

Note

I plan to upload this assignment over a github once grades are out. I wrote the readme considering that fact. Reading it in plain text editor might not be a good idea! I suggest to read [readme.pdf](#) instead

Project Title

Concurrent Token Management System

Project Description

Implemented a client-server solution for managing tokens. Server maintains an initially empty (non-persistent) collection of tokens. Clients issue RPC calls to the server to execute create, drop, read-write methods on tokens. The server executes such RPCs and returns an appropriate response to each call. Client-server communication is assumed synchronous.

Token

A token is an abstract data type, with the following properties: id, name, domain, and state. Tokens are uniquely identified by their id, which is a string. The name of a token is another string. The domain of a token consists of three uint64 integers: low, mid, and high. The state of a token consists of two uint64 integers: a partial value and a final value, which is defined at the integer x in the range [low, mid] and [low, high], respectively, that minimizes $h(\text{name}, x)$ for a hash function h . Hash function used in SHA-256.

Supported Operations

- create(id)**: create a token with the given id. Return a success or fail response.
- drop(id)**: to destroy/delete the token with the given id
- write(id, name, low, high, mid)**:
 - set the properties name, low, mid, and high for the token with the given id. Assume uint64 integers low $<=$ mid $<$ high.
 - compute the partial value of the token as $\min H(\text{name}, x)$ for x in [low, mid], and reset the final value of the token.
 - return the partial value on success or fail response
- read(id)**:
 - find $\min H(\text{name}, x)$ for x in [mid, high]
 - set the token's final value to the minimum of the value in step#1 and its partial value
 - return the token's final value on success or fail response

Setup Environment

Go Installation

Follow: [Download and install Go](#)

Use Version: go1.17.7

Protocol Buffers Installation

Follow: [Protocol Buffer Compiler Installation](#)

Use Version: 3

Install gRPC plugins

```
$ go install google.golang.org/protobuf/cmd/protoc-gen-go@v1.28.0
$ go install google.golang.org/grpc/cmd/protoc-gen-go-grpc@v1.2
```

Update PATH for protoc

```
$ export PATH="$PATH:$GOPATH/bin"
```

Run

Server:

```
# go to project directory
cd <project_directory>
e.g. $ cd /Users/aditya/Documents/Courses/AOS/CMSC621_project2

# start server
go run server.go -port <port_number>
e.g. $ go run server.go -port 50051
```

Client:

```
# go to project directory
cd <project_directory>
e.g. $ cd /Users/aditya/Documents/Courses/AOS/CMSC621_project2

# create request
go run client.go -create -id <id_num> -host <host_address> -port <port_number>
e.g. $ go run client.go -create -id 1 -host localhost -port 50051

# write request
go run client.go -write -id <id_num> -name <token_name> -low <low> -mid <mid> -high <high> -host <host_address> -port <port_number>
e.g. $ go run client.go -write -id 1 -name abcd -low 1 -mid 5 -high 10 -host localhost -port 50051

# read request
go run client.go -read -id <id_num> -host <host_address> -port <port_number>
e.g. $ go run client.go -read -id 1 -host localhost -port 50051

# drop request
go run client.go -drop -id <id_num> -host <host_address> -port <port_number>
e.g. $ go run client.go -drop -id 1 -host localhost -port 50051
```

To run the demo:

```
# go to project directory
cd <project_directory>
e.g. $ cd /Users/aditya/Documents/Courses/AOS/CMSC621_project2

# set executable permission for demo script
$ chmod +x ./demo.sh

# execute demo script
./demo.sh <port number>
e.g. $ ./demo.sh 50051
```

To close the server press Ctrl+C

Project Files and Directories

- server.go**: Code for the server operations
- client.go**: Code for the client operations
- token**: Directory containing code related to token management like proto definitions and logic for each operation that can be performed on tokens
- utils**: Directory containing utilities and helper functions
- go.mod**: Root dependency management
- go.sum**: Checksum for dependencies
- demo.sh**: Shell script demonstrating demo of the project
- analysis_helpers**: Lists commands I generally used to analyze my outputs and it is sometimes difficult to navigate stdout and stderr through large pile of text
- output**: Directory which stores redirected logs from server and client ran via demo script
- demo_screenshots**: Screenshots of the demo I ran

Code Description - What Did I do/Assumptions Made/Deviations

I believe the code itself is very readable. I tried to note few more things below:

- One of the major deviation I took from what is asked in the project is to use min values instead of argmin for read and write operations
- Reason being argmin will always result in same partial and final values. I discussed this already with the TA
- While supporting concurrency, my code supports following type of operations
 - Operations with different id - Parallel execution
 - Read operations with same id - Parallel execution (Although, there is write involved in the last step of read operation, it does not corrupt data as low, mid, high remains the same)
 - Any other combination of operations with same id - Serial execution
- I used 0 as default values for partial and final values. Sign-offed by TA

Demo

Above screenshot is of running the **demo.sh**. Sequence of server and clients launched is logged above

```
Aditya-Medison-Proj02_2 $ ./demo.sh 50051
Launching Server
Server Port: 50051
Server PID: 50050
$ go run server.go -port 50051
Launching Server
Request: 1
go run client.go -create -id 1 -host localhost -port 50051
go run client.go -read -id 1 -host localhost -port 50051
go run client.go -write -id 1 -name abcd -low 1 -mid 5 -high 10 -host localhost -port 50051
go run client.go -drop -id 1 -host localhost -port 50051
Request: 2
go run client.go -create -id 2 -host localhost -port 50051
go run client.go -read -id 2 -host localhost -port 50051
go run client.go -write -id 2 -name ef -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 2 -host localhost -port 50051
Request: 3
go run client.go -create -id 3 -host localhost -port 50051
go run client.go -read -id 3 -host localhost -port 50051
go run client.go -write -id 3 -name gh -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 3 -host localhost -port 50051
Request: 4
go run client.go -create -id 4 -host localhost -port 50051
go run client.go -read -id 4 -host localhost -port 50051
go run client.go -write -id 4 -name ij -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 4 -host localhost -port 50051
Request: 5
go run client.go -create -id 5 -host localhost -port 50051
go run client.go -read -id 5 -host localhost -port 50051
go run client.go -write -id 5 -name kl -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 5 -host localhost -port 50051
Request: 6
go run client.go -create -id 6 -host localhost -port 50051
go run client.go -read -id 6 -host localhost -port 50051
go run client.go -write -id 6 -name mn -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 6 -host localhost -port 50051
Request: 7
go run client.go -create -id 7 -host localhost -port 50051
go run client.go -read -id 7 -host localhost -port 50051
go run client.go -write -id 7 -name op -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 7 -host localhost -port 50051
Request: 8
go run client.go -create -id 8 -host localhost -port 50051
go run client.go -read -id 8 -host localhost -port 50051
go run client.go -write -id 8 -name qr -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 8 -host localhost -port 50051
Request: 9
go run client.go -create -id 9 -host localhost -port 50051
go run client.go -read -id 9 -host localhost -port 50051
go run client.go -write -id 9 -name st -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 9 -host localhost -port 50051
Request: 10
go run client.go -create -id 10 -host localhost -port 50051
go run client.go -read -id 10 -host localhost -port 50051
go run client.go -write -id 10 -name uv -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 10 -host localhost -port 50051
Request: 11
go run client.go -create -id 11 -host localhost -port 50051
go run client.go -read -id 11 -host localhost -port 50051
go run client.go -write -id 11 -name wx -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 11 -host localhost -port 50051
Request: 12
go run client.go -create -id 12 -host localhost -port 50051
go run client.go -read -id 12 -host localhost -port 50051
go run client.go -write -id 12 -name yz -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 12 -host localhost -port 50051
Request: 13
go run client.go -create -id 13 -host localhost -port 50051
go run client.go -read -id 13 -host localhost -port 50051
go run client.go -write -id 13 -name aa -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 13 -host localhost -port 50051
Request: 14
go run client.go -create -id 14 -host localhost -port 50051
go run client.go -read -id 14 -host localhost -port 50051
go run client.go -write -id 14 -name bb -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 14 -host localhost -port 50051
Request: 15
go run client.go -create -id 15 -host localhost -port 50051
go run client.go -read -id 15 -host localhost -port 50051
go run client.go -write -id 15 -name cc -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 15 -host localhost -port 50051
Request: 16
go run client.go -create -id 16 -host localhost -port 50051
go run client.go -read -id 16 -host localhost -port 50051
go run client.go -write -id 16 -name dd -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 16 -host localhost -port 50051
Request: 17
go run client.go -create -id 17 -host localhost -port 50051
go run client.go -read -id 17 -host localhost -port 50051
go run client.go -write -id 17 -name ee -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 17 -host localhost -port 50051
Request: 18
go run client.go -create -id 18 -host localhost -port 50051
go run client.go -read -id 18 -host localhost -port 50051
go run client.go -write -id 18 -name ff -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 18 -host localhost -port 50051
Request: 19
go run client.go -create -id 19 -host localhost -port 50051
go run client.go -read -id 19 -host localhost -port 50051
go run client.go -write -id 19 -name gg -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 19 -host localhost -port 50051
Request: 20
go run client.go -create -id 20 -host localhost -port 50051
go run client.go -read -id 20 -host localhost -port 50051
go run client.go -write -id 20 -name hh -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 20 -host localhost -port 50051
Request: 21
go run client.go -create -id 21 -host localhost -port 50051
go run client.go -read -id 21 -host localhost -port 50051
go run client.go -write -id 21 -name ii -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 21 -host localhost -port 50051
Request: 22
go run client.go -create -id 22 -host localhost -port 50051
go run client.go -read -id 22 -host localhost -port 50051
go run client.go -write -id 22 -name jj -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 22 -host localhost -port 50051
Request: 23
go run client.go -create -id 23 -host localhost -port 50051
go run client.go -read -id 23 -host localhost -port 50051
go run client.go -write -id 23 -name kk -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 23 -host localhost -port 50051
Request: 24
go run client.go -create -id 24 -host localhost -port 50051
go run client.go -read -id 24 -host localhost -port 50051
go run client.go -write -id 24 -name ll -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 24 -host localhost -port 50051
Request: 25
go run client.go -create -id 25 -host localhost -port 50051
go run client.go -read -id 25 -host localhost -port 50051
go run client.go -write -id 25 -name mm -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 25 -host localhost -port 50051
Request: 26
go run client.go -create -id 26 -host localhost -port 50051
go run client.go -read -id 26 -host localhost -port 50051
go run client.go -write -id 26 -name nn -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 26 -host localhost -port 50051
Request: 27
go run client.go -create -id 27 -host localhost -port 50051
go run client.go -read -id 27 -host localhost -port 50051
go run client.go -write -id 27 -name oo -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 27 -host localhost -port 50051
Request: 28
go run client.go -create -id 28 -host localhost -port 50051
go run client.go -read -id 28 -host localhost -port 50051
go run client.go -write -id 28 -name pp -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 28 -host localhost -port 50051
Request: 29
go run client.go -create -id 29 -host localhost -port 50051
go run client.go -read -id 29 -host localhost -port 50051
go run client.go -write -id 29 -name qq -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 29 -host localhost -port 50051
Request: 30
go run client.go -create -id 30 -host localhost -port 50051
go run client.go -read -id 30 -host localhost -port 50051
go run client.go -write -id 30 -name rr -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 30 -host localhost -port 50051
Request: 31
go run client.go -create -id 31 -host localhost -port 50051
go run client.go -read -id 31 -host localhost -port 50051
go run client.go -write -id 31 -name ss -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 31 -host localhost -port 50051
Request: 32
go run client.go -create -id 32 -host localhost -port 50051
go run client.go -read -id 32 -host localhost -port 50051
go run client.go -write -id 32 -name tt -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 32 -host localhost -port 50051
Request: 33
go run client.go -create -id 33 -host localhost -port 50051
go run client.go -read -id 33 -host localhost -port 50051
go run client.go -write -id 33 -name uu -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 33 -host localhost -port 50051
Request: 34
go run client.go -create -id 34 -host localhost -port 50051
go run client.go -read -id 34 -host localhost -port 50051
go run client.go -write -id 34 -name vv -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 34 -host localhost -port 50051
Request: 35
go run client.go -create -id 35 -host localhost -port 50051
go run client.go -read -id 35 -host localhost -port 50051
go run client.go -write -id 35 -name ww -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 35 -host localhost -port 50051
Request: 36
go run client.go -create -id 36 -host localhost -port 50051
go run client.go -read -id 36 -host localhost -port 50051
go run client.go -write -id 36 -name xx -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 36 -host localhost -port 50051
Request: 37
go run client.go -create -id 37 -host localhost -port 50051
go run client.go -read -id 37 -host localhost -port 50051
go run client.go -write -id 37 -name yy -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 37 -host localhost -port 50051
Request: 38
go run client.go -create -id 38 -host localhost -port 50051
go run client.go -read -id 38 -host localhost -port 50051
go run client.go -write -id 38 -name zz -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 38 -host localhost -port 50051
Request: 39
go run client.go -create -id 39 -host localhost -port 50051
go run client.go -read -id 39 -host localhost -port 50051
go run client.go -write -id 39 -name aa -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 39 -host localhost -port 50051
Request: 40
go run client.go -create -id 40 -host localhost -port 50051
go run client.go -read -id 40 -host localhost -port 50051
go run client.go -write -id 40 -name bb -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 40 -host localhost -port 50051
Request: 41
go run client.go -create -id 41 -host localhost -port 50051
go run client.go -read -id 41 -host localhost -port 50051
go run client.go -write -id 41 -name cc -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 41 -host localhost -port 50051
Request: 42
go run client.go -create -id 42 -host localhost -port 50051
go run client.go -read -id 42 -host localhost -port 50051
go run client.go -write -id 42 -name dd -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 42 -host localhost -port 50051
Request: 43
go run client.go -create -id 43 -host localhost -port 50051
go run client.go -read -id 43 -host localhost -port 50051
go run client.go -write -id 43 -name ee -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 43 -host localhost -port 50051
Request: 44
go run client.go -create -id 44 -host localhost -port 50051
go run client.go -read -id 44 -host localhost -port 50051
go run client.go -write -id 44 -name ff -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 44 -host localhost -port 50051
Request: 45
go run client.go -create -id 45 -host localhost -port 50051
go run client.go -read -id 45 -host localhost -port 50051
go run client.go -write -id 45 -name gg -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 45 -host localhost -port 50051
Request: 46
go run client.go -create -id 46 -host localhost -port 50051
go run client.go -read -id 46 -host localhost -port 50051
go run client.go -write -id 46 -name hh -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 46 -host localhost -port 50051
Request: 47
go run client.go -create -id 47 -host localhost -port 50051
go run client.go -read -id 47 -host localhost -port 50051
go run client.go -write -id 47 -name ii -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 47 -host localhost -port 50051
Request: 48
go run client.go -create -id 48 -host localhost -port 50051
go run client.go -read -id 48 -host localhost -port 50051
go run client.go -write -id 48 -name jj -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 48 -host localhost -port 50051
Request: 49
go run client.go -create -id 49 -host localhost -port 50051
go run client.go -read -id 49 -host localhost -port 50051
go run client.go -write -id 49 -name kk -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 49 -host localhost -port 50051
Request: 50
go run client.go -create -id 50 -host localhost -port 50051
go run client.go -read -id 50 -host localhost -port 50051
go run client.go -write -id 50 -name ll -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 50 -host localhost -port 50051
Request: 51
go run client.go -create -id 51 -host localhost -port 50051
go run client.go -read -id 51 -host localhost -port 50051
go run client.go -write -id 51 -name mm -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 51 -host localhost -port 50051
Request: 52
go run client.go -create -id 52 -host localhost -port 50051
go run client.go -read -id 52 -host localhost -port 50051
go run client.go -write -id 52 -name nn -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 52 -host localhost -port 50051
Request: 53
go run client.go -create -id 53 -host localhost -port 50051
go run client.go -read -id 53 -host localhost -port 50051
go run client.go -write -id 53 -name oo -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 53 -host localhost -port 50051
Request: 54
go run client.go -create -id 54 -host localhost -port 50051
go run client.go -read -id 54 -host localhost -port 50051
go run client.go -write -id 54 -name pp -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 54 -host localhost -port 50051
Request: 55
go run client.go -create -id 55 -host localhost -port 50051
go run client.go -read -id 55 -host localhost -port 50051
go run client.go -write -id 55 -name qq -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 55 -host localhost -port 50051
Request: 56
go run client.go -create -id 56 -host localhost -port 50051
go run client.go -read -id 56 -host localhost -port 50051
go run client.go -write -id 56 -name rr -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 56 -host localhost -port 50051
Request: 57
go run client.go -create -id 57 -host localhost -port 50051
go run client.go -read -id 57 -host localhost -port 50051
go run client.go -write -id 57 -name ss -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 57 -host localhost -port 50051
Request: 58
go run client.go -create -id 58 -host localhost -port 50051
go run client.go -read -id 58 -host localhost -port 50051
go run client.go -write -id 58 -name tt -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 58 -host localhost -port 50051
Request: 59
go run client.go -create -id 59 -host localhost -port 50051
go run client.go -read -id 59 -host localhost -port 50051
go run client.go -write -id 59 -name uu -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 59 -host localhost -port 50051
Request: 60
go run client.go -create -id 60 -host localhost -port 50051
go run client.go -read -id 60 -host localhost -port 50051
go run client.go -write -id 60 -name vv -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 60 -host localhost -port 50051
Request: 61
go run client.go -create -id 61 -host localhost -port 50051
go run client.go -read -id 61 -host localhost -port 50051
go run client.go -write -id 61 -name ww -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 61 -host localhost -port 50051
Request: 62
go run client.go -create -id 62 -host localhost -port 50051
go run client.go -read -id 62 -host localhost -port 50051
go run client.go -write -id 62 -name xx -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 62 -host localhost -port 50051
Request: 63
go run client.go -create -id 63 -host localhost -port 50051
go run client.go -read -id 63 -host localhost -port 50051
go run client.go -write -id 63 -name yy -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 63 -host localhost -port 50051
Request: 64
go run client.go -create -id 64 -host localhost -port 50051
go run client.go -read -id 64 -host localhost -port 50051
go run client.go -write -id 64 -name zz -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 64 -host localhost -port 50051
Request: 65
go run client.go -create -id 65 -host localhost -port 50051
go run client.go -read -id 65 -host localhost -port 50051
go run client.go -write -id 65 -name aa -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 65 -host localhost -port 50051
Request: 66
go run client.go -create -id 66 -host localhost -port 50051
go run client.go -read -id 66 -host localhost -port 50051
go run client.go -write -id 66 -name bb -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 66 -host localhost -port 50051
Request: 67
go run client.go -create -id 67 -host localhost -port 50051
go run client.go -read -id 67 -host localhost -port 50051
go run client.go -write -id 67 -name cc -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 67 -host localhost -port 50051
Request: 68
go run client.go -create -id 68 -host localhost -port 50051
go run client.go -read -id 68 -host localhost -port 50051
go run client.go -write -id 68 -name dd -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 68 -host localhost -port 50051
Request: 69
go run client.go -create -id 69 -host localhost -port 50051
go run client.go -read -id 69 -host localhost -port 50051
go run client.go -write -id 69 -name ee -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 69 -host localhost -port 50051
Request: 70
go run client.go -create -id 70 -host localhost -port 50051
go run client.go -read -id 70 -host localhost -port 50051
go run client.go -write -id 70 -name ff -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 70 -host localhost -port 50051
Request: 71
go run client.go -create -id 71 -host localhost -port 50051
go run client.go -read -id 71 -host localhost -port 50051
go run client.go -write -id 71 -name gg -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 71 -host localhost -port 50051
Request: 72
go run client.go -create -id 72 -host localhost -port 50051
go run client.go -read -id 72 -host localhost -port 50051
go run client.go -write -id 72 -name hh -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 72 -host localhost -port 50051
Request: 73
go run client.go -create -id 73 -host localhost -port 50051
go run client.go -read -id 73 -host localhost -port 50051
go run client.go -write -id 73 -name ii -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 73 -host localhost -port 50051
Request: 74
go run client.go -create -id 74 -host localhost -port 50051
go run client.go -read -id 74 -host localhost -port 50051
go run client.go -write -id 74 -name jj -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 74 -host localhost -port 50051
Request: 75
go run client.go -create -id 75 -host localhost -port 50051
go run client.go -read -id 75 -host localhost -port 50051
go run client.go -write -id 75 -name kk -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 75 -host localhost -port 50051
Request: 76
go run client.go -create -id 76 -host localhost -port 50051
go run client.go -read -id 76 -host localhost -port 50051
go run client.go -write -id 76 -name ll -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 76 -host localhost -port 50051
Request: 77
go run client.go -create -id 77 -host localhost -port 50051
go run client.go -read -id 77 -host localhost -port 50051
go run client.go -write -id 77 -name mm -low 8 -mid 100000 -high 500000 -host localhost -port 50051
go run client.go -drop -id 77 -host localhost -port 50051
Request: 78
go run client.go -create -id 78 -host localhost -port 50051
go run client.go -read -id 78 -host localhost -port 50051
go run client.go -write
```