# Program 1:

Write a program to find the sum, difference, product, quotient and remainder of two numbers passed as command line argument.

```java
import java.util.Scanner;
class Arithmetic
{
public static void main(String args[])
{
int first,second,add,subtract,multiply,remainder;
float devide;
Scanner sc=new Scanner(System.in);
first=Integer.parseInt(args[0]);
second=Integer.parseInt(args[1]);
add=first+second;
subtract=first-second;
multiply=first*second;
devide=(float)first/second;
remainder=first%second;
System.out.println("Sum="+add);
System.out.println("Difference="+subtract);
System.out.println("Product="+multiply);
System.out.println("Result="+devide);
System.out.println("Remainder="+remainder);
}
}
```

## Program 2:

Given the sides of a triangle, write a program to check whether the triangle is equilateral, isosceles or scalene and find its area.

```java
import java.util.*; import
java.lang.Math;
class Traingle
{
public static void main(String args[])
{
Scanner sc=new Scanner(System.in);
int a,b,c;
double area,s,val;
System.out.println("Enter 3 sides:");
a=sc.nextInt();
b=sc.nextInt();
c=sc.nextInt();
if(a<b+c && b<a+c && c<a+b)
{
if(a==b && b==c)
System.out.println("Equilateral triangle");
else if(a==b || b==c || c==a)
System.out.println("Isosceles triangle");
else
System.out.println("Scalene triangle");
s=(a+b+c)/2;
val=s*(s-a)*(s-b)*(s-c);
area=Math.sqrt(val);
```

```
System.out.println("Area of the triangle is:"+area);
}

System.out,println(" Can not form a triangle");
}
 }
```

## Program 3:

Read an array of 10 or more numbers and write a program to find the a)
Smallest element in the array
b) Largest element in the array
c) Second largest element in the array

```java
import java.util.*;
public class Array
{
public static void main(String args[])
{
int a;
int arr[]={55,10,8,90,43,87,95,25,50,12};
System.out.println("Array=" + Arrays.toString(arr));
 int count=arr.length;
for(int i=0;i<count;i++)
{
for(int j=i+1;j<count;j++)
{
if(arr[i]>arr[j])
{
```

```
 a=arr[i];
arr[i]=arr[j];
arr[j]=a;
 }
 }
 }
      System.out.println("Sorted Array= " + Arrays.toString(arr));
      System.out.println("Smallest" + arr[0]);
      System.out.println("Largest" + arr[count - 1]);
      System.out.println("Second largest" + arr[count - 2]);
    }
  }
```

## Program 4:

Write a program to perform base conversion a)

Integer to binary

b) Integer to Octal
c) Integer to Hexadecimal

```
import java.util.Scanner ;

class Convert
{
Scanner sc;
int num;
void getVal()
{
```

```java
System.out.println("""Decimal to Hexa Decimal, Octal and Binary);

sc=new Scanner(System.in);

System.out.println("Enter the Number");

num=Integer.parseInt(sc.nextLine());

}
void convert()

{

String hx=Integer.toHexString(num);

System.out.println("HexaDecimal Value is" + hx);

String oc=Integer.toOctalString(num);

System.out.println("Octal value is" + oc);

String bin=Integer.toBinaryString(num);

System.out.println("Binary value is" + bin);

}

}


class Decimal

{

public static void main(String args[])

{

Convert c=new Convert();

c.getVal();
```

```java
       c.convert();
   }
 }
```

## Program 5:

 Write a program to merge two arrays.

```java
import java.util.Scanner;
public class Merge
{
public static void main(String args[])
{
int n1,n2,k;
int c[]=new int[50];
Scanner sc=new Scanner(System.in);
System.out.println("Enter number of elements in first array");
n1=sc.nextInt();
int a[]=new int[n1];
System.out.println("Enter the first array elements");
for(int i=0;i<n1;i++)
```

```java
{
a[i]=sc.nextInt();
c[i]=a[i];
}
 k=n1;
System.out.pr
intln("Enter
number of
elements in
second
array");
 int b[]=new
int[n2];
System.out.println("Enter the second array elements");
for(int i=0;i<n2;i++)
{
b[i]=sc.nextInt();
c[k]=b[i];
k++;
}
 System.out.println("First array");
for(int i=0;i<n1;i++)
```

```java
{
System.out.print(" " +a[i]);
}
System.out.println("Second array");
for(int i=0;i<n2;i++)
{
System.out.print(" " +b[i]);
}
System.out.println("Merged array");
for(int i=0;i<k;i++)
{
System.out.print(" " +c[i]);
}
}
}
```

## Program 6:

Java Programming Code to Find HCF LCM of Two Numbers.

```java
 import java.util.Scanner;
public class HcfLcm
```

```java
{
public static void main(String args[])
    {
  Int temp1,temp2,num1,num2,temp,hcf,lcm;
   Scanner sc=new Scanner(System.in);
   System.out.println("EnterFirstNumber");
   num1=sc.nextInt();
   System.out.println("Enter Second Number");
num2=sc.nextInt();
sc.close();
 temp1=num1;
temp2=num2;
while(temp2!=0)
      {
 temp=temp2;
 temp2=temp1%temp2;
 temp1=temp;
      }
 hcf=temp1;
lcm=(num1*num2)/hcf;
    System.out.println("HCF = " +hcf);
    System.out.println("LCM = " +lcm);
```

```
    }
}
```

## Program 7:

Write a program to find the trace and transpose of a matrix.

```java
import java.util.Scanner;
class TMT
{
public static void main(String args[])
{
int row,col,i,j,sum=0;
Scanner sc=new Scanner(System.in);
System.out.println("Enter Number of Rows");
row=sc.nextInt();
System.out.println("Enter Number of Columns");
col=sc.nextInt();
int mat1[][]=new int[50][50];
System.out.println("Enter elements");
for(i=0;i<row;i++)
{
for(j=0;j<col;j++)
```

```java
{
mat1[i][[j]=sc.nextInt();

}

}

System.out.println("Original Matrix");

for(i=0;i<row;i++)

{

for(j=0;j<col;j++)

{
System.out.print("  " +mat1[i][j]);

}

System.out.println();

}

System.out.println("Transpose of matrix");

for(i=0;i<col;i++)

{

for(j=0;j<row;j++)

{

System.out.print("  " +mat1[j][i]);

}

System.out.println();

}
```

```java
if(row==col)
{
for(i=0;i<row;i++)
{
for(j=0;j<col;j++)
{
if(i==j)
{
Sum=sum+mat1[i][j];
}
}
}
System.out.println("Trace = " +sum);
}       else
{
System.out.println("only Square matrix contains only trace");
}
}
}
```

## Program 8:

Write java program to find the sum of the digits and reverse of a given number using class and objects.

```java
import java.util.Scanner;
class SumRev
{
int rem,m,sum;
SumRev()
{
m=0;
sum=0;
rem=0;
}
void reverse(int n)
{
do
{
rem=n%10;
m=m*10+rem;
n=n/10;
}
while(n>0);
System.out.println("Reverse = " +m);
}
void digit(int n)
{
rem=0;
do
```

```java
{
rem=n%10;
sum=sum+rem;
n=n/10;
}
while(n>0);
System.out.println("Sum of digit = " +sum);
}
}

class Prgm12
{
public static void main(String args[])
{
Scanner sc=new Scanner(System.in);
System.out.println("Enter Number");
int num=sc.nextInt();
SumRev obj=new SumRev();
obj.reverse(num);
obj.digit(num);
}
}
```

**Program 9:**

Write a Java Programming Code to Check given string Anagram or Not. If the two strings are anagram to each other, then one string can be rearranged to form the other string. For Example: abc and cba are anagram.

```java
 import java.util.Scanner;

class Anagram
```

```java
{
public static void main(String args[])
{
String str1,str2;
int len,len1,len2,i,j,flag=0;
Scanner scan=new Scanner(System.in);
System.out.println("Enter first string:");
str1=scan.nextLine();
System.out.println("Enter second string:");
str2=scan.nextLine();
len1=str1.length();
 len2=str2.length();
if(len1==len2)
{
len=len1;
for(i=0;i<len;i++)
{
flag=0;
for(j=0;j<len;j++)
{
if(str1.charAt(i)==str2.charAt(j))
```

```java
{
flag=1;
break;
}
}
if(flag==0)
 {
break;
 }
}
if(flag==0)
        {
        System.out.println("Strings  are  not  anagram  to  each  other");
}
 else
 {
    System.out.println("Strings are anagram");
   }
}
else
 {
```

```
        System.out.println("Both Strings must have the same no of
characters to be anagram");
        }
    }
  }
```

## **Program 10:**

Write a Java Program to remove all vowels from a string.

```
import java.util.Scanner;
public clas VowelsRemove
{
Public static void main(String args[])
{
String str1,str2;
Scanner sc=new Scanner(System.in);
System.out.println("Enter a String");
str1=sc.nextLine();
str2=str1.replaceAll("[aeiouAEIOU]"," ");
System.out.println("All vowels removed successfully);
System.out.println(str2);
}
}
```

# Program 11:

Create a class Student to read and display the student details. Create another class mark inherit from student to read marks of 5 subjects and find total and average. Write a Java program to display the result of a student.

```java
import java.util.Scanner;

class Student
{
int admno;
Scanner sc;
Student()
{
sc = new Scanner(System.in);
}
void read()
{
System.out.println("Enter Admno:");
admno = sc.nextInt();
}
void display()
{
System.out.print(admno + "\t");
}
}
```

```java
class Mark extends Student
{
intmark[];
int total;
int avg;
int i;
String result;
Mark()
{
super();
mark = new int[5];
total = 0;
avg = 0;
}
void read()
{
super.read();
System.out.println("Enter 5 subject marks....");
for (i = 0; i < 5; i++)
{
System.out.println("Enter subject[" + (i + 1) + "]:");
mark[i] = sc.nextInt();
}
}
void calculate()
{
for (i = 0; i < 5; i++)
{
total = total + mark[i];
}
  avg = total / 5;
```

```java
if (total >= 175)
{
result ="PASSED";
}
 else
{
result = "FAILED";
}
}
void display()
{
super.display();
System.out.println("\t" + result);
}
}

class P11
{
public static void main(String[] args)
{
Mark m[];
int j = 0;
int n;
Scanner sc = new Scanner(System.in);
System.out.println("Enter Number of Students:");
n = sc.nextInt();
m = new Mark[n];
for (j = 0; j < n; j++)
{
m[j] = new Mark();
```

```
System.out.println("Enter [" + (j + 1) + "] Student details.....");
m[j].read();
m[j].calculate();
 }
System.out.println("Student Details");
System.out.println("Admno\tResult");
for (j = 0; j < n; j++)
{
m[j].display();
}
}
}
```

## Program 12:

Using class and objects, write a java program to find the sum of two complex numbers(Hint: Use object as parameter to function).

```
import java.util.*;
class Complex
{
int real,imaginary;
Complex()
{
}
Complex(int tempReal,int tempImaginary)
{
real=tempReal;
imaginary=tempImaginary;
}
```

```java
Complex addComp(Complex c1,Complex c2)
{
Complex temp=new Complex();
temp.real=c1.real+c2.real;
temp.imaginary=c1.imaginary+c2.imaginary;
return temp;
}
}

public class Comp
{
public static void main(String args[])
{
Scanner sc=new Scanner(System.in);
System.out.println("Enter first real part number");
int a=sc.nextInt();
System.out.println("Enter first imaginary part number");
int b=sc.nextInt();
Complex c1=new Complex(a,b);
System.out.println("Enter second real part number");
int c=sc.nextInt();
System.out.println("Enter second imaginary part number");
int d=sc.nextInt();
Complex c2=new Complex(c,d);
System.out.println("Complex number 1" +c1.real+ "+" +c1.imaginary+ "i");
System.out.println("Complex number 2" +c2.real+ "+" +c2.imaginary+ "i");
Complex c3=new Complex();
c3=c3.addComp(c1,c2);
System.out.println("Sum of Complex Number" +c3.real+ "+" +c3.imaginary + "i");
} }
```

# Program 13:

Write a program to count and display total number of objects created to a class (Hint:static members).

```
public class NumObj
 {
   static int count=0;
   NumObj()
    {
     count++;
    }
   public static void main(String args[])
    {
     NumObj obj1=new NumObj();
     NumObj obj2=new NumObj();
     NumObj obj3=new NumObj();
     NumObj obj4=new NumObj();
     System.out.println("Number of Objetcs Created" + count);
    }
 }
```

# Program 14:

Write a java program to find the volume of cube, rectangular box, cylinder using function overloading.

```
import java.util.*;
 class Overload
```

```java
{
   double area(float l,float w,float b)
    {
      return l*w*h;
    }
   double area(float l)
    {
      return l*l*l;
    }
   double area(float r,float h)
    {
      return 3.14*r*r*r;
    }
 }

 class MathOver
  {
public static void main(String args[])
{
Overload ov=new Overload();
Scanner sc=new Scanner(System.in);
System.out.println("Enter the length, width and height of the rectangular box");
float l=sc.nextInt();
float w=sc.nextInt();
float h=sc.nextInt();
double rect=ov.area(l,w,h);
System.out.println("Volume of rectangular box " + rect);
System.out.println("Enter the edge length of Cube");
float e=sc.nextInt();
double cube=ov.area(e);
```

```java
System.out.println("Volume of Cube is " + cube);
System.out.println("Enter the radius and height of the Cylinder");
float r=sc.nextInt();
float hi=sc.nextInt();
double cyli=ov.area(r,hi);
System.out.println("Volume of Cylinder is " + cyli);
  }  }
```

## Program 15:

Create an abstract class shape and create TwoDim and ThreeDim as sub classes. Create classes square and triangle derived from TwoDim and sphere and cube derived from ThreeDim. Write a program to determinethe area of various shapes.

```java
 import java.util.Scanner;

abstract class Shape
  {
    final float pi = 3.14f;
abstract void area();
  }

 class TwoDim
  {
    Scanner sc;
     TwoDim()
      {
        sc = new Scanner(System.in);
      }
    void area()
    {
```

```java
        }
    }

    class ThreeDim extends Shape
    {
        int a;
        Scanner sc;
        ThreeDim()
        {
            sc = new Scanner(System.in);
        }
void area()
        {

        }
    }
    class Square extends TwoDim
    {
float area;
int a;
Square()
        {
super();
 a = 0;
 area = 0.0f;
        }
void read()
        {
            System.out.println("Enter side of a square: ");
            a = sc.nextInt();
        }
void area()
```

```java
  {
    area = a * a;
    System.out.println("Area of Square=" + area);
  }
}

 class Triangle extends TwoDim
  {
 float area;
int b;
int h;
Triangle()
  {
super();
b = 0;
h = 0;
area = 0.0f;
  }
 void read()
   {
    System.out.println("Enter breadth of a triangle: ");
b = sc.nextInt();
    System.out.println("Enter heigh of a triangle: ");
h = sc.nextInt();
   }
void area()
  {
    area = (b * h) / 2;
    System.out.println("Area of Triangle=" + area);
  }
}
```

```java
class Sphere extends ThreeDim
 {
float area;
int r;
Sphere()
    {
super();
r = 0;
area = 0.0f;
    }
void read()
    {
      System.out.println("Enter radius of sphere: ");
      r = sc.nextInt();
    }
void area()
{
    area = (4 * pi * r * r);
    System.out.println("Area of Sphere=" + area);
    }
 }

 class Cube extends ThreeDim
 {
 float area;
 int a;
Cube()
    {
super();
a=0;
```

```java
        area = 0.0f;
      }
    void read()
     {
      System.out.println("enter side of cube: ");
      a = sc.nextInt();
     }
   void area()
{
     area = 6 * a * a;
     System.out.println("Area of Cube= " + area);
    }
   }


 class P15
  {
   public static void main(String args[])
    {
    Square s = new Square();
    Triangle t = new Triangle();
    Sphere sp = new Sphere();
Cube c = new Cube();
s.read();
sp.read();
t.read();
c.read();
s.area();
t.area();
sp.area();
c.area();
   } }
```

# Program 16:

Create an interface volume with member variable pi and methods readdata
() and dispvolume (). Create two classes sphere and cylinder to implement
this interface. Write a Java program to find the volume.

```java
interface Volume
 {
double      pi=3.14;
void        readdata();
void dispvolume();
 }
 class Sphere implements Volume
 {
int r=0;
double vs=0;
   public void readdata()
   {
r=5;
   }
   public void dispvolume()
   {
     vs=(4*pi*r*r*r)/3;
     System.out.println("Volume of the Sphere:" +vs);
   }
 }

class Cylinder extends Sphere
 {
```

```java
int r=0,h=0;
double v;
   public void readdata()
    {
     super.readdata();
     r=6;
h=4;
    }
   public void dispvolume()
    {
     super.dispvolume();
      v=pi*r*r*h;
     System.out.println("Volume of the Cylinder:" +v);
    }
 }

public class Vol
 {
  public static void main(String args[])
   {
    Cylinder obj=new Cylinder();
    obj.readdata();
    obj.dispvolume();
   }
 }
```

## Program 17:

Write a multi thread java program for displaying odd numbers and even numbers up to a limit (Hint: Implement thread using Runnable interface).

```java
import java.io.*;
class Even implements Runnable
 {
   Thread even;
int       limit,i;
Even(int a)
     {
    even=new Thread(this,"Even");
limit=a;
even.start();
    }
  public void run()
   {
try
     {
       for(i=2;i<limit;i=i+2)
        {
          System.out.println(i);
          Thread.sleep(500);
        }
     }
    catch(Exception e)
     {
       System.out.println(e);
     }
   }
 }

 class Odd implements Runnable
 {
```

```java
    Thread odd;
Int limit,i;
    Odd(int b)
     {
       odd=new Thread(this,"Odd");
limit=b;
odd.start();
     }
    public void run()
     {
try
      {
        for(i=1;i<limit;i=i+2)
         {
           System.out.println("\t" + i);
           Thread.sleep(500);
         }
      }
     catch(Exception e)
      {
        System.out.println(e);
      }
    }
   }

  class MultiThread
   {
     public static void main(String args[]) throws IOException
      {
        int n1,n2;
        Scanner sc=new Scanner(System.in);
```

```java
        System.out.println("Enter limit of even numbers");
n1=sc.nextInt();
        System.out.println("Enter limit of odd numbers");
n2=sc.nextInt();
        Even en=new Even(n1);
Odd od=new Odd(n2);
        try
         {
           Thread.sleep(10000);
         }
        catch(Exception e)
         {
         System.out.println(e);
         }
       }
     }
```

## Program 18

Create a class Account to deposit and withdraw money from a bank. Create a user defined exception "MinBalExp" to be invoked when the withdrawal amount is greater than balance.

```java
 import java.util.*;

class Account
 {
  int accno, balance = 0, wd;
  Scanner sc;
  Account()
```

```java
{
  sc = new Scanner(System.in);
}
void deposit()
{
  System.out.println("Enter Amount to deposit:");
  int amount = sc.nextInt();
  balance = balance + amount;
}
void getbalance()
{
  System.out.println("Balance=" + balance);
}

void withDraw()
{
  System.out.println("Enter Amount to withdraw:");
wd = sc.nextInt();
try
  {
    if (balance < wd)
throw new MinBalExp();
    System.out.println("Collect amount");
  }
  catch (Exception e)
  {
   System.out.println(e);
  }
 }
}
```

```java
class MinBalExp extends Exception
 {
  MinBalExp()
  {
    System.out.println("Sorry, Your account has that much balance");
  }
}

class P18
 {
  public static void main(String args[])
  {
    Account a = new Account();
a.deposit();
    a.withDraw();
  }
}
```

## **Program 19**

Write an applet to display a rectangle with specified coordinate and colour passed as parameter from the HTML file.

Java Code:

```java
import java.applet.*; import
java.awt.*;
 public class Prgm19 extends Applet
  {
```

```java
int x;
int y;
int width;
int height;
Color col;
public void init()
    {
 x=Integer.parseInt(getParameter("x"));
y=Integer.parseInt(getParameter("y"));
width=Integer.parseInt(getParameter("width"));
height=Integer.parseInt(getParameter("height"));
col=new Color(Integer.parseInt(this.getParameter("c"),16));
    }
    public void paint(Graphics g)
    {
      g.setColor(col);
      g.drawRect(x,y,width,height);
    }
 }
```

HTML Code:

```html
<HTML>
 <BODY>
  <APPLET CODE="Prgm19.class" WIDTH=2000 HEIGHT=2000>
  <PARAM NAME="x" VALUE="10">
  <PARAM NAME="y" VALUE="20">
  <PARAM NAME="width" VALUE="500">
  <PARAM NAME="height" VALUE="300">
  <PARAM NAME="c" VALUE="FF0000">
 </APPLET>
 </BODY>
```

</HTML>

## Program 20

Create an AWT application to add, remove items in a list box.

Java Code:

```
import java.applet.*;
import java.awt.*; import
java.awt.event.*;
 public class Prgm20 extends Applet implements ActionListener
 {
   List l1;
   TextField t1;
   Button b1,b2;
   FlowLayout f1;
public void init()
    {
f1=new FlowLayout();
b1=new Button("ADD");
b2=new Button("REMOVE");
t1=new TextField(30);
l1=new List();
add(t1);
add(l1);
add(b1);
add(b2);
b1.addActionListener(this);
b2.addActionListener(this);
```

```
        }
    public void actionPerformed(ActionEvent e)
     {
       if(e.getSource()==b1)
        {
          String s=t1.getText();
          l1.add(s);
t1.setText("");
        }
       if(e.getSource()==b2)
        {
          int i=l1.getSelectedIndex();
l1.remove(i);
        }
     }
 }
```

HTML Code:

```
<HTML>
 <BODY>
  <APPLET CODE="Prgm20.class" WIDTH=800 HEIGHT=500>
  </APPLET>
 </BODY>
</HTML>
```

**Program 21**

Create a database table employee (id, name, design, and dept.) and insert some records. Write a Java program to list the employee details using JDBC.

```java
import java.sql.*;
import java.io.*;
public class Prgm21
  {
  public static void main(String args[])
  {
    Connection con=null;
    try
{

con=DriverManager.getConnection("jdbc:derby://localhost:1527/Emp","Hridya","123456");
      Statement st=con.createStatement();
      ResultSet rs=st.executeQuery("Select * from Employee");
      System.out.println("------------Employee Details---------------");
      System.out.println("\n");
      System.out.print("Eno          ");
      System.out.print("Name         ");
      System.out.print("Designation       ");
      System.out.print("Department      ");
      System.out.println("                -------------     -------------");
while(rs.next())
      {
        System.out.print(rs.getInt("id"));
        System.out.print("             ");
        System.out.print(rs.getString("name"));
        System.out.print("            ");
        System.out.print(rs.getString("design"));
```

```java
                System.out.print("              ");
                System.out.println(rs.getString("dept"));
            }
rs.close();
st.close();
con.close();
System.in.read();
        }
    catch(Exception e)
     {
       System.out.println(e.getMessage());
     }
   }
}
```