

در این پروژه دو سری کد قرار دارد.

سری اول برای سرور اصلی است.

سری دوم برای کاربر.

سرور اصلی:

از دو کلاس تشکیل شده است.

Server :

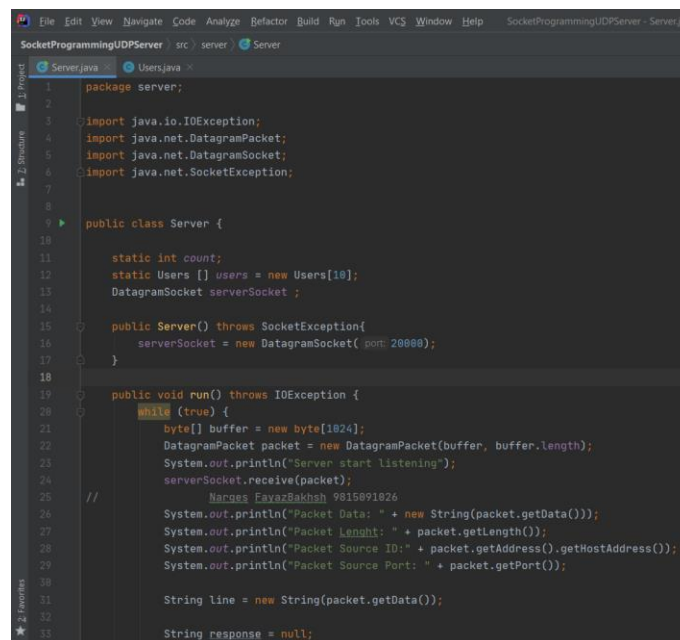
در این کلاس در خط 12 تعداد کاربرانی که اطلاعاتشان را ثبت می کند را نگه می دارد.

اگر داده دریافتی با "register" شروع شده باشد اسم فرد را ذخیره میکند.

اگر با "port" یا "ip" شروع شده باشد اطلاعات را به نام فرد اضافه می کند.

اگر با "user" شروع شده باشد اطلاعات این فرد را اگر موجود باشد، باز می گرداند.

در ثبت نام هم چک می کند تا فردی با نام تکراری ذخیره نشود.



```
1 package server;
2
3 import java.io.IOException;
4 import java.net.DatagramPacket;
5 import java.net.DatagramSocket;
6 import java.net.SocketException;
7
8
9 public class Server {
10
11     static int count;
12     static Users [] users = new Users[10];
13     DatagramSocket serverSocket ;
14
15     public Server() throws SocketException{
16         serverSocket = new DatagramSocket( port: 20000);
17     }
18
19     public void run() throws IOException {
20         while (true) {
21             byte[] buffer = new byte[1024];
22             DatagramPacket packet = new DatagramPacket(buffer, buffer.length);
23             System.out.println("Server start listening");
24             serverSocket.receive(packet);
25             // Narges FayazBakhsh 9815091026
26             System.out.println("Packet Data: " + new String(packet.getData()));
27             System.out.println("Packet Length: " + packet.getLength());
28             System.out.println("Packet Source ID: " + packet.getAddress().getHostAddress());
29             System.out.println("Packet Source Port: " + packet.getPort());
30
31             String line = new String(packet.getData());
32
33             String response = null;
```

```

SocketProgrammingUDPServer - Server.java
SocketProgrammingUDPServer / src / server / Server

Server.java
Users.java

23 String response = null;
24 if (line.startsWith("register")) {
25     String[] tokens = line.split(regex: " ");
26     if (add(tokens[1]) == 0) {
27         response = "welcome " + tokens[1] + ". you are registered successfully." +
28             " please add your ip and port.";
29     } else
30         response = "this user exit! please try again";
31 }
32 else if (line.startsWith("ip")) {
33     String[] tokens = line.split(regex: " ");
34     addIp(tokens[1]);
35     response = "your ip successfully add.";
36 } else if (line.startsWith("port")) {
37     String[] tokens = line.split(regex: " ");
38     addport(tokens[1]);
39     response = "your port successfully add.";
40 } else if (line.startsWith("user")) {
41     int k;
42     for (k = 0; k <= count; k++) {
43         String[] tokens = line.split(regex: " ");
44         int w = search(tokens[1]);
45         if (w != -1) {
46             response = tokens[1] + users[w].information();
47         }
48         else
49             response = "this user dont exist";
50     }
51 }
52 else
53     response = "Your keyword is not recognize!";
54 }
55

```

```

SocketProgrammingUDPServer / src / server / Server

Server.java
Users.java

56
57 DatagramPacket sendPacket = new DatagramPacket(response.getBytes(), response.getBytes().length,
58     packet.getAddress(), packet.getPort());
59 serverSocket.send(sendPacket);
60
61 System.out.println();
62 }
63 }
64
65 public int search(String name) {
66     int sw = -1;
67     for (int i = 0; i <= count; i++) {
68         if (users[i].get().equals(name))
69             sw = i;
70     }
71     return sw;
72 }
73
74 public int add(String name){
75     if(search(name) == -1 ) {
76         count++;
77         users[count] = new Users();
78         users[count].Users(name);
79     }
80     return 0;
81 }
82 else
83     return 1;
84 }
85
86 public void addIp(String ip) {users[count].ip(ip);}
87
88 public void addport(String port) {users[count].port(port);}
89

```

```
SocketProgrammingUDPServer - src - server - Server
Server.java - Users.java
100      users[count].Users(name);
101
102      return 0;
103  }
104  else
105      return 1;
106  }
107
108  public void addIp(String ip) { users[count].ip(ip); }
109
110  public void addport(String port) { users[count].port(port); }
111
112  public static void main(String[] args) {
113      count = -1;
114      try{
115          Server server = new Server();
116          server.run();
117      } catch (SocketException e) {
118          e.printStackTrace();
119      } catch (IOException e) {
120          e.printStackTrace();
121      }
122  }
```

Users :

در این کلاس، اطلاعات کاربران (نام و ای پی و پورت) ذخیره می شود.

```
SocketProgrammingUDPServer - src - server - Users
Server.java - Users.java
1  package server;
2
3  public class Users {
4
5
6      private String name;
7      private String Port;
8      private String Ip;
9
10
11      void Users(String name){
12          this.name = name;
13          Port = " ";
14          Ip = " ";
15          // Narqes FayazBakhsh 9815091026
16      }
17
18      public void ip (String ip){
19          Ip = ip;
20      }
21      public void port(String port){
22          Port = port;
23      }
24
25      public String get() { return name; }
26
27      public String information(){
28          String answer = " " + Ip + " " + Port + " ";
29          return answer;
30      }
31
32  }
33
34
35
```

کاربر:

از چهار کلاس تشکیل شده.

Client:

اگر خط با user شروع شود، کلاس ClientTCP فراخوانی می شود و اجرا می شود.

اگر با ip یا port شروع شود این اطلاعات را نگه می دارد ، برای زمانی که میخواهد منتظر ارسال پیام باشد بداند روی کدام پورت باید گوش کند.

```

Client2 src > client Client clientSocket
Client.java ClientTCP.java ClientHearing.java ClientThread.java
1 package client;
2
3 import java.io.*;
4 import java.net.*;
5
6 public class Client {
7     DatagramSocket clientSocket;
8
9     static int sw;
10    public String ipl;
11    public int portI;
12
13    public Client( int portNumber) throws SocketException {
14        clientSocket = new DatagramSocket(portNumber);
15    }
16
17    public void run() throws IOException {
18        // Hargues FayazBakhsh
19        BufferedReader consoleReader = new BufferedReader(new InputStreamReader(System.in));
20
21        while (true){
22            System.out.println("Please enter something");
23            String line = consoleReader.readLine();
24            line = line + " ";
25            if(line.startsWith("user")){
26                sw = 1;
27            }
28            else if(line.startsWith("ip")){
29                String[] tok= line.split( regex: " ");
30                ipl = tok[1];
31            }
32            else if(line.startsWith("port")){
33                String[] tok= line.split( regex: " ");

```

```

Client2 src > client Client run
Client.java ClientTCP.java ClientHearing.java ClientThread.java
34    String[] tok= line.split( regex: " ");
35    portI = Integer.parseInt(tok[1]);
36    }
37    else if (line.startsWith("hear")){
38        ClientHearing clientHearing = new ClientHearing(portI);
39        clientHearing.run();
40    }
41    DatagramPacket packet = new DatagramPacket(line.getBytes(), line.getBytes().length,
42        InetAddress.getByName("localhost"), port 28888);
43    clientSocket.send(packet);
44
45    if(line.startsWith("exit"))
46        break;
47
48    byte[] buffer = new byte[1024];
49    DatagramPacket recievedPacket = new DatagramPacket(buffer,buffer.length);
50    clientSocket.receive(recievedPacket);
51    System.out.println(new String(recievedPacket.getData()));
52
53    if (sw == 1 ) {
54        String lineRec = new String(recievedPacket.getData());
55        String[] tokensRec = lineRec.split( regex: " ");
56
57        String Ip = tokensRec[1];
58        int Port = Integer.parseInt(tokensRec[2]);
59
60        ClientTCP clientTCP = new ClientTCP(Ip ,Port);
61        clientTCP.run();
62    }
63
64 }
65

```

```
Client2 > src > client > Client > run
Client.java ClientTCP.java ClientHearing.java ClientThread.java
1 clientTCP.run();
2
3 }
4
5 }
6
7 clientSocket.close();
8
9 }
10
11 public static void main(String[] args) {
12
13     sw = 0;
14     Client client = null;
15     try {
16         client = new Client( portNumber: 40123);
17         client.run();
18     }
19     catch (SocketException e) {
20         e.printStackTrace();
21     }
22     catch (IOException e) {
23         e.printStackTrace();
24     }
25 }
26
27 }
28
29 }
30
31 }
```

ClientTCP:

این کلاس برای برقراری ارتباط و شروع چت با یک کاربر است . برای ارتباط یک پورت و ای پی دریافت می کند و یک ارتباط TCP با آن فرد ایجاد می کند.

```
Client2 > src > client > ClientTCP
Client.java ClientTCP.java ClientHearing.java ClientThread.java
1 package client;
2
3 import java.io.*;
4 import java.net.Socket;
5
6 public class ClientTCP {
7
8     Socket socket;
9     BufferedReader reader;
10    BufferedWriter writer;
11
12    public ClientTCP(String ip , int port) {
13        try {
14            socket = new Socket( "localhost", port);
15            reader = new BufferedReader(new InputStreamReader(socket.getInputStream()));
16            writer = new BufferedWriter(new OutputStreamWriter(socket.getOutputStream()));
17        } catch (IOException e) {
18            e.printStackTrace();
19        }
20    }
21
22    public void run() {
23        // Narges FayazBakhsh 9815091026
24        System.out.println("Local IP : " + socket.getLocalAddress().getHostAddress());
25        System.out.println("Local Port : " + socket.getLocalPort());
26        System.out.println("Remote IP : " + socket.getInetAddress().getHostAddress());
27        System.out.println("Remote Port : " + socket.getPort());
28
29        System.out.println("\n*start chat:");
30
31        BufferedReader consoleReader = new BufferedReader(new InputStreamReader(System.in));
32        while (true) {
33            try {
34
```



```
Client2 src \ client ClientTCP
ClientTCP.java
package client;
import java.io.*;
import java.net.*;

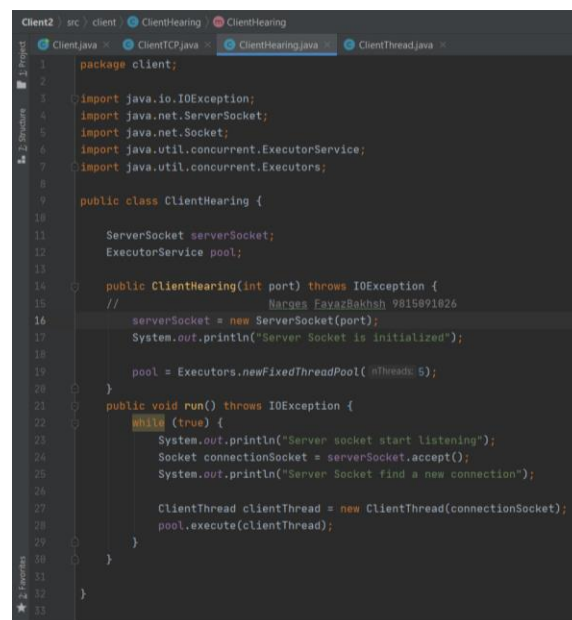
public class ClientTCP {
    public ClientTCP() {
        try {
            Socket socket = new Socket("localhost", 8080);
            BufferedReader reader = new BufferedReader(new InputStreamReader(socket.getInputStream()));
            BufferedWriter writer = new BufferedWriter(new OutputStreamWriter(socket.getOutputStream()));

            while (true) {
                try {
                    System.out.println("Please enter something: ");
                    String line = reader.readLine();
                    writer.write(line + "\n");
                    writer.flush();
                    if (line.startsWith("exit")) {
                        break;
                    }
                    line = reader.readLine();
                    System.out.println("Server Response : " + line);
                    if (line.startsWith("exit")) {
                        break;
                    }
                } catch (IOException e) {
                    e.printStackTrace();
                    break;
                }
            }

            try {
                System.out.println("exit chat!");
                reader.close();
                writer.close();
                socket.close();
            } catch (IOException e) {
                e.printStackTrace();
            }
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```

ClientHearing:

این کلاس برای زمانی است که کاربر پس از ثبت نام منتظر گرفتن پیام از کاربران دیگر است و منتظر می ماند.



```
Client2 src \ client ClientHearing
ClientHearing.java
package client;
import java.io.*;
import java.net.*;
import java.util.concurrent.*;

public class ClientHearing {
    ServerSocket serverSocket;
    ExecutorService pool;

    public ClientHearing(int port) throws IOException {
        // Narges FayazBakhsh 9815891826
        serverSocket = new ServerSocket(port);
        System.out.println("Server Socket is initialized");

        pool = Executors.newFixedThreadPool(5);
    }

    public void run() throws IOException {
        while (true) {
            System.out.println("Server socket start listening");
            Socket connectionSocket = serverSocket.accept();
            System.out.println("Server Socket find a new connection");

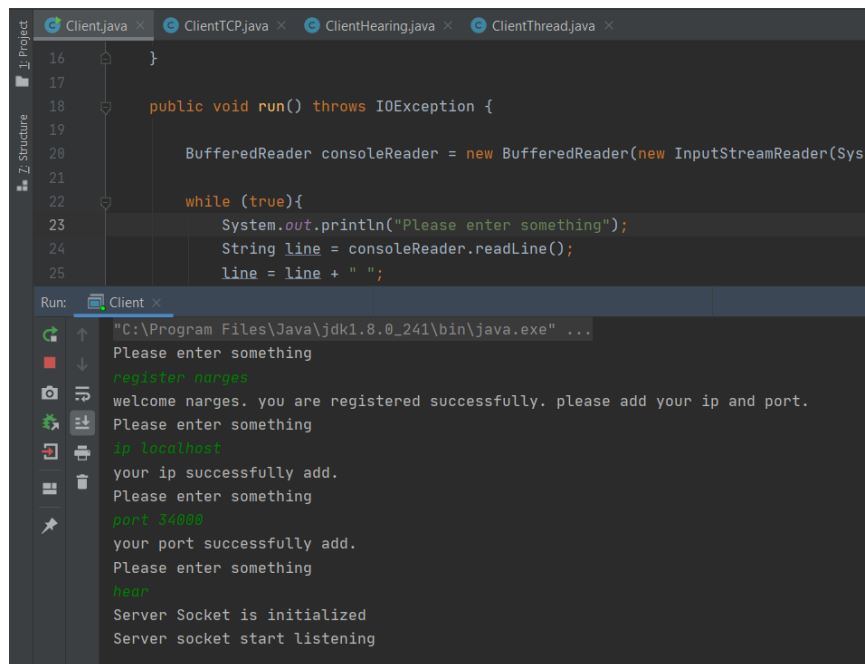
            ClientThread clientThread = new ClientThread(connectionSocket);
            pool.execute(clientThread);
        }
    }
}
```

clientThread:

این ترد برای این است که جواب پیام های ارسال شده را بدهد.

چون در کلاس قبلی ، این کلاس به صورت ترد تعریف شده، می توان همزمان با چند نفر chat کرد.

```
Client2 src \ client ClientThread
Client.java x ClientTCP.java x ClientHearing.java x ClientThread.java x
1 package client;
2
3 import java.io.*;
4 import java.net.Socket;
5
6 public class ClientThread implements Runnable {
7
8     Socket connectionSocket;
9     BufferedReader reader;
10    BufferedWriter writer;
11
12
13    public ClientThread(Socket connectionSocket) throws IOException {
14        this.connectionSocket = connectionSocket;
15        reader = new BufferedReader(new InputStreamReader(connectionSocket.getInputStream()));
16        writer = new BufferedWriter(new OutputStreamWriter(connectionSocket.getOutputStream()));
17        // Narges FayazBakhsh 9815891826
18    }
19
20    @Override
21    public void run() {
22        System.out.println("Local IP : " + connectionSocket.getLocalAddress().getHostAddress());
23        System.out.println("Local Port : " + connectionSocket.getLocalPort());
24        System.out.println("Remote IP : " + connectionSocket.getInetAddress().getHostAddress());
25        System.out.println("Remote Port : " + connectionSocket.getPort());
26
27        System.out.println("\n"+"start chat:");
28
29        BufferedReader consoleReader = new BufferedReader(new InputStreamReader(System.in));////////
30
31        while (true){
32            try {
33                String line = reader.readLine();
34            }
35        }
36    }
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```
16 }
17
18 public void run() throws IOException {
19
20     BufferedReader consoleReader = new BufferedReader(new InputStreamReader(System.in));
21
22     while (true){
23         System.out.println("Please enter something");
24         String line = consoleReader.readLine();
25         line = line + " ";
26     }
27 }
```

Run: Client x

"C:\Program Files\Java\jdk1.8.0_241\bin\java.exe" ...

Please enter something

register narges

welcome narges. you are registered successfully. please add your ip and port.

Please enter something

ip localhost

your ip successfully add.

Please enter something

port 34000

your port successfully add.

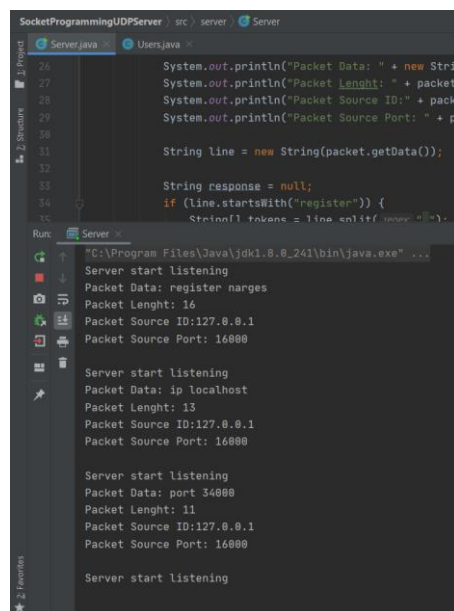
Please enter something

hehe

Server Socket is initialized

Server socket start listening

سرور :



```
26 System.out.println("Packet Data: " + new String(packet.getData()));
27 System.out.println("Packet Length: " + packet.getLength());
28 System.out.println("Packet Source ID: " + packet.getSourceID());
29 System.out.println("Packet Source Port: " + packet.getSourcePort());
30
31 String line = new String(packet.getData());
32
33 String response = null;
34 if (line.startsWith("register")) {
35     String[] tokens = line.split(" ");
36     String name = tokens[1];
37     String ip = tokens[2];
38     String port = tokens[3];
39     register(name, ip, port);
40 }
41 }
```

Run: Server x

"C:\Program Files\Java\jdk1.8.0_241\bin\java.exe" ...

Server start listening

Packet Data: register narges

Packet Length: 16

Packet Source ID: 127.0.0.1

Packet Source Port: 16000

Server start listening

Packet Data: ip localhost

Packet Length: 13

Packet Source ID: 127.0.0.1

Packet Source Port: 16000

Server start listening

Packet Data: port 34000

Packet Length: 11

Packet Source ID: 127.0.0.1

Packet Source Port: 16000

Server start listening

کاربر دوم:

گرفتن اطلاعات و شروع چت

The screenshot shows an IDE with the following code in `Client.java`:

```
61 clientTCP.run();
62
63 }
64
65 }
66
67 clientSocket.close();
68
69 }
70
71 public static void main(String[] args) {
72     sw = 0;
73     Client client = null;
74     try {
75         client = new Client( portNumber: 40123);
76         client.run();
77     }
78     catch (SocketException e) {
79         e.printStackTrace();
80     }
81 }
```

The Run console shows the following output:

```
Run: Client
C:\Program Files\Java\jdk1.8.0_241\bin\java.exe ...
Please enter something
user: narges
narges localhost 34000
Local IP : 127.0.0.1
Local Port : 57152
Remote IP : 127.0.0.1
Remote Port : 34000

start chat:
Please enter something:
```

چت کردن:

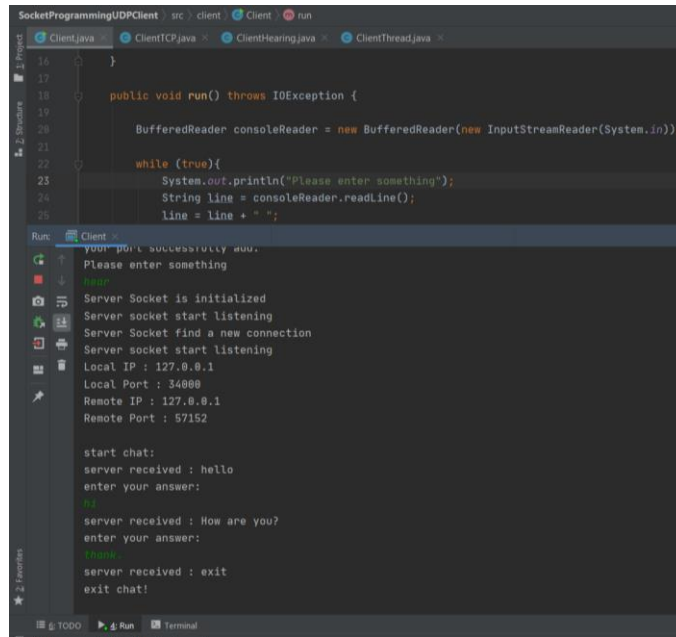
کاربر دوم:

The screenshot shows the continuation of the chat application execution. The Run console output is as follows:

```
Remote Port : 34000

start chat:
Please enter something:
hello
Server Response : hi
Please enter something:
How are you?
Server Response : thank.
Please enter something:
exit
exit chat!
Please enter something
```

کاربر اول:



The screenshot shows an IDE with a project named 'SocketProgrammingUDPCient'. The code editor displays the 'Client.java' file with the following code:

```
16 }
17
18 public void run() throws IOException {
19
20     BufferedReader consoleReader = new BufferedReader(new InputStreamReader(System.in));
21
22     while (true){
23         System.out.println("Please enter something");
24         String line = consoleReader.readLine();
25         line = line + " ";
26     }
27 }
```

The Run console shows the following output:

```
your port successfully add.
Please enter something
hello
Server Socket is initialized
Server socket start listening
Server Socket find a new connection
Server socket start listening
Local IP : 127.0.0.1
Local Port : 34888
Remote IP : 127.0.0.1
Remote Port : 57152

start chat:
server received : hello
enter your answer:
hi
server received : How are you?
enter your answer:
thank
server received : exit
exit chat!
```

مسئله پیش آمده:

ابتدا کلاس ClientTCP و ClientHearing را به صورت thread تعریف کردم اما چون جدا اجرا می شدند وقتی ورودی را وارد می کردم هم برای کاربر و هم برای سرور پیام فرستاده می شد و نمی توانست پیام را راحت جدا کند چون از کنسول ورودی گرفته می شد برای همین مجبور شدم به صورت کلاس عادی تعریف کنم.

چون کد کلاینت همزمان نمی توانست روی یک دستگاه اجرا شود. کد را دقیقاً در یک پروژه دیگر کپی کردم تا چت دو کاربر را بتوان نمایش داد.