Pratik Patil

Roll No: 58

UNIT NO	List of Practical	Date	Signature
1	Write a program for implementing Client Server communication model using TCP		
2	Write a program for implementing the Client Server communication model using UDP.		
3	Write a program to show the object communication using RMI.		
4	Show the implementation of web services.		
5	Study and implementation of Infrastructure as a Service. and study of cloud computing Architecture		
6	Installation and Configuration of virtualization using KVM.		
7	Study and implementation of Infrastructure as a Service		
8	Study and implementation of Storage as a Service		
9	Study and implementation of Identity Management		
10	Study Cloud Security management		
11	Write a program for the web feed.		
12	Study and implementation of Single-Sing-On.		
13	User Management in the Cloud		
14	Case study on Amazon EC2/Microsoft Azure/Google Cloud Platform		

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PRACTICAL 1

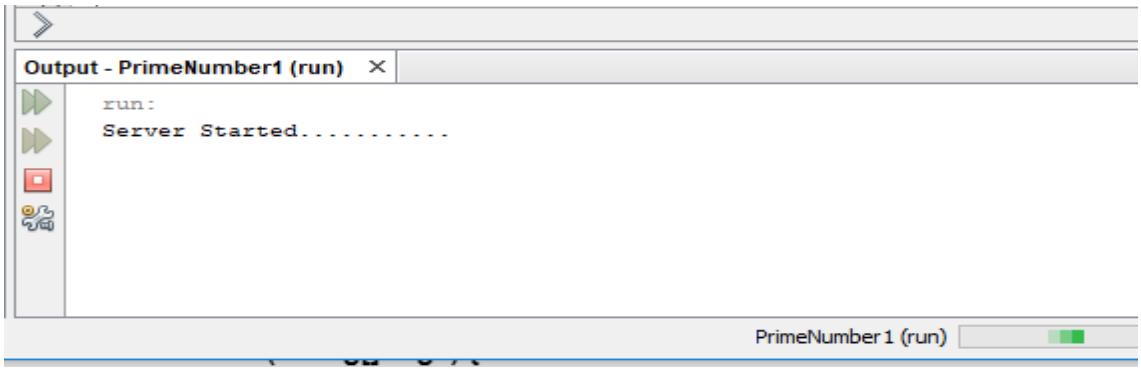
Date: 05-12-24

Aim: Write a program for implementing a client server communication model using TCP.

a) A client-server based program using TCP to find if the number entered is prime or not. Server Code:

```
package primenumber;
import java.net.*; import
java.io.*;
public class PrimeNumber{
        public static void main(String[] args){
         try{
            ServerSocket ss = new ServerSocket(8001);
            System.out.println("Server  Started..............  ");
            Socket s = ss.accept();
            DataInputStream in = new DataInputStream(s.getInputStream()); int x
            = in.readInt();
            DataOutputStream otc = new DataOutputStream(s.getOutputStream()); boolean
            isPrime = true;
            if (x <= 1) {
                isPrime = false;
            } else {
                for (int i = 2; i <= x / 2; i++) {
                    if (x % i == 0) {
                        isPrime = false;
                        break;
                    }
                }
            }
            if (isPrime) {
                otc.writeUTF(x + " is prime");
            } else {
                otc.writeUTF(x + " is not prime");
            }
            s.close();
            ss.close();
        } catch (Exception e) {
            System.out.println(e.toString());
        }
    }
}
```

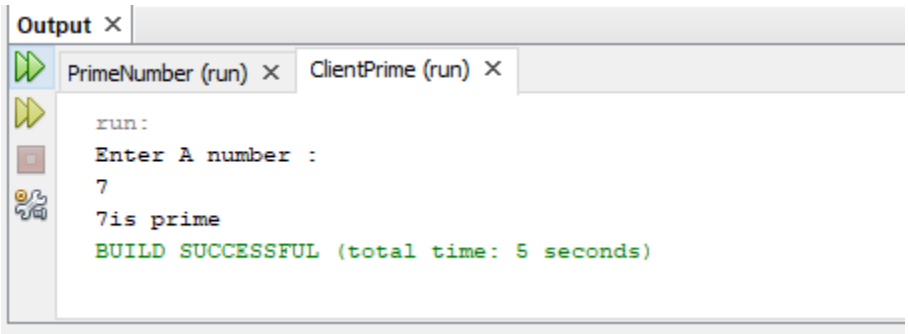
OUTPUT:



Client-code:

```
package clientprime;
import java.io.*;
import java.net.*;
public class ClientPrime {
   public static void main(String[] args) { try{
         Socket cs = new Socket("LocalHost",8001);
         BufferedReader infu = new BufferedReader(new InputStreamReader(System.in));
         System.out.println("Enter A number :");
         int a = Integer.parseInt(infu.readLine());
         DataOutputStream out = new DataOutputStream(cs.getOutputStream());
         out.writeInt(a);
         DataInputStream in = new DataInputStream(cs.getInputStream());
         System.out.println(in.readUTF());
         cs.close();
      }
      catch(Exception e){
         System.out.println(e.toString());
      }
   }
}
```

OUTPUT:



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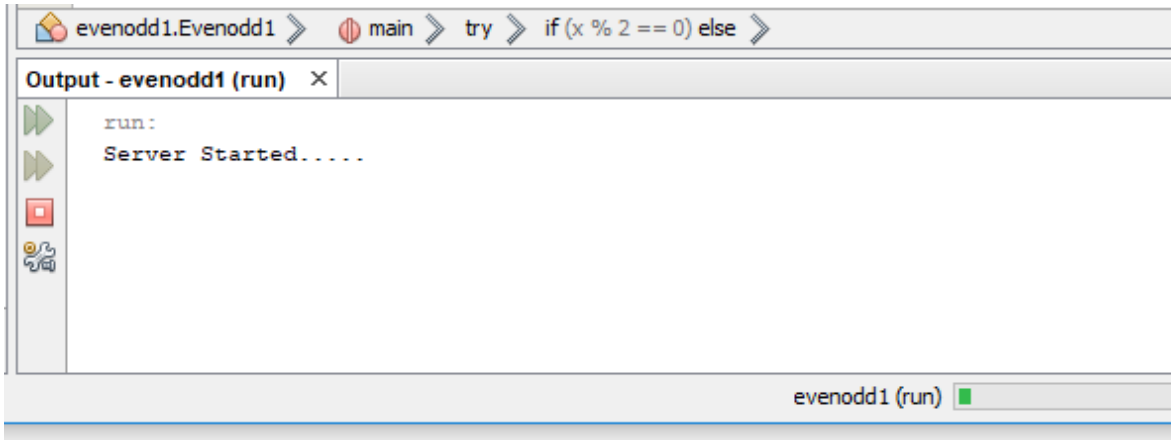
b) A client-server based program using TCP to find if the number entered is Even or Odd. Server code:

```
package evenodd1;
import java.net.*;
import java.io.*;
public class Evenodd1 {
   public static void main(String[] args) throws IOException {
      try{
         ServerSocket ss = new ServerSocket(8002);
         System.out.println("Server Started ..... ");
         Socket s = ss.accept();
         DataInputStream in = new DataInputStream(s.getInputStream()); int x
         = in.readInt();
         DataOutputStream otc = new DataOutputStream(s.getOutputStream()); if(x %
         2==0)
         {
            otc.writeUTF(x + "is Even");
         }
         else{
            otc.writeUTF(x + "is odd");
         }
      }
      catch(Exception e){
   System.out.println(e.toString());
   }
}
}
```

OUTPUT:



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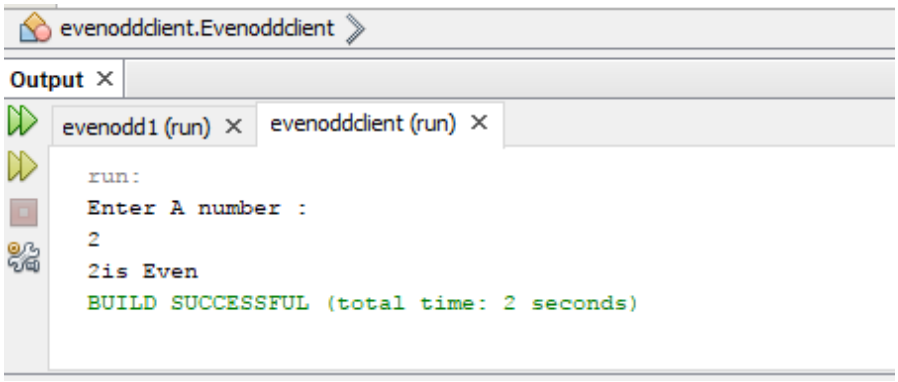
Client-code:

```
package evenoddclient;
import java.net.*;  import
java.io.*;
public class Evenoddclient {
   public static void main(String[] args) { try{
         Socket cs = new Socket("LocalHost",8002);
         BufferedReader infu = new BufferedReader(new InputStreamReader(System.in));
         System.out.println("Enter A number :");
         int a = Integer.parseInt(infu.readLine());
         DataOutputStream out = new DataOutputStream(cs.getOutputStream());
         out.writeInt(a);
         DataInputStream in = new DataInputStream(cs.getInputStream());
         System.out.println(in.readUTF());
         cs.close();
      }
      catch(Exception e){
         System.out.println(e.toString());
      }
   }
   }
```

OUTPUT:



c) A client-server based program using TCP to find the factorial of the number entered. Server code:

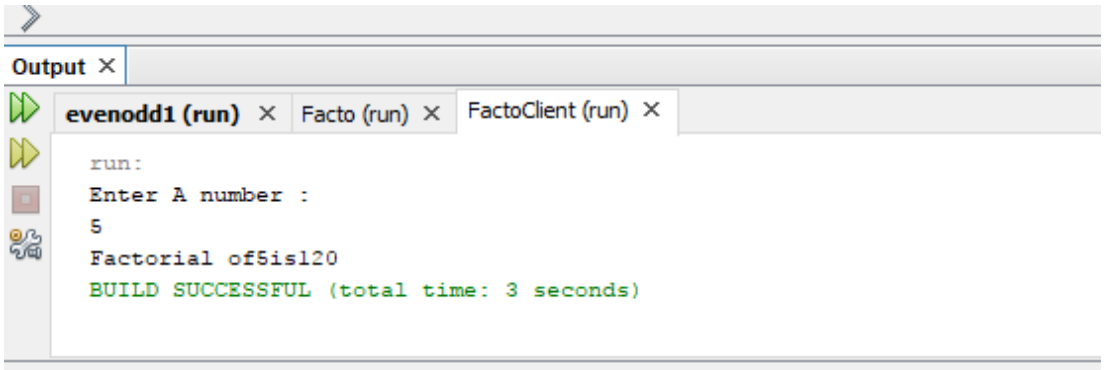
```
package facto; import
java.io.*; import
java.net.*; public class
Facto {
   public static void main(String[] args) { try{
         ServerSocket ss = new ServerSocket(8003);
         System.out.println("Server Started..... ");
         Socket s = ss.accept();
         DataInputStream in = new DataInputStream(s.getInputStream()); int x
         = in.readInt();
         DataOutputStream otc = new DataOutputStream(s.getOutputStream()); long
         factorial=1;
         for(int i =1;i<=x;i++){
            factorial *= i;
         }
         otc.writeUTF("Factorial of"+ x+"is"+factorial);
         }
      catch(Exception e){
         System.out.println(e.toString());
      }
   }
}
```

Client-code package

```
factoclient; import
java.io.*; import
java.net.*;
public class FactoClient {
   public static void main(String[] args) { try{
         Socket cs = new Socket("LocalHost",8003);
         BufferedReader infu = new BufferedReader(new InputStreamReader(System.in));
         System.out.println("Enter A number :");
         int a = Integer.parseInt(infu.readLine());
         DataOutputStream out = new DataOutputStream(cs.getOutputStream());
         out.writeInt(a);
         DataInputStream in = new DataInputStream(cs.getInputStream());
         System.out.println(in.readUTF());
         cs.close();
      }
      catch(Exception e){
```

```
            System.out.println(e.toString());
        }
    }
    }
```

OUTPUT:



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PRACTICAL 2

Date: 12-12-24

Aim: Write a program for implementing the Client-Server communication model using UDP.

a) Client-Server based program UDP to find the number entered is even or odd.

Server Code:

```
package evenoddserver;
import java.io.*;
import java.net.*;
public class EvenOddServer {
   public static void main(String[] args) { try
      {
         DatagramSocket ds = new DatagramSocket(2000); byte
         b[] = new byte[1024];
         DatagramPacket dp = new DatagramPacket(b,b.length); ds.receive(dp);
         String str = new String(dp.getData(),0,dp.getLength());
         System.out.println(str);
         int a = Integer.parseInt(str);
         String s = new String();
         if(a%2==0)
            s= "Number is even"; else
            s= "Number is odd";  byte
         b1[] = new byte[1024]; b1 =
         s.getBytes();
         DatagramPacket dp1 = new
DatagramPacket(b1,b1.length,InetAddress.getLocalHost(),1000); ds.send(dp1);
      }
      catch(Exception e)
      {
         e.printStackTrace();
      }
   }
}
```

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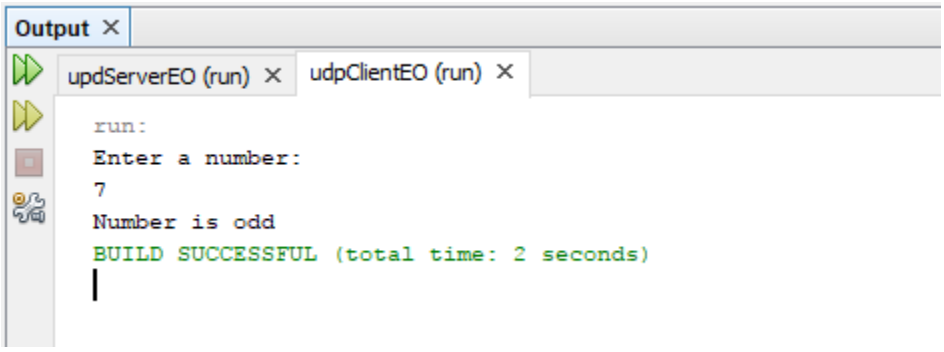
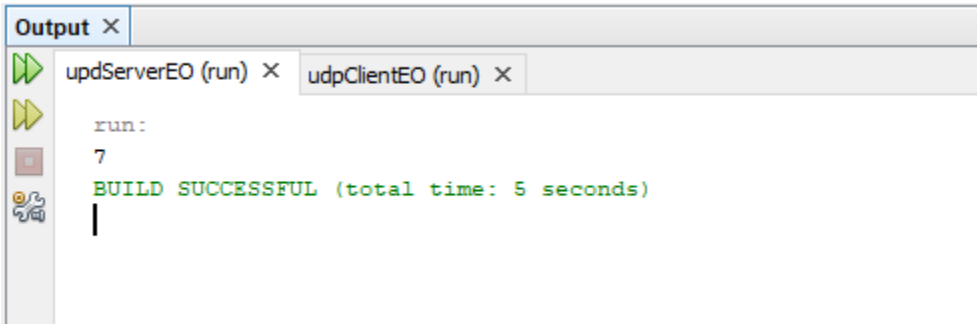
Client Code:

```
package evenoddclient1;
import java.io.*;
import java.net.*;
public class EvenOddClient1 {
    public static void main(String[] args) { try
        {
            DatagramSocket ds = new DatagramSocket(1000);
            BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
            System.out.println("Enter a number :");
            String num = br.readLine();
            byte b[] = new byte[1024];
            b= num.getBytes();
            DatagramPacket dp = new
DatagramPacket(b,b.length,InetAddress.getLocalHost(),2000); ds.send(dp);
            byte b1[] = new byte[1024];
            DatagramPacket dp1 =new DatagramPacket(b1,b1.length);
            ds.receive(dp1);
            String str = new String(dp1.getData(),0,dp1.getLength());
            System.out.println(str);
        }
        catch(Exception e)
        {
            e.printStackTrace();
        }
    }
}
```

OUTPUT:





b) Client-server based program using UDP to find factorial of entered number.

Server Code package serverfacto; import java.io.*; import java.net.*;

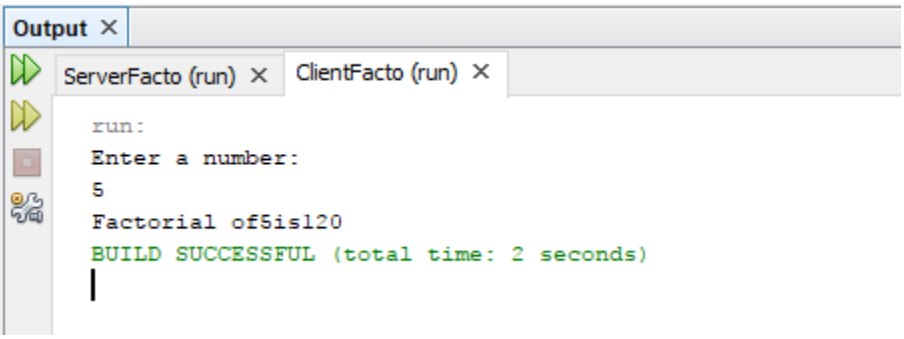
```
public class ServerFacto {
   public static void main(String[] args) { try{
         DatagramSocket ds = new DatagramSocket(2000); byte b
         [] = new byte[1024];
         DatagramPacket dp = new DatagramPacket(b,b.length); ds.receive(dp);
         String str = new String(dp.getData(),0,dp.getLength());
         System.out.println(str);
         int num = Integer.parseInt(str);
         long factorial = calculateFactorial(num);
         String result = "Factorial of" + num + "is" + factorial; byte
         b1[]= result.getBytes();
         DatagramPacket dp1 = new DatagramPacket(b1,b1.length,InetAddress.getLocalHost(),1000);
         ds.send(dp1);
      }
      catch(Exception e)
      {
         e.printStackTrace();
      }
   }
   public static long calculateFactorial(int num)
   {
      long factorial =1; for(int
      i=1;i<=num;i++){
         factorial*=i;
      }
      return factorial;
```

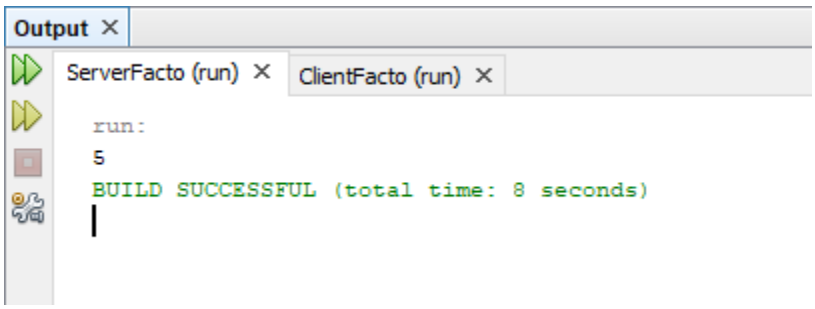
```
    }
}
```

Client Code package
clientfacto; import
java.io.*; import
java.net.*;

```
public class ClientFacto {
    public static void main(String[] args) { try
        {
            DatagramSocket ds=new DatagramSocket(1000);
            BufferedReader br=new BufferedReader(new InputStreamReader(System.in));
            System.out.println("Enter a number: ");
            String num=br.readLine(); byte[]
            b=num.getBytes();
            DatagramPacket dp=new
DatagramPacket(b,b.length,InetAddress.getLocalHost(),2000); ds.send(dp);
            byte[] b1=new byte[1024];
            DatagramPacket dp1=new DatagramPacket(b1,b1.length);
            ds.receive(dp1);
            String result=new String(dp1.getData(),0,dp1.getLength());
            System.out.println(result);
        }
        catch(Exception e)
        {
            e.printStackTrace();
        }
    }
}
```

OUTPUT:





c) Client-server based program to implement simple calculator operations addition, subtraction, multiplication and division.

Server Code:

```
package calserver;
import java.io.*;
import java.net.*;
public class CalServer {
   public static void main(String[] args) { try
      {
         DatagramSocket ds = new DatagramSocket(2000); byte[]
         b = new byte[1024];
         DatagramPacket dp = new DatagramPacket(b, b.length); ds.receive(dp);
         String str = new String(dp.getData(), 0, dp.getLength());
         System.out.println("Received data: " + str);

         // Parse the received data (e.g., "5 + 3") String[]
         parts = str.split(" ");
         double num1 = Double.parseDouble(parts[0]); String
         operation = parts[1];
         double num2 = Double.parseDouble(parts[2]);

         // Perform the operation
         double result = 0; switch
         (operation) {
            case "+":
               result = num1 + num2;
               break;
            case "-":
               result = num1 - num2;
               break;
            case "*":
               result = num1 * num2;
```

```
            break;
        case "/":
            if (num2 != 0) {
                result = num1 / num2;
            } else {
                throw new ArithmeticException("Division by zero");
            }
            break;
        default:
            throw new IllegalArgumentException("Invalid operation: " + operation);
        }

        // Send the result back to the client String
        response = "Result: " + result; byte[] b1 =
        response.getBytes();
        DatagramPacket dp1 = new DatagramPacket(b1, b1.length, dp.getAddress(), dp.getPort());
        ds.send(dp1);
    } catch (Exception e) {
        e.printStackTrace();
    }
  }
}
```

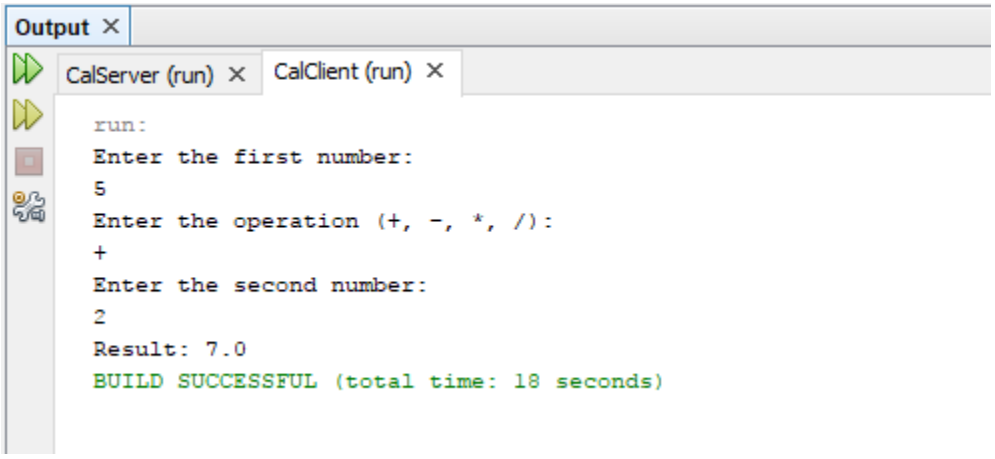
Client Code:

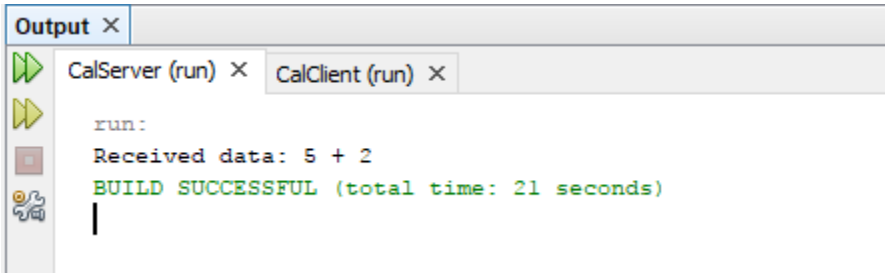
```
package calclient;
import java.io.*;
import java.net.*;
public class CalClient {
  public static void main(String[] args) { try
    {
        DatagramSocket ds = new DatagramSocket(1000);
        BufferedReader br = new BufferedReader(new InputStreamReader(System.in));

        // Input two numbers and an operation from the user
        System.out.println("Enter the first number: ");  String
        num1 = br.readLine(); System.out.println("Enter the
        operation (+, -, *, /): "); String operation =
        br.readLine(); System.out.println("Enter the second
        number: "); String num2 = br.readLine();

        // Combine input into a single string
        String data = num1 + " " + operation + " " + num2; byte[]
```

```
            b = data.getBytes();

            // Send the data to the server
            DatagramPacket dp = new DatagramPacket(b, b.length,
InetAddress.getLocalHost(), 2000);
            ds.send(dp);

            // Receive the result from the server
            byte[] b1 = new byte[1024];
            DatagramPacket dp1 = new DatagramPacket(b1, b1.length);
            ds.receive(dp1);
            String response = new String(dp1.getData(), 0, dp1.getLength());
            System.out.println(response);

        } catch (Exception e) {
            e.printStackTrace();
        }
    }
}
```

OUTPUT:

Addition:





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Subtraction:

```
Output
CalServer (run)   CalClient (run)
run:
Enter the first number:
4
Enter the operation (+, -, *, /):
-
Enter the second number:
3
Result: 1.0
BUILD SUCCESSFUL (total time: 6 seconds)
```

```
Output
CalServer (run)   CalClient (run)
run:
Enter the first number:
5
Enter the operation (+, -, *, /):
+
Enter the second number:
2
Result: 7.0
```

Multiplication:

```
Output
CalServer (run)   CalClient (run)
run:
Enter the first number:
2
Enter the operation (+, -, *, /):
*
Enter the second number:
3
Result: 6.0
BUILD SUCCESSFUL (total time: 7 seconds)
```

```
Output
CalServer (run)   CalClient (run)
run:
Received data: 2 * 3
BUILD SUCCESSFUL (total time: 11 seconds)
```

Division:

```
Output
CalServer (run)   CalClient (run)
run:
Enter the first number:
4
Enter the operation (+, -, *, /):
/
Enter the second number:
2
Result: 2.0
BUILD SUCCESSFUL (total time: 10 seconds)
```

```
Output
CalServer (run)   CalClient (run)
run:
Received data: 4 / 2
BUILD SUCCESSFUL (total time: 13 seconds)
```

d) Client-server based program to find square, square root, cube and cube root of the entered numbers.

<u>Server code:</u>

```
package udpserveroperations;
import java.io.*;
import java.net.*;
import java.math.*;
public class UdpServerOperations { public
    static void main (String args []){ try {
        System.out.print("Server is running..."); DatagramSocket ds
        = new DatagramSocket(2000);
```

```
        byte b[]=new byte[1024];
        DatagramPacket dp = new DatagramPacket(b,b.length); ds.receive(dp);
        String str=new String (dp.getData(),0,dp.getLength());
        System.out.println(str);
        int a =Integer.parseInt(str);
        String s= new String();
        s="The Square: "+ a*a+" \nSquare _Root: "+Math.sqrt(a)
+"\nCube:"+a*a*a+"\nCube_Root: "+Math.cbrt(a);
        byte b1[]= new byte[1024];
        b1=s.getBytes(); DatagramPacket
        dp1= new
DatagramPacket(b1,b1.length,InetAddress.getLocalHost(),1000); ds.send(dp1);
    }
    catch (Exception  e){
     e.printStackTrace();
    }
    }
}
```

Client code:

```
package udpclientoperations;
import java.io.*;
import java.net.*;
public class UdpClientOperations { public
    static void main (String args[]){
        try {
            System.out.println("Client is running...");
            BufferedReader br = new BufferedReader (new InputStreamReader(System.in));
            System.out.println("Enter Number :");
            String num= br.readLine(); byte
            b[]= new byte[1024];
            b=num.getBytes();
            DatagramSocket  ds= new DatagramSocket (1000); DatagramPacket dp
            = new
DatagramPacket(b,b.length,InetAddress.getLocalHost(),2000); ds.send(dp);
            byte b1[]= new byte[1024];
            DatagramPacket dp1= new DatagramPacket(b1,b1.length);
            ds.receive(dp1);
            String r= new String (dp1.getData(),0,dp1.getLength());
            System.out.println(r);
        }
```

```
        catch (Exception e){ e.printStackTrace();
        }
    }
}
```

OUTPUT:

```
Client is running...
Enter Number :
8
The Square: 64
Square _Root: 2.8284271247461903
Cube:512
Cube_Root: 2.0
BUILD SUCCESSFUL (total time: 2 seconds)
```

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