Mandatory Exercise 2
Distributed Mutual Exclusion

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November 17, 2021

https://github.com/hoaj/distributed_mutex

1 Description of solution

We have chosen that the server grants permission to the critical section(CS). To enter a CS, a node sends a requests to the central server and awaits a reply from it. The reply constitutes a token that signifies permission to enter the CS. If no other node has the token at the time of the request then the central server replies immediately, granting the token. If the token is currently held by another node, then the server does not reply but queues the request. On exiting the CS, a message is sent to the server, giving it back the token. If the queue of waiting nodes is not empty, then the server chooses the oldest entry in the queue, removes it and replies to the corresponding node. The chosen node then holds the token.

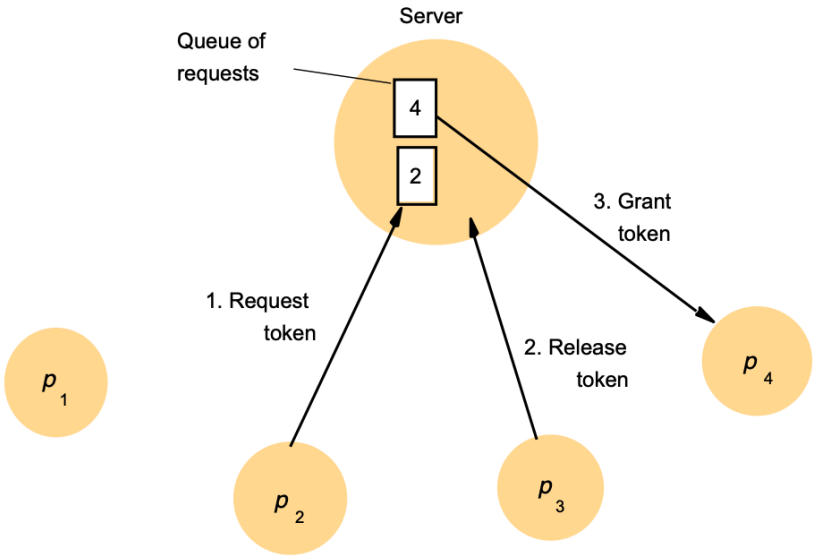

Figure 1: The Central Server Algorithm

2 Logs

```
Central Server log:
2021/11/11 18:19:15 Node: 1 got enqueued
2021/11/11 18:19:15 Node: 1 got dequeued
2021/11/11 18:19:15 Node: 1 just entered the CS
2021/11/11 18:19:17 Node: 2 got enqueued
2021/11/11 18:19:19 Node: 3 got enqueued
2021/11/11 18:19:19 Node: 1 just left the CS
2021/11/11 18:19:21 Node: 1 got enqueued
2021/11/11 18:19:21 Node: 2 got dequeued
2021/11/11 18:19:21 Node: 2 just entered the CS
2021/11/11 18:19:25 Node: 2 just left the CS
2021/11/11 18:19:27 Node: 2 got enqueued
2021/11/11 18:19:27 Node: 3 got dequeued
2021/11/11 18:19:27 Node: 3 just entered the CS
2021/11/11 18:19:31 Node: 3 just left the CS
2021/11/11 18:19:33 Node: 3 got enqueued
2021/11/11 18:19:33 Node: 1 got dequeued
2021/11/11 18:19:33 Node: 1 just entered the CS
2021/11/11 18:19:37 Node: 1 just left the CS
2021/11/11 18:19:39 Node: 1 got enqueued
2021/11/11 18:19:39 Node: 2 got dequeued
2021/11/11 18:19:39 Node: 2 just entered the CS
2021/11/11 18:19:43 Node: 2 just left the CS
2021/11/11 18:19:45 Node: 2 got enqueued
2021/11/11 18:19:45 Node: 3 got dequeued
2021/11/11 18:19:45 Node: 3 just entered the CS
2021/11/11 18:19:49 Node: 3 just left the CS
2021/11/11 18:19:52 Node: 3 got enqueued
2021/11/11 18:19:52 Node: 1 got dequeued
2021/11/11 18:19:52 Node: 1 just entered the CS
2021/11/11 18:19:56 Node: 1 just left the CS
2021/11/11 18:19:58 Node: 1 got enqueued
2021/11/11 18:19:58 Node: 2 got dequeued
2021/11/11 18:19:58 Node: 2 just entered the CS
2021/11/11 18:20:02 Node: 2 just left the CS
2021/11/11 18:20:04 Node: 2 got enqueued
2021/11/11 18:20:04 Node: 3 got dequeued
2021/11/11 18:20:04 Node: 3 just entered the CS
```

We started nodes in this order: Node 1, Node 2, Node 3.

Node 1 log:
2021/11/11 18:19:15 Node: 1 entered CS
2021/11/11 18:19:19 Node: 1 left CS
2021/11/11 18:19:33 Node: 1 entered CS
2021/11/11 18:19:37 Node: 1 left CS
2021/11/11 18:19:52 Node: 1 entered CS
2021/11/11 18:19:56 Node: 1 left CS
2021/11/11 18:20:10 Node: 1 entered CS
2021/11/11 18:20:14 Node: 1 left CS

Node 2 log:
2021/11/11 18:19:21 Node: 2 entered CS
2021/11/11 18:19:25 Node: 2 left CS
2021/11/11 18:19:39 Node: 2 entered CS
2021/11/11 18:19:43 Node: 2 left CS
2021/11/11 18:19:58 Node: 2 entered CS
2021/11/11 18:20:02 Node: 2 left CS
2021/11/11 18:20:16 Node: 2 entered CS

Node 3 log:
2021/11/11 18:19:27 Node: 3 entered CS
2021/11/11 18:19:31 Node: 3 left CS
2021/11/11 18:19:45 Node: 3 entered CS
2021/11/11 18:19:49 Node: 3 left CS
2021/11/11 18:20:04 Node: 3 entered CS
2021/11/11 18:20:08 Node: 3 left CS