**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:**

// Demonstrating Server-side Programming

import java.net.\*;

import java.io.\*;

public class TCP\_Server {

    //Initialize socket and input stream

    private Socket s = null;

    private ServerSocket ss = null;

    private DataInputStream in = null;

    // Constructor with port

    public TCP\_Server(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[])

    {

        Server s = new Server(5000);

    }

}

**TCP Client Program:**

// Demonstrating Client-side Programming

import java.io.\*;

import java.net.\*;

public class TCP\_Client {

// 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 TCP\_Client(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) {

        Client c = new Client("127.0.0.1", 5000);

    }

}

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

**UDP Server Program:**

// 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 UDP\_Server

{

    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));

            // Exit the server if the client sends "bye"

            if (data(receive).toString().equals("bye"))

            {

                System.out.println("Client sent bye.....EXITING");

                break;

            }

            // Clear the buffer after every message.

            receive = new byte[65535];

        }

    }

    // A utility method to convert the byte array

    // data into a string representation.

    public static StringBuilder data(byte[] a)

    {

        if (a == null)

            return null;

        StringBuilder ret = new StringBuilder();

        int i = 0;

        while (a[i] != 0)

        {

            ret.append((char) a[i]);

            i++;

        }

        return ret;

    }

}

**UDP Client Program:**

// Implementation using DatagramSocket

import java.io.IOException;

import java.net.DatagramPacket;

import java.net.DatagramSocket;

import java.net.InetAddress;

import java.util.Scanner;

public class UDP\_Client

{

    public static void main(String args[]) throws IOException

    {

        Scanner sc = new Scanner(System.in);

        // Step 1:Create the socket object for carrying the data.

        DatagramSocket ds = new DatagramSocket();

        InetAddress ip = InetAddress.getLocalHost();

        byte buf[] = null;

        // loop while user not enters "bye"

        while (true)

        {

            String inp = sc.nextLine();

            // convert the String input into the byte array.

            buf = inp.getBytes();

            // Step 2 : Create the datagramPacket for sending the data.

            DatagramPacket DpSend =

                  new DatagramPacket(buf, buf.length, ip, 1234);

            // Step 3 : invoke the send call to actually send the data.

            ds.send(DpSend);

            // break the loop if user enters "bye"

            if (inp.equals("bye"))

                break;

        }

    }

}