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I Pledge my Honor that I have abided by the Stevens Honor System *Joseph Pelligra*

Building a TCP chat server using Go

As a final Project I decided to build a chat server using Go. Go enables multiple clients to connect to a single server through TCP to enable the real time sending and receiving of messages through a single connection. There are Five main packages in this project client, command, main, room, and server and let's take a closer look at each:

Client:

This package is responsible for keeping user info, the TCP connection, and parsing the client's input and then sending that to the server, the basic struct for the client function is:

```
type client struct {
        conn     net.Conn
        nick     string
        room     *room
        commands chan<- command
}
```

Where conn is the client TCP connection, nick is the users assigned username as a string, room which is the pointer to the current chat room, and commands which contain the channel of incoming commands to be sent to the server for processing.

Command:

The command package simply contains the struct for the different commands that will be used in the chat server. The struct for this function is:

```
type command struct {
        id     commandID
        client *client
        args   []string
}
```

Where id is the unique command type id, client is the sender of the information to the server And argos is the string to be sent from the clients message to the server

Main:

The main package contains the functionality to build a TCP server by initializing a TCP which listens for new messages, when a message is detected it sends that to the other clients connected to the server.

```go
func main() {
	s := newServer()
	go s.run()

	listener, err := net.Listen("tcp", ":8888")
	if err != nil {
		log.Fatalf("unable to start server: %s", err.Error())
	}

	defer listener.Close()
	log.Printf("server started on :8888")

	for {
		conn, err := listener.Accept()
		if err != nil {
			log.Printf("failed to accept connection: %s", err.Error())
			continue
		}

		go s.newClient(conn)
	}
}
```

Room:

The room package is responsible for holding the names of rooms and the members of rooms. The struct for the room package is:

```go
type room struct {
	name    string
	members map[net.Addr]*client
}
```

Where name is the string for the room name and members is the list of members for that room using a client remove address.

Server:
Finally the Server package is responsible for executing the different functions of the program as it operates. THis is achieved using a switch case to determine what to do and when:

```go
func (s *server) run() {
	for cmd := range s.commands {
		switch cmd.id {
		case CMD_NICK:
			s.nick(cmd.client, cmd.args[1])
		case CMD_JOIN:
			s.join(cmd.client, cmd.args[1])
		case CMD_ROOMS:
			s.listRooms(cmd.client)
		case CMD_MSG:
			s.msg(cmd.client, cmd.args)
		case CMD_QUIT:
			s.quit(cmd.client)
		}
	}
}
```

Working Example:

Go-Chat-Server

Steps to build the chat server

In terminal 1:

```
go build .
./Go-Chat-Server
```

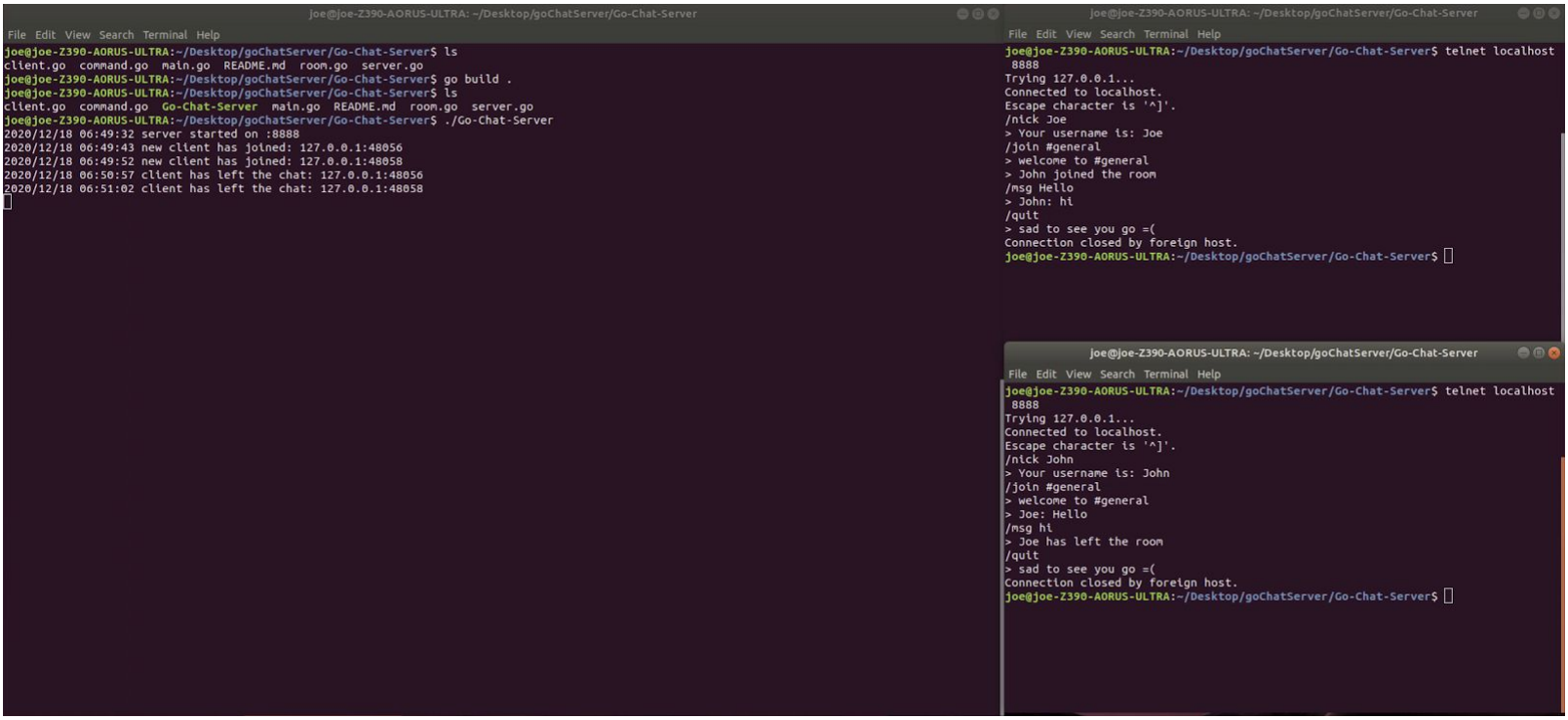
In terminal 2:

```
telnet localhost 8888
/nick <desired_name>
/join #general
/msg Hello
```

In Terminal 3:

```
telnet localhost 8888
/nick <desired_name>
/join #general
/msg Hello
```

Github Repository: https://github.com/JPelligra/Go-Chat-Server



References:

This project was made possible by a tutorial on how to use got o set up a TCP server:
https://www.youtube.com/watch?v=Sphme0BqJiY