

CS 5523: Operating Systems

Homework 5

Report of the work

This mini project tends to implement the concepts of distributed systems using java RMI. The code for this assignment is contained in the **src** directory. Following are the steps to get the program running:

1. Extract the zipped file for all the code.
2. Compile using "**javac *.java**".
3. Open at least 4 tabs of the terminal:
 - a) to **compile all the code and run rmiregistry in the first tab**.
 - b) in the **second tab run "java HelloServer"** to start the server.
 - c) in the **third and fourth tabs run "java HelloClient"** to start 2 client systems that would be served under this server.
4. Follow the instructions on the screen.

The zipped directory also contains a README.md file which has the above instructions (how to compile and successfully run the code).

The assignment tends to implement the following functionalities:

1. **go -50 30** : client wants to go 50m South and 30m East, server updates the location and reports the new location (go 40 -20 means go 40m North and 20m West).
2. **get location** : client wants to know its current (x,y) location, server reports the current location of this client.
3. **list 30** : client wants to get the list of users within 30m, server determines such clients/users within 30m of requesting client and send their information (user-id, name, age, additional info for extra credits) to the client, client keeps that list in a linked list and prints their user-id, name, and age on the screen.
4. **chat** : (extra credits) client sends msg directly to user-id. Server not involved.
5. **quit** : client leaves the system, server takes it out from the list.

These above mentioned functionalities can be implemented with any number of clients in the system as this uses the concepts of Factory (the number of clients do not need to be pre defined, any number of clients can come and go from the system). The only limitation using this project would be the machine the code runs on (memory limitations in handling increasing number of clients).

The implementation of the above functionalities work as expect. Below are the screenshots to demonstrate the functionalities:

```
File Edit View Search Terminal Tabs Help
utkarshsingh@ubuntu: ~/RMI/Given/src x
utkarshsingh@ubuntu:~/RMI/Given/src$ javac *.java
utkarshsingh@ubuntu:~/RMI/Given/src$ rmiregistry
```

All the java code is compiled and rmiregistry is run.

Then in the second tab we run **HelloServer** to startup the server program:

```
File Edit View Search Terminal Tabs Help
utkarshsingh@ubuntu: ~/RMI/Given/src x utkarst
utkarshsingh@ubuntu:~/RMI/Given/src$ java HelloServer
Server is ready
number of clients = 2
```

Server is up and running.

Next , the other two tabs are used to fire up 2 clients, at least to fully execute all the functionalities:

```
utkarshsingh@ubuntu: ~/RMI/Given/src
File Edit View Search Terminal Tabs Help
utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x
utkarshsingh@ubuntu:~/RMI/Given/src$ java HelloClient
Enter name:
First_Client
Enter x and y:
10 13
Enter age:
23
Data for this client stored..

List of commands you can use:.
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.

Server calling back -> number of clients =2
```

Client 1 is up and running.

Now we run the second client:

```
utkarshsingh@ubuntu: ~/RMI/Given/src
File Edit View Search Terminal Tabs Help
utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x
utkarshsingh@ubuntu:~/RMI/Given$ cd src/
utkarshsingh@ubuntu:~/RMI/Given/src$ clear
utkarshsingh@ubuntu:~/RMI/Given/src$ java HelloClient
Enter name:
Second_client
Enter x and y:
13 45
Enter age:
34
Server calling back -> number of clients =2
Data for this client stored..

List of commands you can use:.
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.
```

Client 2 is up and running.

First functionality: **go x y:**

```
Server calling back -> number of clients =2
go 13 38
Connecting to server now... Server is moving the client to the new location...
The new location has been updated with the values provided: 13 and 38

List of commands you can use:.
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.
```

Second functionality: **get location:**

```
File Edit View Search Terminal Tabs Help
utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x
utkarshsingh@ubuntu:~/RMI/Given/src$ java HelloClient
Enter name:
First_client
Enter x and y:
10 13
Enter age:
23
Data for this client stored..

List of commands you can use:.
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.

Server calling back -> number of clients =2
go 13 38
Connecting to server now... Server is moving the client to the new location...
The new location has been updated with the values provided: 13 and 38

List of commands you can use:.
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.

get location
Fetching location now... The current location on an X-Y plane is: 13 and 38

List of commands you can use:.
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.
```

Third functionality: list n ('n' being the radius of search):

```
File Edit View Search Terminal Tabs Help
utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x
Data for this client stored..

List of commands you can use:.
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.

Server calling back -> number of clients =2
go 13 38
Connecting to server now... Server is moving the client to the new location...
The new location has been updated with the values provided: 13 and 38

List of commands you can use:.
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.

get location
Fetching location now... The current location on an X-Y plane is: 13 and 38

List of commands you can use:.
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.

list 30
First_Client is closest to First_Client distance 0.0
First_Client is closest to Second_Client distance 7.0

List of commands you can use:.
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.
```

Fourth functionality: chat:

```
List of commands you can use:.
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.

chat
Enter client's name:
Second_Client
Enter a message to send:
Hi there
Hi from First_Client to Second_Client : message sent to you is Hi there

List of commands you can use:.
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.
```

```
File Edit View Search Terminal Tabs Help
utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x
utkarshsingh@ubuntu:~/RMI/Given$ cd src/
utkarshsingh@ubuntu:~/RMI/Given/src$ clear
utkarshsingh@ubuntu:~/RMI/Given/src$ java HelloClient
Enter name:
Second_Client
Enter x and y:
13 45
Enter age:
34
Server calling back -> number of clients =2
Data for this client stored..

List of commands you can use:..
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.

Hi from First_Client to Second_Client : message sent to you is Hi there
```

Fifth functionality: **quit**:

```
File Edit View Search Terminal Tabs Help
utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x utkarshsingh@ubuntu: ~/RMI/Given/src x
utkarshsingh@ubuntu:~/RMI/Given$ cd src/
utkarshsingh@ubuntu:~/RMI/Given/src$ clear
utkarshsingh@ubuntu:~/RMI/Given/src$ java HelloClient
Enter name:
Second_Client
Enter x and y:
13 45
Enter age:
34
Server calling back -> number of clients =2
Data for this client stored..

List of commands you can use:..
1. go (X, Y) without the brackets and the comma. - This moves the location of the client you're on, to the X,Y coordinates in an XY plane.
2. get location - This gives the current location of your client in terms of X,Y.
3. list 30 - Lists the number of clients in 30m radius of your client.
4. chat - Sends a message to a clients.
5. quit - Will exit the system.

Hi from First_Client to Second_Client : message sent to you is Hi there
quit
utkarshsingh@ubuntu:~/RMI/Given/src$
```