**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.**
3. **For TCP Server-Client: Connection Based Protocol**

**TCP Server Program:**

import java.io.\*;

import java.net.\*;

public class Server {

private Socket socket = null;

private ServerSocket server = null;

private DataInputStream in = null;

private DataOutputStream out = null;

public Server(int port) {

try {

server = new ServerSocket(port);

System.out.println("Server started");

System.out.println("Waiting for a client ...");

socket = server.accept();

System.out.println("Client accepted");

in = new DataInputStream(new BufferedInputStream(socket.getInputStream()));

out = new DataOutputStream(socket.getOutputStream());

// Thread to listen for incoming messages from the client

Thread receiveThread = new Thread(() -> {

String message;

try {

while (true) {

message = in.readUTF();

System.out.println("Client: " + message);

}

} catch (IOException e) {

System.out.println("Connection closed.");

}

});

receiveThread.start();

// Main thread to send messages to the client

BufferedReader consoleInput = new BufferedReader(new InputStreamReader(System.in));

String message;

while (true) {

message = consoleInput.readLine();

out.writeUTF(message);

}

} catch (IOException e) {

System.out.println(e);

} finally {

try {

socket.close();

in.close();

out.close();

} catch (IOException e) {

System.out.println(e);

}

}

}

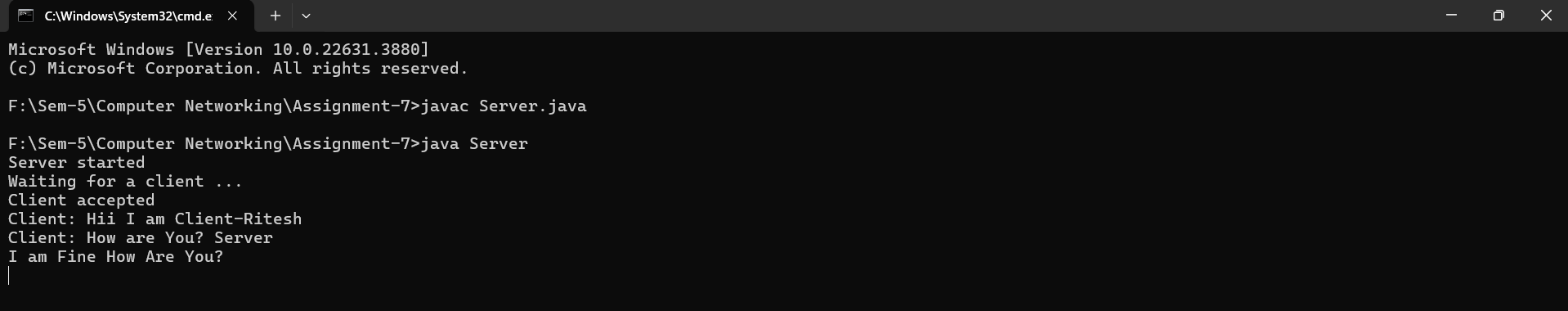
public static void main(String[] args) {

Server server = new Server(5000);

}

}

**OUTPUT:**

****

**TCP Client Program:**

import java.io.\*;

import java.net.\*;

public class ClientTCP {

private Socket socket = null;

private DataInputStream in = null;

private DataOutputStream out = null;

public ClientTCP(String address, int port) {

try {

socket = new Socket(address, port);

System.out.println("Connected to the server");

in = new DataInputStream(socket.getInputStream());

out = new DataOutputStream(socket.getOutputStream());

// Thread to listen for incoming messages from the server

Thread receiveThread = new Thread(() -> {

String message;

try {

while (true)

{

message = in.readUTF();

System.out.println("Server: " + message);

}

}catch (IOException e) {

System.out.println("Connection closed.");

}

});

receiveThread.start();

// Main thread to send messages to the server

BufferedReader consoleInput = new BufferedReader(new InputStreamReader(System.in));

String message;

while (true)

{

message = consoleInput.readLine();

out.writeUTF(message);

}

} catch (UnknownHostException u) {

System.out.println(u);

} catch (IOException e) {

System.out.println(e);

} finally {

try

{

socket.close();

in.close();

out.close();

} catch (IOException e) {

System.out.println(e);

}

}

}

public static void main(String[] args) {

ClientTCP client = new ClientTCP("127.0.0.1", 5000);

}

}

**OUTPUT:**

****

1. **For UDP Server-Client: Connection Less Protocol**

**UDP Server Program:**

import java.io.\*;

import java.net.\*;

class UDPServer {

public static void main(String[] args) {

try {

DatagramSocket server\_socket = new DatagramSocket(1234);

byte[] in\_data = new byte[1024];

byte[] out\_data;

while (true) {

DatagramPacket Packet2 = new DatagramPacket(in\_data, in\_data.length);

server\_socket.receive(Packet2);

String str = new String(Packet2.getData(), 0, Packet2.getLength());

System.out.println("Received from client: " + str);

InetAddress IP\_add1 = Packet2.getAddress();

int port = Packet2.getPort();

BufferedReader server\_input = new BufferedReader(new InputStreamReader(System.in));

System.out.print("Enter response: ");

String send\_str = server\_input.readLine();

out\_data = send\_str.getBytes();

DatagramPacket Packet3 = new DatagramPacket(out\_data, out\_data.length, IP\_add1, port);

server\_socket.send(Packet3);

}

} catch (IOException e) {

e.printStackTrace();

}

}

}

**Output :**

****

**UDP Client Program:**

import java.io.\*;

import java.net.\*;

class UDPClient {

public static void main(String[] args) {

try {

BufferedReader user\_input = new BufferedReader(new InputStreamReader(System.in));

DatagramSocket client\_socket = new DatagramSocket();

InetAddress IP\_add = InetAddress.getByName("localhost");

byte[] out\_data;

byte[] in\_data = new byte[1024];

System.out.print("Enter message: ");

String str = user\_input.readLine();

out\_data = str.getBytes();

DatagramPacket Packet1 = new DatagramPacket(out\_data, out\_data.length, IP\_add, 1234);

client\_socket.send(Packet1);

DatagramPacket Packet4 = new DatagramPacket(in\_data, in\_data.length);

client\_socket.receive(Packet4);

String receive\_str = new String(Packet4.getData(), 0, Packet4.getLength());

System.out.println("Server response: " + receive\_str);

client\_socket.close();

} catch (IOException e) {

e.printStackTrace();

}

}

}

**OUTPUT:**

****