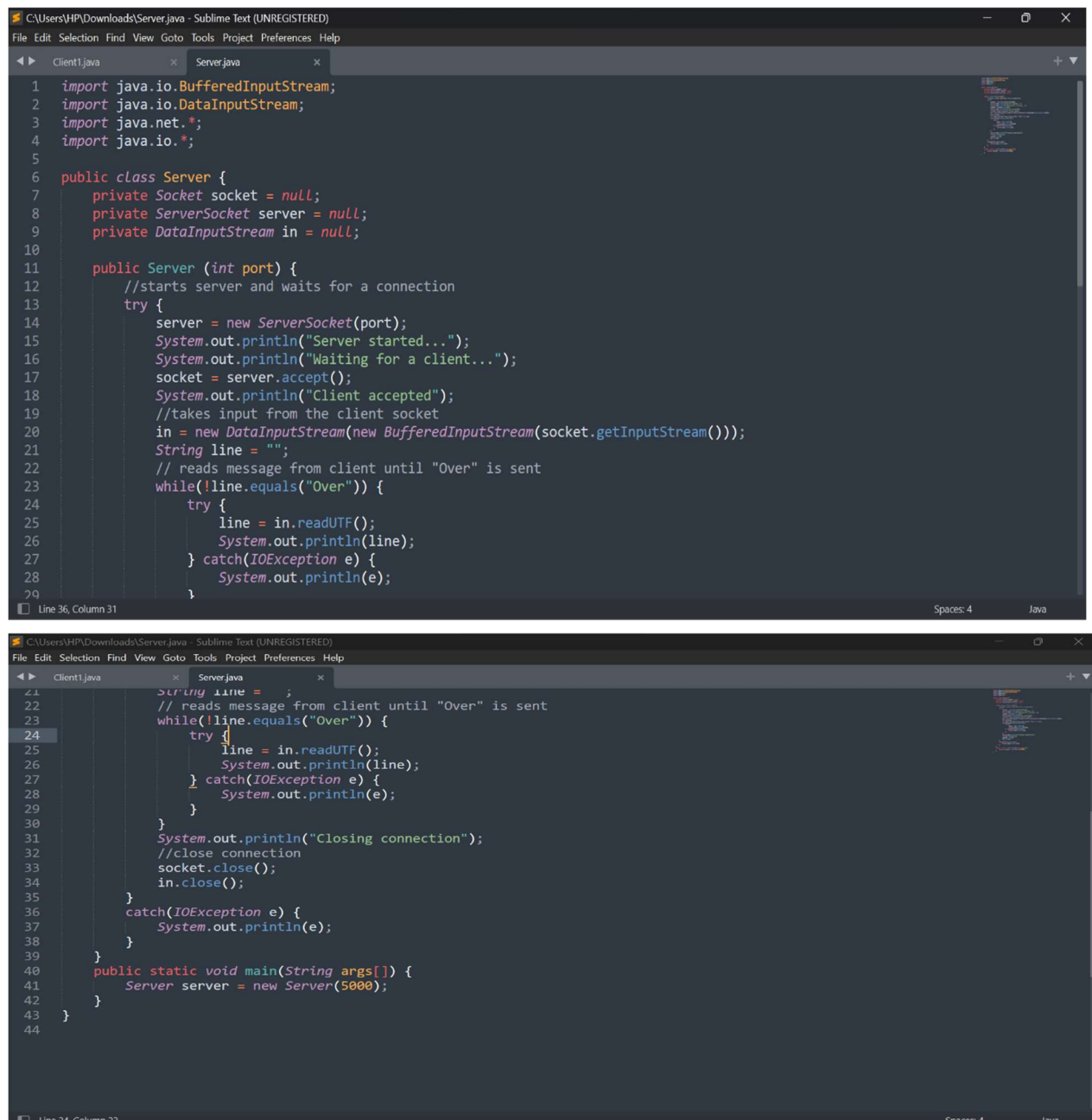**Date:  29/ 09 / 2023**

**Lab Practical #07:**

Study Client-Server Socket programming - TCP & UDP

**Practical Assignment #07:**

1. **Write a C/Java code for TCP Server-Client Socket Programming.**
2. **Write a C/Java code for UDP Server-Client Socket Programming.**

**1. For TCP Server-Client:**

**TCP Server Program:**

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## TCP Client Program:

```java
import java.net.*;
import java.io.*;
public class Client1
{
    //initialize socket and i/o stream
    private Socket socket = null;
    private BufferedReader input = null;
    private DataOutputStream out = null;

    //constructor to put IP address and port
    public Client1(String address, int port) {
        //establish a connection
        try{
            socket = new Socket(address, port);
            System.out.println("Connnected");
            //take input from terminal
            input = new BufferedReader(new InputStreamReader(System.in));
            //sends output to the socket
            out = new DataOutputStream(socket.getOutputStream());
        }
        catch(UnknownHostException e) {
            System.out.println("unknownHost :: " + e);
        }
        catch(IOException e) {
            System.out.println("ioException :: " + e);
```
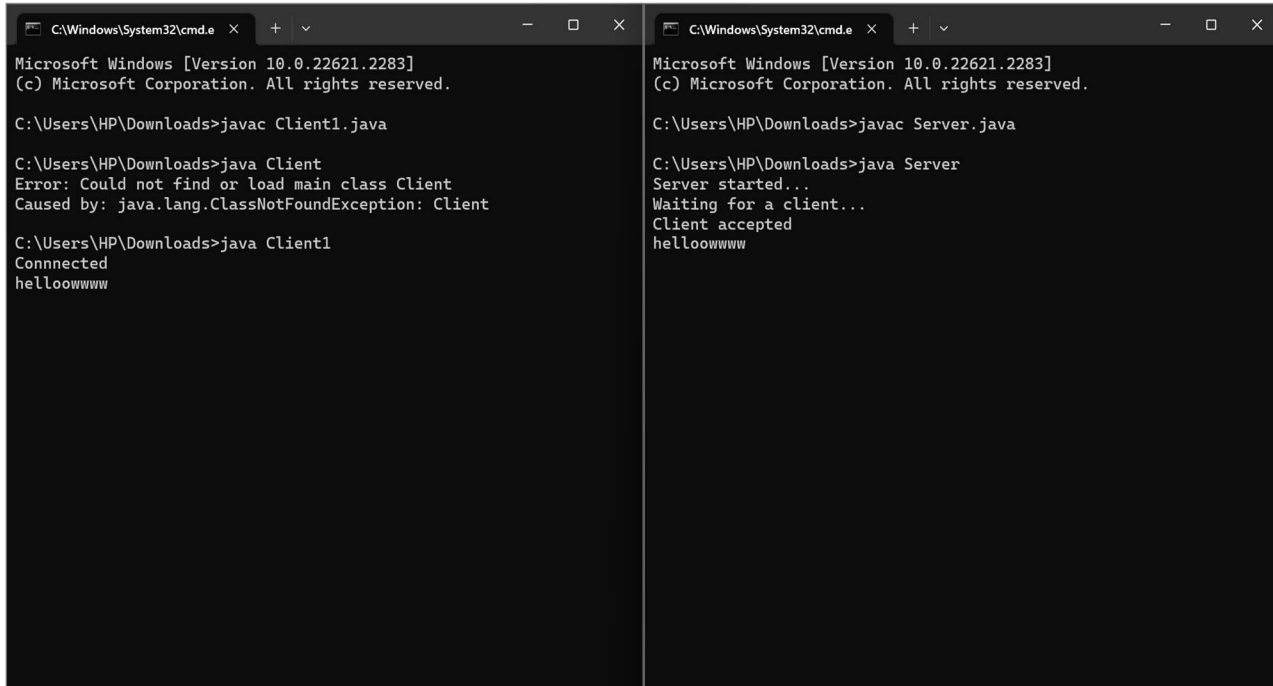
```java
            System.out.println("ioException :: " + e);
        }
        //String to read message from input tab
        String line = "";
        while(!line.equals("Over")) {
            try{
                line = input.readLine();
                out.writeUTF(line);
            }
            catch(IOException e) {
                System.out.println("ioException :: " + e);
            }
        }
        //close the connection
        try {
            input.close();
            out.close();
            socket.close();
        } catch(IOException e) {
            System.out.println("ioException :: " + e);
        }
    }
    public static void main(String args[]) {
        Client1 client = new Client1("127.0.0.1",5000);
    }
}
```

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## Output:
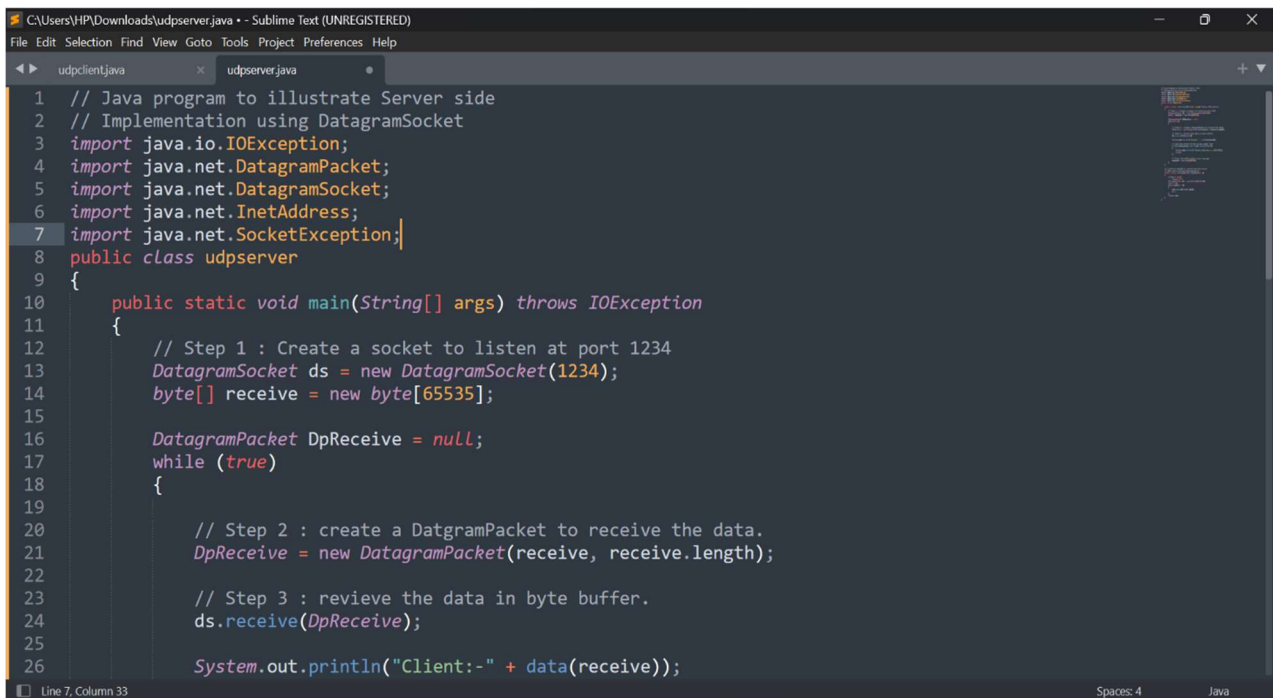


## 2. For UDP Server-Client:

### UDP Server Program:



```java
// Java program to illustrate Server side
// Implementation using DatagramSocket
import java.io.IOException;
import java.net.DatagramPacket;
import java.net.DatagramSocket;
import java.net.InetAddress;
import java.net.SocketException;
public class udpserver
{
    public static void main(String[] args) throws IOException
    {
        // Step 1 : Create a socket to listen at port 1234
        DatagramSocket ds = new DatagramSocket(1234);
        byte[] receive = new byte[65535];

        DatagramPacket DpReceive = null;
        while (true)
        {

            // Step 2 : create a DatgramPacket to receive the data.
            DpReceive = new DatagramPacket(receive, receive.length);

            // Step 3 : revieve the data in byte buffer.
            ds.receive(DpReceive);

            System.out.println("Client:-" + data(receive));
```

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```java
26                // Exit the server if the client sends "bye"
27                if (data(receive).toString().equals("bye"))
28                {
29                    System.out.println("Client sent bye.....EXITING");
30                    break;
31                }
32                // Clear the buffer after every message.
33                receive = new byte[65535];
34            }
35        }
36        // A utility method to convert the byte array
37        // data into a string representation.
38        public static StringBuilder data(byte[] a)
39        {
40            if (a == null)
41                return null;
42            StringBuilder ret = new StringBuilder();
43            int i = 0;
44            while (a[i] != 0)
45            {
46                ret.append((char) a[i]);
47                i++;
48            }
49            return ret;
50        }
51  }
```

## UDP Client Program:

```java
1   // Java program to illustrate Client side
2   // Implementation using DatagramSocket
3   import java.io.IOException;
4   import java.net.DatagramPacket;
5   import java.net.DatagramSocket;
6   import java.net.InetAddress;
7   import java.util.Scanner;
8
9   public class udpclient
10  {
11      public static void main(String args[]) throws IOException
12      {
13          Scanner sc = new Scanner(System.in);
14
15          // Step 1:Create the socket object for
16          // carrying the data.
17          DatagramSocket ds = new DatagramSocket();
18
19          InetAddress ip = InetAddress.getLocalHost();
20          byte buf[] = null;
21
22          // loop while user not enters "bye"
23          while (true)
24          {
25              String inp = sc.nextLine();
26
```

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```java
23          while (true)
24          {
25              String inp = sc.nextLine();
26
27              // convert the String input into the byte array.
28              buf = inp.getBytes();
29
30              // Step 2 : Create the datagramPacket for sending
31              // the data.
32              DatagramPacket DpSend =
33                  new DatagramPacket(buf, buf.length, ip, 1234);
34
35              // Step 3 : invoke the send call to actually send
36              // the data.
37              ds.send(DpSend);
38
39              // break the loop if user enters "bye"
40              if (inp.equals("bye"))
41                  break;
42          }
43      }
44  }
45
```

## Output:

```
Microsoft Windows [Version 10.0.22621.2283]
(c) Microsoft Corporation. All rights reserved.

C:\Users\HP\Downloads>javac udpserver.java

C:\Users\HP\Downloads>java udpserver
Client:-bye
Client sent bye.....EXITING

C:\Users\HP\Downloads>
```

```
Microsoft Windows [Version 10.0.22621.2283]
(c) Microsoft Corporation. All rights reserved.

C:\Users\HP\Downloads>javac udpclient.java

C:\Users\HP\Downloads>java udpclient
bye

C:\Users\HP\Downloads>
```