implemented causal broadcast algorithm for operation propagation.

Tasks

1. Understand the optimized version of the observed-remove set CRDT (ORSet) from the slides.
2. Consider how the previously implemented causal broadcast algorithm can be used by the ORSet CRDT. There will be no `cbcast` message in the client API, being the code (handler) invoked directly by the CRDT algorithm, and CRDT code invoked as result of a deliver.
3. Write the ORSet code. The client API should be in terms of `add`, `remove`, and `read` messages. The last one should reply with the elements in the set, by simply invoking the local *elements* query function, while the former two should trigger `cbcast` messages, using the result of the respective *prepare*. Remember to also invoke the appropriate *effect* at the replica which issues the add/remove update (as cbcast only sends to other replicas).