



Faculty of Engineering and Applied Science

SOFE 4790 Distributed Systems

Individual Programming Assignment #1

Name: Mitul Patel

Student number: 100700131

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Demo: <https://www.youtube.com/watch?v=Xu8b1VmmlLI>

Github: <https://github.com/UOITEngineering2/assignment1fall2020-Mitul2000>

Functionality:

I created an application where clients can create and join rooms and start their own game instance. The host is able to start a game and the server keeps track of all the rooms and each game played in the corresponding room. The game I decided to make was a rock paper scissor game. Each player in a room would see if the other players won or lost and depending on the win condition, they would either win or lose money. This application also validates fair play and invalid joining seasons. Friends are able to play with one another in their own room and have fun. The diagram on the next page shows how connections would be established before a game would begin.

Server Functionality:

- Create separate rooms for each requesting client.
- Add any Client to the room they would like to join using roomid
- Starting individual game instances for each room when host Client desires
- Validate for Invalid roomid sent by Client
- Have Broadcasting capabilities to send messages to all the Clients connected
- Having Room Broadcasting capabilities to Clients communicating in their own respective rooms.
- Playing against Server a Game of Rock Paper Scissor
- Validating Invalid user Play.
- Updating Player wallet amount according to Player win Condition

Client Functionality

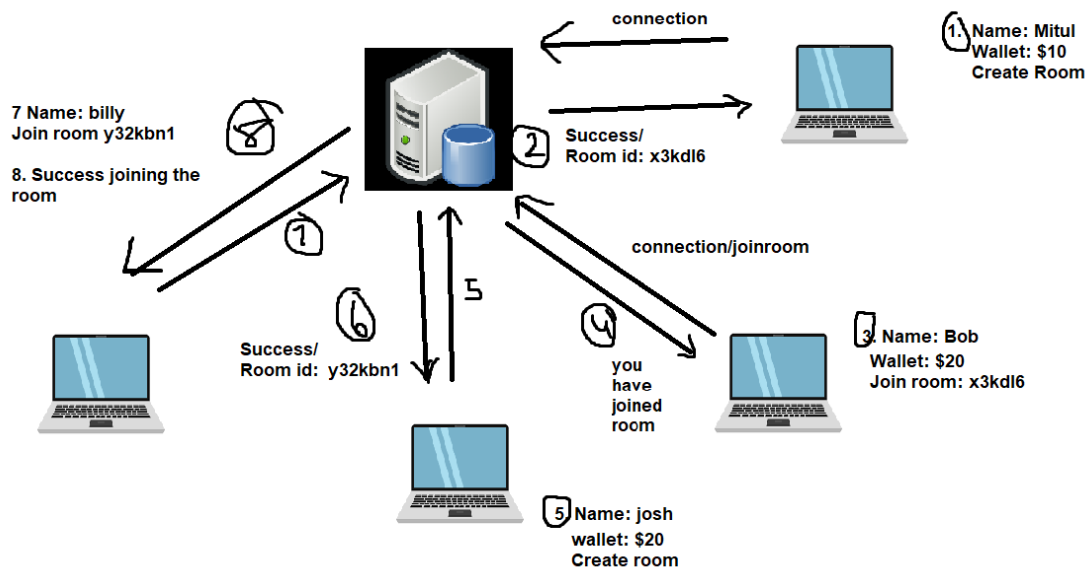
- Having separate thread for Listening and sending data for asynchronous callbacks from other Clients
- Middleware functionality for creating rooms/joining rooms/creating users/getting results
- Updating personal wallets based on their winnings.
- Viewing Friends in their own room.

Challenges

I faced a lot of challenges getting this to work. The biggest challenge was to create middleware-like capabilities where depending on the message that a client would send, each response should be handled differently. Also not all messages should be diverted to one client. Each message is unique to who should receive it and trying to create that architecture was very challenging. Also, making a multithreaded client was also challenging to make communication asynchronous. This would allow the client to accept messages concurrently while a client is trying to send information to the server regarding the game logic.

Solution

The solution was to keep trying and not giving up because I had the idea on how to implement it right but I was just making syntax errors. However, I was able to overcome all the challenges and get all the functionality working.



test 1 Creating and Joining Room

The following images shows me running the connection as I have mentioned above. Terminals: S, C, C, C, C

Test 3: Maintaining different game states

Test 4: Game Play with Server

Test 5: Messing only the rooms that need to receive the messages

The last images shows how different clients are able to manage their own game states with validation and have other features mentioned above

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

: RESULT Message : Mitul : R
, Computer : R RESULT : DRAW
Mitul R C P
Mitul : R , Computer : P RESU
LT Computer WINS
Server Size = 4
Message sent By: Mitul Action
: RESULT Message : Mitul : R
, Computer : P RESULT Compute
r WINS
Mitul R C R
Mitul : R , Computer : R RESU
LT : DRAW
Server Size = 4
Message sent By: Mitul Action
: RESULT Message : Mitul : R
, Computer : R RESULT : DRAW
Mitul P C P
Mitul : P , Computer : P RESU
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Message sent By: Mitul Action
: RESULT Message : Mitul : P
, Computer : P RESULT : DRAW
Mitul P C S
Mitul : P , Computer : S RESU
LT : Computer WINS
Server Size = 4
Message sent By: Mitul Action
: RESULT Message : Mitul : P
, Computer : S RESULT : Compu
ter WINS
[]

R
Sending messages to the Server
Socket
=====GAMESTARTED SELECT YOUR
OPTIONS=====
Make a move R, P, S :
Mitul : R , Computer : R RESUL
T : DRAW=== Wallet :5
Mitul : R , Computer : R RESUL
T : DRAW=== Wallet :5
P
Sending messages to the Server
Socket
=====GAMESTARTED SELECT YOUR
OPTIONS=====
Make a move R, P, S :
Mitul : P , Computer : P RESUL
T : DRAW=== Wallet :5
Mitul : P , Computer : P RESUL
T : DRAW=== Wallet :5
P
Sending messages to the Server
Socket
=====GAMESTARTED SELECT YOUR
OPTIONS=====
Mitul : P , Computer : S RESUL
T : Computer WINS=== Wallet :2
Mitul : P , Computer : S RESUL
T : Computer WINS=== Wallet :2
Make a move R, P, S :

---UserSetup Complete---
In Lobby : Mitul, Bob,
Please Wait till Host Begins
....
In Lobby : Mitul, Bob,
kjlsdf
Press Enter To Continue....
Please Wait till Host Begins
....
sdf
Press Enter To Continue....
Please Wait till Host Begins
....
Bob gameStarted

Press Enter To Continue....
=====GAMESTARTED SELECT YOUR
OPTIONS=====
Make a move R, P, S :
Mitul : R , Computer : R RESUL
T : DRAW=== Wallet :10
Mitul : R , Computer : R RESUL
T : DRAW=== Wallet :10
Mitul : R , Computer : P RESUL
T Computer WINS=== Wallet :5
Mitul : R , Computer : R RESUL
T : DRAW=== Wallet :5
Mitul : P , Computer : P RESUL
T : DRAW=== Wallet :5
Mitul : P , Computer : S RESUL
T : Computer WINS=== Wallet :2

patel@DESKTOP-DGRS31B MINGW64
~/OneDrive/Documents/Year IV/D
istributed Systems/Distributed
Assignment1/client
$ java Client
Connected!
-----Welcome To Multiplayer
Rock/Paper/Scissor-----
-----Play Against Server---
-----
How much money would you like
to sit with?
20
What is your name?
Billy
Create a Room with friends [C]
or Join a room [Anykey]
C
Your Room id is: UGt8vaQoKE
Share this code with your fri
ends to join the same table
---UserSetup Complete---
Start the game: [Y]
In Lobby : Billy,
In Lobby : Billy,
[]

patel@DESKTOP-DGRS31B MINGW64
~/OneDrive/Documents/Year IV
/Distributed Systems/Distribu
tedAssignment1/Client
$ java Client
Connected!
-----Welcome To Multiplayer
Rock/Paper/Scissor-----
-----Play Against Server---
-----
How much money would you like
to sit with?
20
What is your name?
Josh
Create a Room with friends [C]
or Join a room [Anykey]
C
Your Room id is: dukSy0lIn2
Share this code with your fri
ends to join the same table
---UserSetup Complete---
Start the game: [Y]
In Lobby : Josh,
In Lobby : Josh,
UGt8vaQoKE
=====GAMESTARTED SELECT YOUR
OPTIONS=====
Make a move R, P, S :
Josh gameStarted
Josh gameStarted
```