

Date: 29/09/2023

## Lab Practical #07:

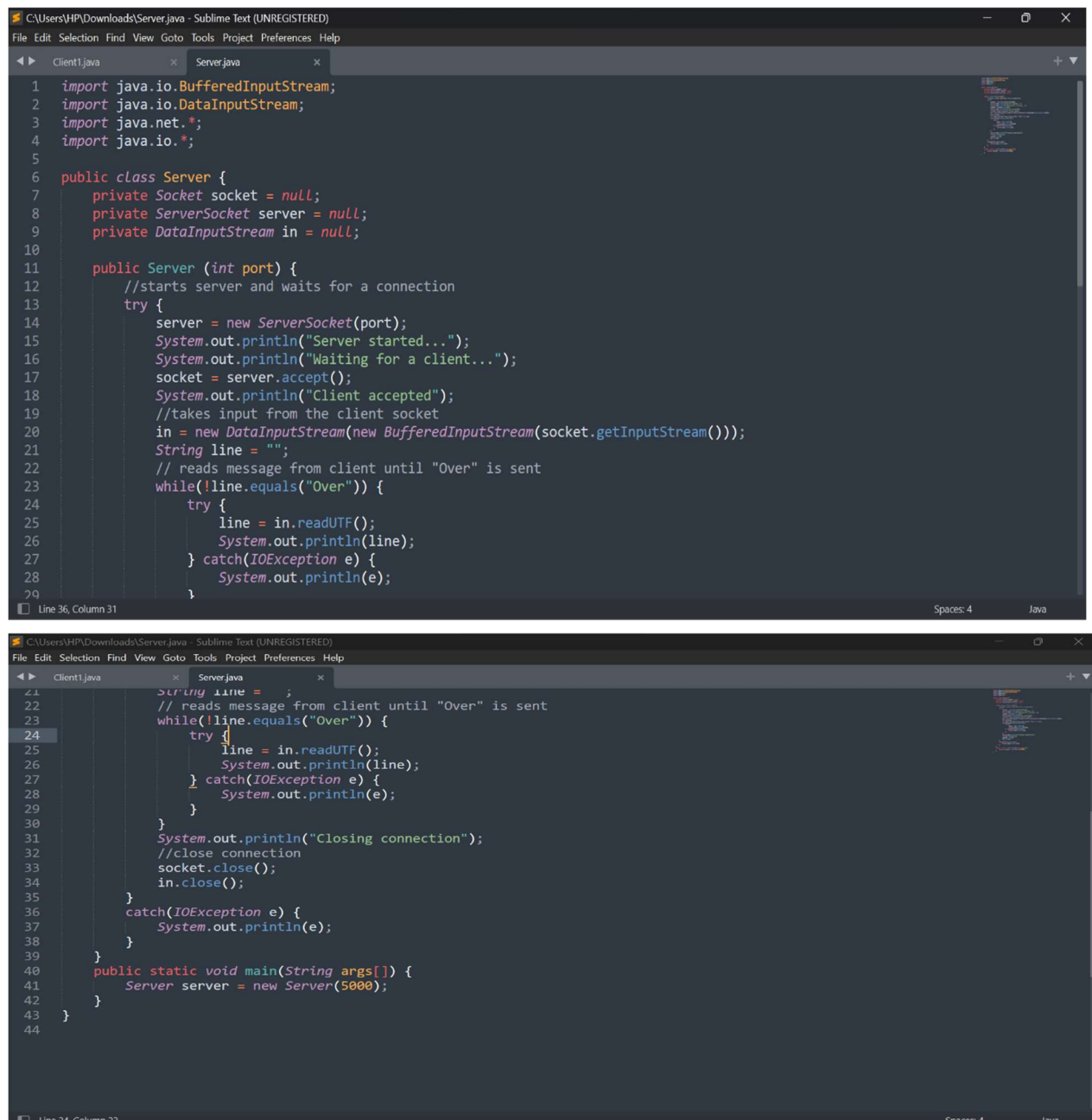
Study Client-Server Socket programming - TCP & UDP

### 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:



```
1 import java.io.BufferedReader;
2 import java.io.DataInputStream;
3 import java.net.*;
4 import java.io.*;
5
6 public class Server {
7     private Socket socket = null;
8     private ServerSocket server = null;
9     private DataInputStream in = null;
10
11     public Server (int port) {
12         //starts server and waits for a connection
13         try {
14             server = new ServerSocket(port);
15             System.out.println("Server started...");
16             System.out.println("Waiting for a client...");
17             socket = server.accept();
18             System.out.println("Client accepted");
19             //takes input from the client socket
20             in = new DataInputStream(new BufferedInputStream(socket.getInputStream()));
21             String line = "";
22             // reads message from client until "Over" is sent
23             while(!line.equals("Over")) {
24                 try {
25                     line = in.readUTF();
26                     System.out.println(line);
27                 } catch(IOException e) {
28                     System.out.println(e);
29                 }
30             }
31             System.out.println("Closing connection");
32             //close connection
33             socket.close();
34             in.close();
35         } catch(IOException e) {
36             System.out.println(e);
37         }
38     }
39
40     public static void main(String args[]) {
41         Server server = new Server(5000);
42     }
43 }
44
```

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### TCP Client Program:

```
C:\Users\HP\Downloads\Client1.java - Sublime Text (UNREGISTERED)
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Client1.java
Server.java

1  import java.net.*;
2  import java.io.*;
3  public class Client1
4  {
5      //initialize socket and i/o stream
6      private Socket socket = null;
7      private BufferedReader input = null;
8      private DataOutputStream out = null;
9
10     //constructor to put IP address and port
11     public Client1(String address, int port) {
12         //establish a connection
13         try{
14             socket = new Socket(address, port);
15             System.out.println("Connected");
16             //take input from terminal
17             input = new BufferedReader(new InputStreamReader(System.in));
18             //sends output to the socket
19             out = new DataOutputStream(socket.getOutputStream());
20         }
21         catch(UnknownHostException e) {
22             System.out.println("unknownHost :: " + e);
23         }
24         catch(IOException e) {
25             System.out.println("ioException :: " + e);
```

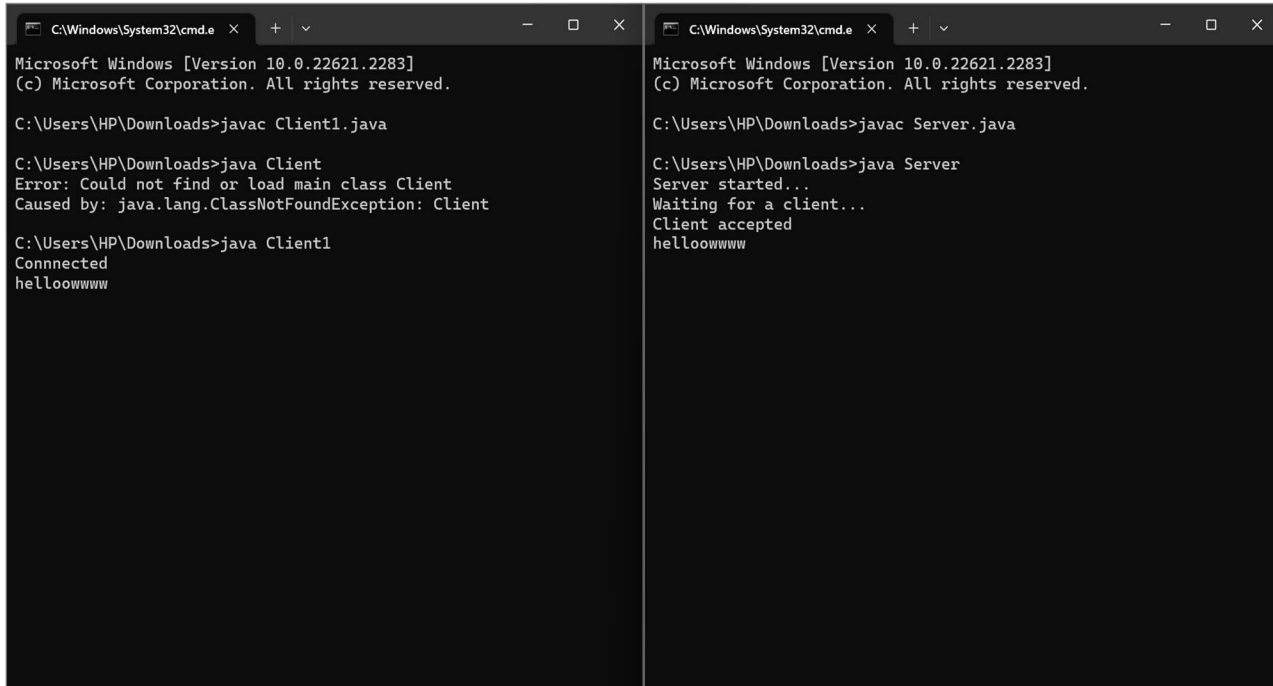
```
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Client1.java
Server.java

25     System.out.println("ioException :: " + e);
26 }
27 //String to read message from input tab
28 String line = "";
29 while(!line.equals("Over")) {
30     try{
31         line = input.readLine();
32         out.writeUTF(line);
33     }
34     catch(IOException e) {
35         System.out.println("ioException :: " + e);
36     }
37 }
38 //close the connection
39 try {
40     input.close();
41     out.close();
42     socket.close();
43 } catch(IOException e) {
44     System.out.println("ioException :: " + e);
45 }
46 }
47 public static void main(String args[]) {
48     Client1 client = new Client1("127.0.0.1",5000);
49 }
50 }
```

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### Output:



```
C:\Windows\System32\cmd.e x + v
Microsoft Windows [Version 10.0.22621.2283]
(c) Microsoft Corporation. All rights reserved.

C:\Users\HP\Downloads>javac Client1.java

C:\Users\HP\Downloads>java Client
Error: Could not find or load main class Client
Caused by: java.lang.ClassNotFoundException: Client

C:\Users\HP\Downloads>java Client1
Connected
helloowwww

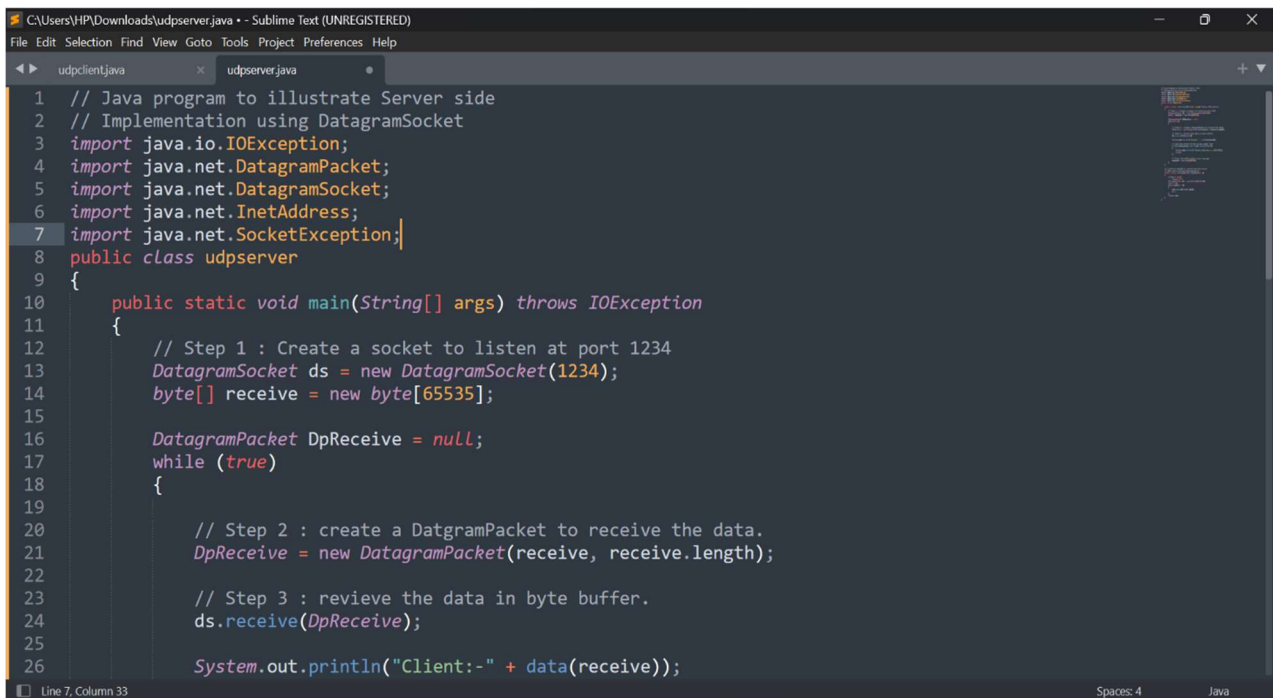
C:\Windows\System32\cmd.e x + v
Microsoft Windows [Version 10.0.22621.2283]
(c) Microsoft Corporation. All rights reserved.

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

C:\Users\HP\Downloads>java Server
Server started...
Waiting for a client...
Client accepted
helloowwww
```

## 2. For UDP Server-Client:

### UDP Server Program:



```
C:\Users\HP\Downloads\udpsrver.java - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

udpcient.java x udpsrver.java
1 // Java program to illustrate Server 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.net.SocketException;
8 public class udpsrver
9 {
10     public static void main(String[] args) throws IOException
11     {
12         // Step 1 : Create a socket to listen at port 1234
13         DatagramSocket ds = new DatagramSocket(1234);
14         byte[] receive = new byte[65535];
15
16         DatagramPacket DpReceive = null;
17         while (true)
18         {
19
20             // Step 2 : create a DatagramPacket to receive the data.
21             DpReceive = new DatagramPacket(receive, receive.length);
22
23             // Step 3 : receive the data in byte buffer.
24             ds.receive(DpReceive);
25
26             System.out.println("Client:-" + data(receive));
27         }
28     }
29 }
```

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```
C:\Users\HP\Downloads\udpserver.java - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

udpclient.java x udpserver.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 }
```

Line 24, Column 35 Spaces: 4 Java

### UDP Client Program:

```
C:\Users\HP\Downloads\udpclient.java - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

udpclient.java x udpserver.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         }
27     }
28 }
```

Line 17, Column 50 Spaces: 4 Java

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```
C:\Users\HP\Downloads\udpclient.java - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

udpclient.java x udpserver.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 }
```

Line 17, Column 50 Spaces: 4 Java

## Output:

```
C:\Windows\System32\cmd.e x + v - □ x
Microsoft Windows [Version 10.0.22621.2283]
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C:\Users\HP\Downloads>javac udpserver.java

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

C:\Users\HP\Downloads>

C:\Windows\System32\cmd.e x + v - □ x
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>
```