**Lab Practical #06:**

Study Client-Server Socket programming - TCP & UDP

**Practical Assignment #06:**

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:**

**TCP Server Program:**

**// TCP Server-side Programming**

**import java.net.\*;**

**import java.io.\*;**

**public class SocketServer {**

**// Initialize socket and input stream**

**private Socket s = null;**

**private ServerSocket ss = null;**

**private DataInputStream in = null;**

**// Constructor with port**

**public SocketServer(int port) {**

**// Starts server and waits for a connection**

**try**

**{**

**ss = new ServerSocket(port);**

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

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

**s = ss.accept();**

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

**// Takes input from the client socket**

**in = new DataInputStream(**

**new BufferedInputStream(s.getInputStream()));**

**String m = "";**

**// Reads message from client until "Over" is sent**

**while (!m.equals("Over"))**

**{**

**try**

**{**

**m = in.readUTF();**

**System.out.println(m);**

**}**

**catch(IOException i)**

**{**

**System.out.println(i);**

**}**

**}**

**System.out.println("Closing connection");**

**// Close connection**

**s.close();**

**in.close();**

**}**

**catch(IOException i)**

**{**

**System.out.println(i);**

**}**

**}**

**public static void main(String args[])**

**{**

**SocketServer s = new SocketServer(5000);**

**}**

**}**

**TCP Client Program:**

**// TCP Client-side Programming**

**import java.io.\*;**

**import java.net.\*;**

**public class SocketClient {**

**// Initialize socket and input/output streams**

**private Socket s = null;**

**private DataInputStream in = null;**

**private DataOutputStream out = null;**

**// Constructor to put IP address and port**

**public SocketClient(String addr, int port)**

**{**

**// Establish a connection**

**try {**

**s = new Socket(addr, port);**

**System.out.println("Connected");**

**// Takes input from terminal**

**in = new DataInputStream(System.in);**

**// Sends output to the socket**

**out = new DataOutputStream(s.getOutputStream());**

**}**

**catch (UnknownHostException u) {**

**System.out.println(u);**

**return;**

**}**

**catch (IOException i) {**

**System.out.println(i);**

**return;**

**}**

**// String to read message from input**

**String m = "";**

**// Keep reading until "Over" is input**

**while (!m.equals("Over")) {**

**try {**

**m = in.readLine();**

**out.writeUTF(m);**

**}**

**catch (IOException i) {**

**System.out.println(i);**

**}**

**}**

**// Close the connection**

**try {**

**in.close();**

**out.close();**

**s.close();**

**}**

**catch (IOException i) {**

**System.out.println(i);**

**}**

**}**

**public static void main(String[] args) {**

**SocketClient c = new SocketClient("127.0.0.1", 5000);**

**}**

**}**

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

**UDP Server Program:**

**// UDPServer.java**

**import java.net.DatagramPacket;**

**import java.net.DatagramSocket;**

**public class UDPServer {**

**public static void main(String[] args) {**

**final int PORT = 12345;**

**byte[] buffer = new byte[1024];**

**try (DatagramSocket serverSocket = new DatagramSocket(PORT)) {**

**System.out.println("UDP Server is running on port " + PORT);**

**while (true) {**

**// Receive packet**

**DatagramPacket request = new DatagramPacket(buffer, buffer.length);**

**serverSocket.receive(request);**

**String clientMessage = new String(request.getData(), 0, request.getLength());**

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

**// Prepare response**

**String responseMessage = "Hello Client, I received your message: " + clientMessage;**

**byte[] responseData = responseMessage.getBytes();**

**// Send response**

**DatagramPacket response = new DatagramPacket(**

**responseData,**

**responseData.length,**

**request.getAddress(),**

**request.getPort()**

**);**

**serverSocket.send(response);**

**}**

**} catch (Exception e) {**

**e.printStackTrace();**

**}**

**}**

**}**

**UDP Client Program:**

**// UDPClient.java**

**import java.net.DatagramPacket;**

**import java.net.DatagramSocket;**

**import java.net.InetAddress;**

**public class UDPClient {**

**public static void main(String[] args) {**

**final String SERVER\_ADDRESS = "localhost";**

**final int SERVER\_PORT = 12345;**

**try (DatagramSocket clientSocket = new DatagramSocket()) {**

**// Message to send**

**String message = "Hello Server, this is Client!";**

**byte[] sendData = message.getBytes();**

**// Send packet**

**InetAddress serverIP = InetAddress.getByName(SERVER\_ADDRESS);**

**DatagramPacket sendPacket = new DatagramPacket(sendData, sendData.length, serverIP, SERVER\_PORT);**

**clientSocket.send(sendPacket);**

**// Receive response**

**byte[] receiveBuffer = new byte[1024];**

**DatagramPacket receivePacket = new DatagramPacket(receiveBuffer, receiveBuffer.length);**

**clientSocket.receive(receivePacket);**

**String serverReply = new String(receivePacket.getData(), 0, receivePacket.getLength());**

**System.out.println("Received from server: " + serverReply);**

**} catch (Exception e) {**

**e.printStackTrace();**

**}**

**}**

**}**