Consensus

SliceIT: rban, jouj, phimo

November 2022

GitHub link https://github.com/JonasUJ/dsys-hw4

1 Preface

We have chosen the Ricart & Agrawala algorithm for implementing a consensus algorithm.

2 Log discussion

Looking at the log you can see the interaction that is Alice joins, Bob joins, Charlie Joins. Alice connects to Bob, and then Charlie. Alice locks, Bob locks, Charlie locks. Alice unlocks, then Bob, then Charlie.

From this interaction we can see that we satisfy liveliness, everybody gets to enter the critical section, i.e every client that requests the lock gets it at some point. We satisfy safety, as no more than one client is ever in the critical section.

2.1 Log

This is a complied log consisting of Alice, Bob and Charlie, for the original logs look at the git repository for the logs of the corresponding names. Look at the readme for the option to splice logs of the programs while they are running.

```
    // the three clients are created
Alice   (5704): 21:54:24 changing state Released -> Released
Bob     (2640): 21:55:11 changing state Released -> Released
Charlie (13116): 21:55:36 changing state Released -> Released


//Alice dials up the other clients
Alice   (5704): 21:55:55 dialing 2
Alice   (5704): 21:55:56 dialing 2
Alice   (5704): 21:55:56 connected to peer 2640
Alice   (5704): 21:55:56 connected to peer 2640 on port 2
Alice   (5704): 21:55:58 dialing 3
```

```
Alice   (5704): 21:55:58 dialing 3
Alice   (5704): 21:55:58 connected to peer 13116
Alice   (5704): 21:55:59 connected to peer 13116 on port 3

Bob     (2640): 21:55:56 dialing 1
Bob     (2640): 21:55:56 connected to peer 5704
Bob     (2640): 21:55:58 dialing 3
Bob     (2640): 21:55:58 connected to peer 13116

Charlie (13116): 21:55:58 dialing 1
Charlie (13116): 21:55:58 connected to peer 5704
Charlie (13116): 21:55:59 dialing 2
Charlie (13116): 21:55:59 connected to peer 2640


//all clients lock in the order Alice -> Bob -> Charlie
Alice   (5704): 21:58:46 attempting to lock
Alice   (5704): 21:58:46 attempting to enter critical section
Alice   (5704): 21:58:46 changing state Released -> Wanted
Alice   (5704): 21:58:46 multicasting {0 5704}
Alice   (5704): 21:58:46 got reply
Alice   (5704): 21:58:46 got reply
Alice   (5704): 21:58:46 changing state Wanted -> Held
Alice   (5704): 21:58:46 changing time 0 -> 1
Alice   (5704): 21:58:46 entered critical section at time 1

Alice   (5704): 22:01:09 changing time 1 -> 3
Alice   (5704): 22:01:09 recv {time:2 pid:2640}
Alice   (5704): 22:01:27 changing time 3 -> 5
Alice   (5704): 22:01:27 recv {time:4 pid:13116}

Bob     (2640): 21:58:46 changing time 0 -> 1
Bob     (2640): 21:58:46 recv {pid:5704}
Bob     (2640): 21:58:46 replying {0 5704}
Bob     (2640): 21:58:46 changing time 1 -> 2
Bob     (2640): 22:01:09 attempting to lock
Bob     (2640): 22:01:09 attempting to enter critical section
Bob     (2640): 22:01:09 changing state Released -> Wanted
Bob     (2640): 22:01:09 multicasting {2 2640}
Bob     (2640): 22:01:09 got reply
Bob     (2640): 22:01:27 recv {time:4 pid:13116}

Charlie (13116): 21:58:46 changing time 0 -> 1
Charlie (13116): 21:58:46 recv {pid:5704}
Charlie (13116): 21:58:46 replying {0 5704}
Charlie (13116): 21:58:46 changing time 1 -> 2
```

```
Charlie (13116): 22:01:09 changing time 2 -> 3
Charlie (13116): 22:01:09 recv {time:2 pid:2640}
Charlie (13116): 22:01:09 replying {2 2640}
Charlie (13116): 22:01:09 changing time 3 -> 4
Charlie (13116): 22:01:27 attempting to lock
Charlie (13116): 22:01:27 attempting to enter critical section
Charlie (13116): 22:01:27 changing state Released -> Wanted
Charlie (13116): 22:01:27 multicasting {4 13116}

//Alice unlocks
Alice   (5704): 22:02:23 leaving critical section
Alice   (5704): 22:02:23 changing state Held -> Released
Alice   (5704): 22:02:23 replying {2 2640}
Alice   (5704): 22:02:23 changing time 5 -> 6
Alice   (5704): 22:02:23 replying {4 13116}
Alice   (5704): 22:02:23 changing time 6 -> 7
Alice   (5704): 22:02:23 left critical section

Bob     (2640): 22:02:23 got reply
Bob     (2640): 22:02:23 changing state Wanted -> Held
Bob     (2640): 22:02:23 changing time 2 -> 3
Bob     (2640): 22:02:23 entered critical section at time 3

Charlie (13116): 22:02:23 got reply

//bob unlocks
Bob     (2640): 22:08:24 leaving critical section
Bob     (2640): 22:08:24 changing state Held -> Released
Bob     (2640): 22:08:24 replying {4 13116}
Bob     (2640): 22:08:24 changing time 3 -> 4
Bob     (2640): 22:08:24 left critical section

Charlie (13116): 22:08:24 got reply
Charlie (13116): 22:08:24 changing state Wanted -> Held
Charlie (13116): 22:08:24 changing time 4 -> 5
Charlie (13116): 22:08:24 entered critical section at time 5

//Charlie unlocks
Charlie (13116): 22:09:06 leaving critical section
Charlie (13116): 22:09:06 changing state Held -> Released
Charlie (13116): 22:09:06 left critical section
```