

## Mandatory Activity 4 (Distributed Mutual Exclusion)

### System Requirements:

- **R1:**

Our system maintains a list of 10 possible addresses, and so can handle 10 peers at a given time. The call to enter the critical section is made on start-up and the critical section just prints a string to our log and terminal.

- **R2 (Safety):**

Every call to enter the critical section awaits a go-ahead from all known peers, which it will not get if another peer is in the critical section.

- **R3 (Liveliness):**

Priority to gain access to the critical section is handled by seniority as the node with the higher timestamp is awarded access. In the event of equal timestamps, the higher nodeID wins.

The algorithm is designed so that each node keeps track of how many peers it has, to determine whether all the peers allow it access to CS. Sadly keeping the respective lists of peers synchronized proved a challenge, as well as freeing up ports when a client would quit. As such the program only works right now in one direction, as the first client is unaware of the second and the second of the third etc.

## Appendix

2024/11/11 23:28:08 Starting server for Node 15 on :50058

2024/11/11 23:28:08 Node 15 requesting critical section

2024/11/11 23:28:08 Node 15 requesting CS at timestamp 1

2024/11/11 23:28:08 Node 15 entering critical section

2024/11/11 23:28:08 Node 15 releasing at timestamp 1

2024/11/11 23:28:08 Node 15 now processing pending requests

2024/11/11 23:28:20 Starting server for Node 16 on :50060

2024/11/11 23:28:20 Node 16 requesting critical section

2024/11/11 23:28:20 Node 16 requesting CS at timestamp 1

2024/11/11 23:28:20 Node 15 received request from Node 16 at timestamp 1

2024/11/11 23:28:36 Starting server for Node 17 on :50056

2024/11/11 23:28:36 Node 17 requesting critical section

2024/11/11 23:28:36 Node 17 requesting CS at timestamp 1

2024/11/11 23:28:36 Node 16 received request from Node 17 at timestamp 1

2024/11/11 23:28:36 Node 15 received request from Node 17 at timestamp 1

2024/11/11 23:30:06 Node 15 received shutdown signal. Quitting...

2024/11/11 23:30:06 No peers to notify on shutdown.

2024/11/11 23:30:38 Starting server for Node 18 on :50060

2024/11/11 23:30:38 Node 18 requesting critical section

2024/11/11 23:30:38 Node 18 requesting CS at timestamp 1

2024/11/11 23:30:38 Node 18 entering critical section

2024/11/11 23:30:38 Node 18 releasing at timestamp 1

2024/11/11 23:30:38 Node 18 now processing pending requests

2024/11/11 23:30:46 Starting server for Node 19 on :50054

2024/11/11 23:30:46 Node 19 requesting critical section

2024/11/11 23:30:46 Node 19 requesting CS at timestamp 1

2024/11/11 23:30:46 Node 18 received request from Node 19 at timestamp 1