

Distributed-System-Assignment1

Distributed Player Status System (DPSS) using Java RMI

Submitted By : Vaibhav Malhotra - 40079373

Development tools

All code is written in IntelliJ IDE, Java JDK version 8.

Build and Run

IntelliJ:

- Open the project in folder DPSS
- Run: AmericaGameServer, EuropeGameServer, AsiaGameServer.
- Run: PlayerClient (to launch a player window)
- Run: AdminClient (to launch a Admin window)
- To run multiple clients change the configuration to “Allow parallel run”.

Command Line:

- Move to *DPSS* directoy: **cd DPSS**.
- Create a new folder named *dist* in the current folder : **mkdir dist**
- Compile the code (outputting into dist folder): **javac -d dist src/**/*.java**
- Move to *dist* folder: **cd dist**
- Run all 3 servers using following commands (will have to open different terminals):
 - **java -cp . GameServers.AmericaServer.AmericaGameServer**
 - **java -cp . GameServers.EuropeServer.EuropeGameServer**
 - **java -cp . GameServers.AsiaServer.AsiaGameServer**
- Run the clients (will have to open in different terminals):
 - **java -cp . Client.PlayerClient**
 - **java -cp . Client.AdminClient**

Concepts implemented

1. RMI

Remote Method Invocation has been used to invoke client requests on the servers based on user's IP address.

2. UDP

For below communication between server UDP is used:

- getPlayerStatus() – When admin requests this method on a server, that server sends UDP request to other two servers to get the player info.
- createPlayer() – When a user tries to create a new player on a server, that server sends a UDP request to other servers to check if Username already exists.

3. Multi-threading

- All servers run on their individual thread
- All UDP requests are sent on a new thread
- All client requests are sent on a new thread

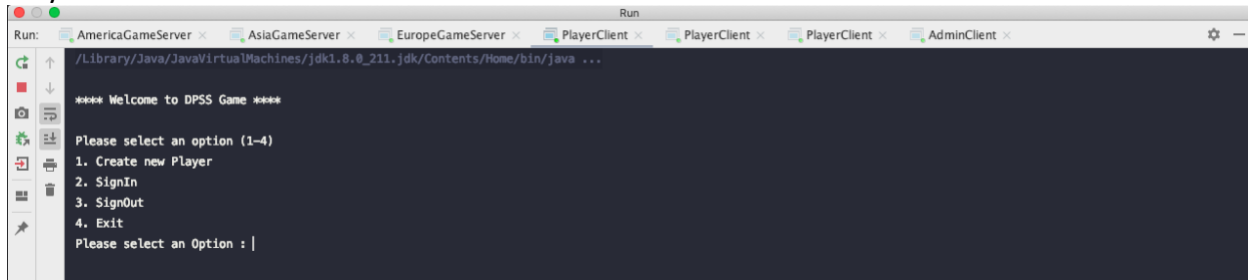
4. Locks and HashTable

- Player data on server are stored in a Hashtables. Hashtables are thread-safe and promote concurrency.
- Lock (ReentrantLock) is used for proper synchronization to allow multiple users to perform operations for the same or different accounts at the same time.

Testing

Intro screens:

Player Screen:

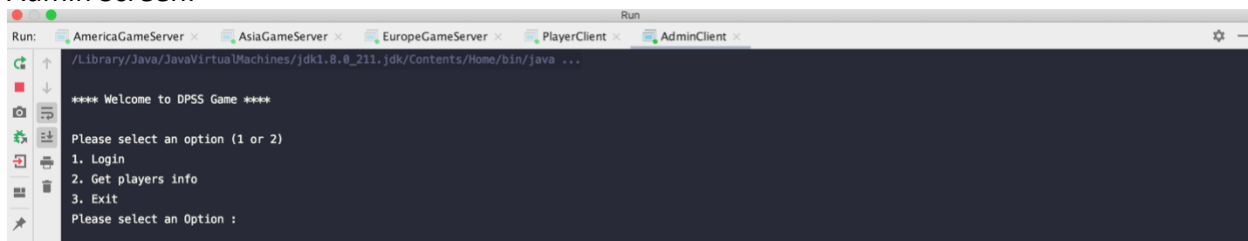


```
Run: AmericaGameServer x AsiaGameServer x EuropeGameServer x PlayerClient x PlayerClient x PlayerClient x AdminClient x
/Library/Java/JavaVirtualMachines/jdk1.8.0_211.jdk/Contents/Home/bin/java ...

**** Welcome to DPSS Game ****

Please select an option (1-4)
1. Create new Player
2. SignIn
3. SignOut
4. Exit
Please select an Option : |
```

Admin Screen:



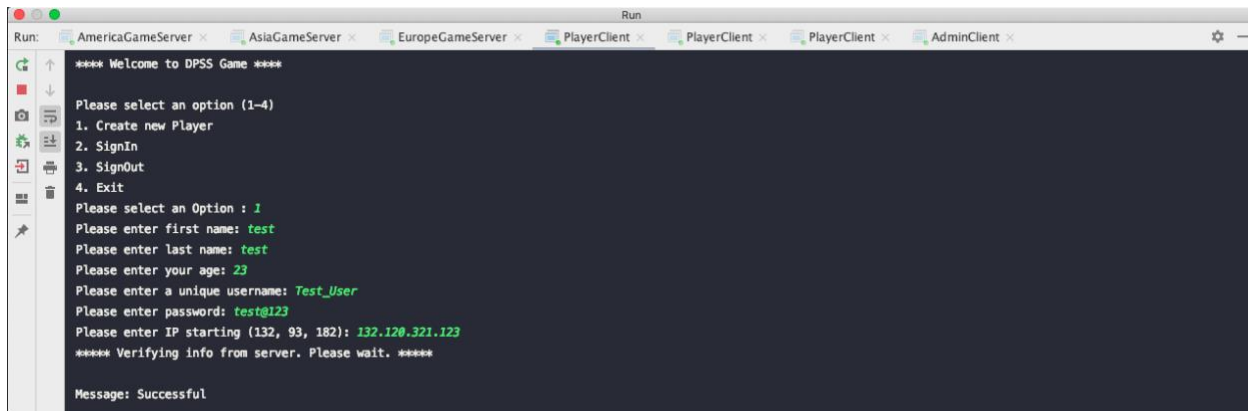
```
Run: AmericaGameServer x AsiaGameServer x EuropeGameServer x PlayerClient x AdminClient x
/Library/Java/JavaVirtualMachines/jdk1.8.0_211.jdk/Contents/Home/bin/java ...

**** Welcome to DPSS Game ****

Please select an option (1 or 2)
1. Login
2. Get players info
3. Exit
Please select an Option :
```

Player testing:

1. Create player



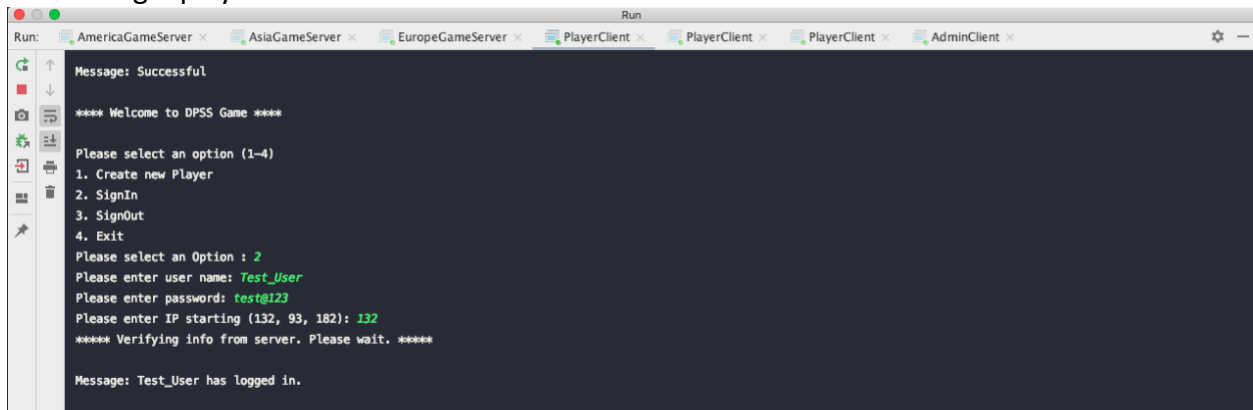
```
Run: AmericaGameServer x AsiaGameServer x EuropeGameServer x PlayerClient x PlayerClient x PlayerClient x AdminClient x

**** Welcome to DPSS Game ****

Please select an option (1-4)
1. Create new Player
2. SignIn
3. SignOut
4. Exit
Please select an Option : 1
Please enter first name: test
Please enter last name: test
Please enter your age: 23
Please enter a unique username: Test_User
Please enter password: test@123
Please enter IP starting (132, 93, 182): 132.120.321.123
**** Verifying info from server. Please wait. ****

Message: Successful
```

2. Login player



The screenshot shows a terminal window with a title bar that includes tabs for 'AmericaGameServer', 'AsiaGameServer', 'EuropeGameServer', and three instances of 'PlayerClient', along with an 'AdminClient'. The terminal output is as follows:

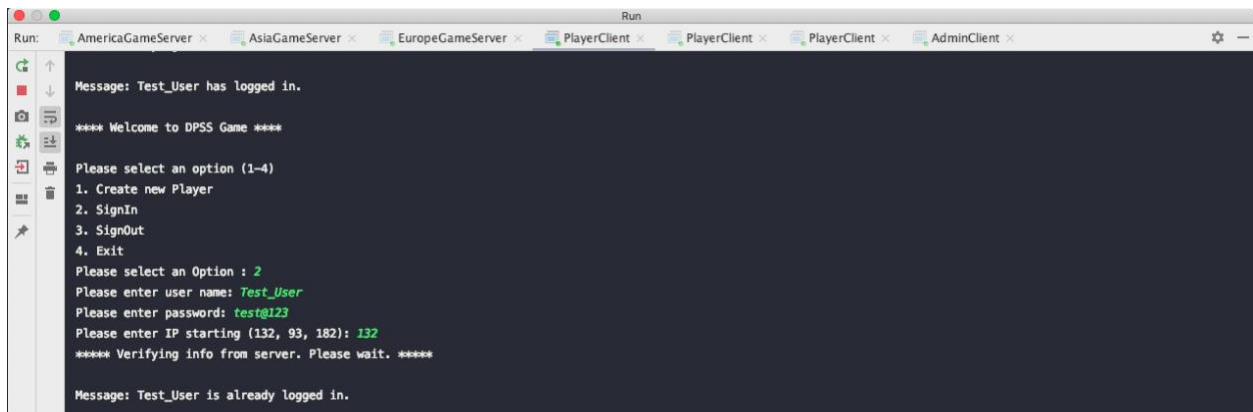
```
Run: AmericaGameServer x AsiaGameServer x EuropeGameServer x PlayerClient x PlayerClient x PlayerClient x AdminClient x
Message: Successful

**** Welcome to DPSS Game ****

Please select an option (1-4)
1. Create new Player
2. SignIn
3. SignOut
4. Exit
Please select an Option : 2
Please enter user name: Test_User
Please enter password: test@123
Please enter IP starting (132, 93, 182): 132
**** Verifying info from server. Please wait. ****

Message: Test_User has logged in.
```

3. Login player who is already logged in.



The screenshot shows the same terminal window as before. The output is as follows:

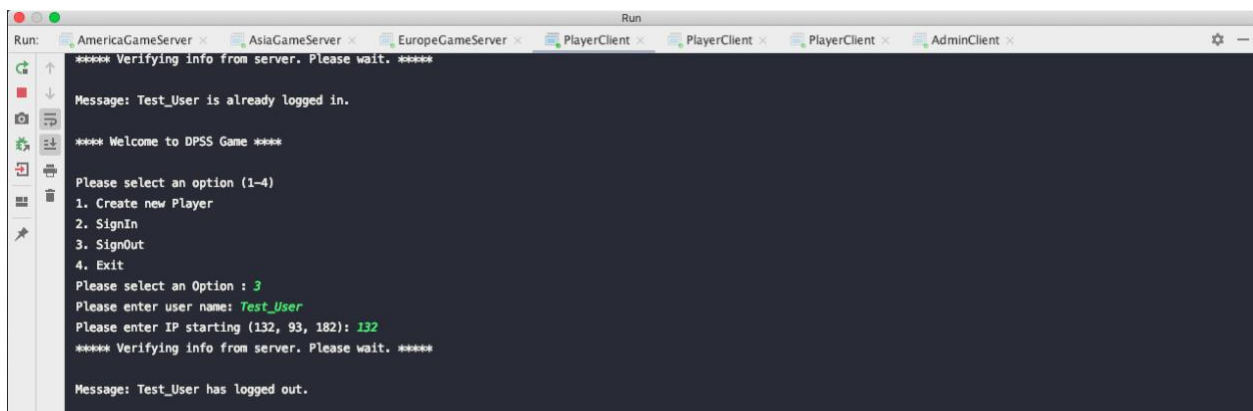
```
Run: AmericaGameServer x AsiaGameServer x EuropeGameServer x PlayerClient x PlayerClient x PlayerClient x AdminClient x
Message: Test_User has logged in.

**** Welcome to DPSS Game ****

Please select an option (1-4)
1. Create new Player
2. SignIn
3. SignOut
4. Exit
Please select an Option : 2
Please enter user name: Test_User
Please enter password: test@123
Please enter IP starting (132, 93, 182): 132
**** Verifying info from server. Please wait. ****

Message: Test_User is already logged in.
```

4. Logout player



The screenshot shows the same terminal window. The output is as follows:

```
Run: AmericaGameServer x AsiaGameServer x EuropeGameServer x PlayerClient x PlayerClient x PlayerClient x AdminClient x
**** Verifying info from server. Please wait. ****

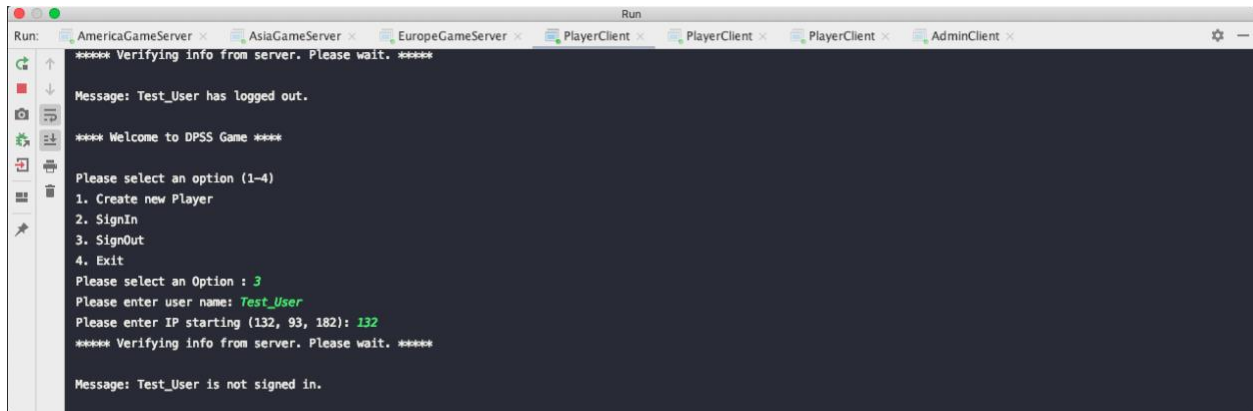
Message: Test_User is already logged in.

**** Welcome to DPSS Game ****

Please select an option (1-4)
1. Create new Player
2. SignIn
3. SignOut
4. Exit
Please select an Option : 3
Please enter user name: Test_User
Please enter IP starting (132, 93, 182): 132
**** Verifying info from server. Please wait. ****

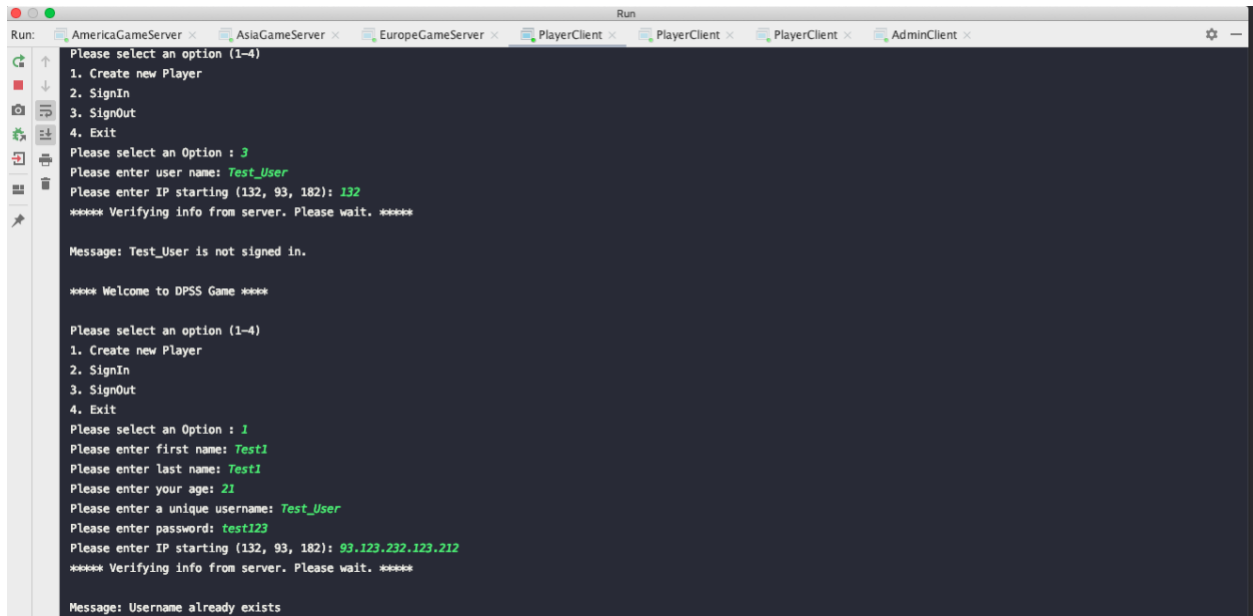
Message: Test_User has logged out.
```

5. Logout player who is not logged in



```
Run: AmericaGameServer x AsiaGameServer x EuropeGameServer x PlayerClient x PlayerClient x PlayerClient x AdminClient x
**** Verifying info from server. Please wait. ****
Message: Test_User has logged out.
**** Welcome to DPSS Game ****
Please select an option (1-4)
1. Create new Player
2. SignIn
3. SignOut
4. Exit
Please select an Option : 3
Please enter user name: Test_User
Please enter IP starting (132, 93, 182): 132
**** Verifying info from server. Please wait. ****
Message: Test_User is not signed in.
```

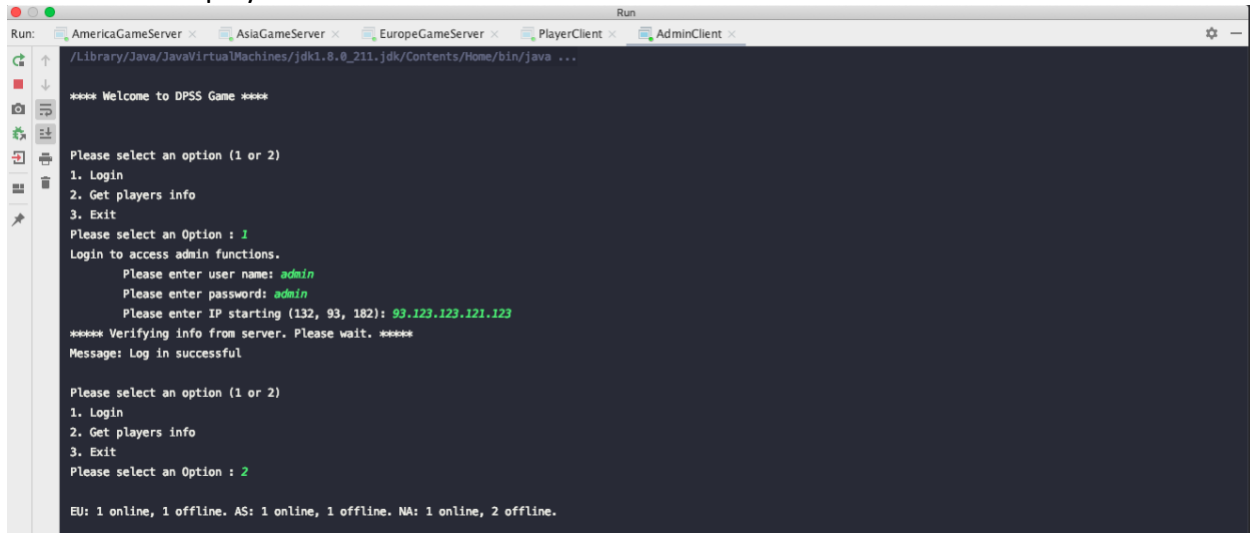
6. Try to create a user (Already on another server)



```
Run: AmericaGameServer x AsiaGameServer x EuropeGameServer x PlayerClient x PlayerClient x PlayerClient x AdminClient x
Please select an option (1-4)
1. Create new Player
2. SignIn
3. SignOut
4. Exit
Please select an Option : 3
Please enter user name: Test_User
Please enter IP starting (132, 93, 182): 132
**** Verifying info from server. Please wait. ****
Message: Test_User is not signed in.
**** Welcome to DPSS Game ****
Please select an option (1-4)
1. Create new Player
2. SignIn
3. SignOut
4. Exit
Please select an Option : 1
Please enter first name: Test1
Please enter last name: Test1
Please enter your age: 21
Please enter a unique username: Test_User
Please enter password: test123
Please enter IP starting (132, 93, 182): 93.123.232.123.212
**** Verifying info from server. Please wait. ****
Message: Username already exists
```

Admin:

1. Get player status on server IP 93



```
Run: AmericaGameServer x AsiaGameServer x EuropeGameServer x PlayerClient x AdminClient x
/Library/Java/JavaVirtualMachines/jdk1.8.0_211.jdk/Contents/Home/bin/java ...

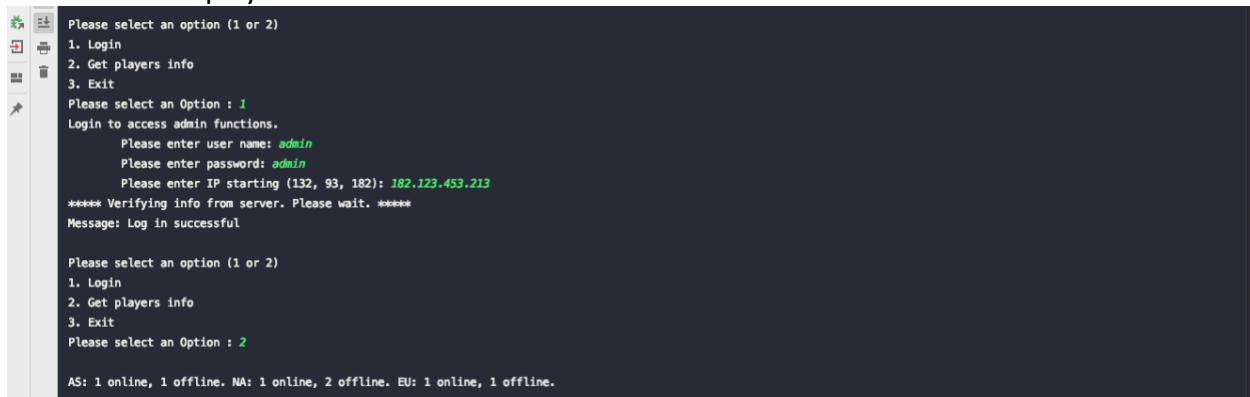
**** Welcome to DPSS Game ****

Please select an option (1 or 2)
1. Login
2. Get players info
3. Exit
Please select an Option : 1
Login to access admin functions.
Please enter user name: admin
Please enter password: admin
Please enter IP starting (132, 93, 182): 93.123.123.121
***** Verifying info from server. Please wait. *****
Message: Log in successful

Please select an option (1 or 2)
1. Login
2. Get players info
3. Exit
Please select an Option : 2

EU: 1 online, 1 offline. AS: 1 online, 1 offline. NA: 1 online, 2 offline.
```

2. Get player status on server IP 182



```
Please select an option (1 or 2)
1. Login
2. Get players info
3. Exit
Please select an Option : 1
Login to access admin functions.
Please enter user name: admin
Please enter password: admin
Please enter IP starting (132, 93, 182): 182.123.453.213
***** Verifying info from server. Please wait. *****
Message: Log in successful

Please select an option (1 or 2)
1. Login
2. Get players info
3. Exit
Please select an Option : 2

AS: 1 online, 1 offline. NA: 1 online, 2 offline. EU: 1 online, 1 offline.
```

3. Invalid IP or credentials



```
Login to access admin functions.
Please enter user name: admin123
Please enter password: admin123
Please enter IP starting (132, 93, 182): 32.122.123.322
Please enter IP starting (132, 93, 182): 132.122.123.322
***** Verifying info from server. Please wait. *****
Error: Credentials invalid. Please try again.
```