**Write a program to input 2 numbers from the user and display their addition,multiplication,Substraction ,and division.**

```
import java.util.Scanner;
public class ArithmeticOperations
{
    public static void main(String[] args)
     {
          Scanner scanner = new Scanner(System.in);

           System.out.print("Enter the first number: ");
            int num1 = scanner.nextInt();

           System.out.print("Enter the second number: ");
            int num2 = scanner.nextInt();

            int sum = num1 + num2;
            System.out.println("Sum of the numbers: " + sum);

            int product = num1 * num2;
            System.out.println("Product of the numbers: " + product);

            int difference = num1 - num2;
            System.out.println("Difference of the numbers: " + difference);

             float quotient = (float) num1 / num2;
             System.out.println("Quotient of the numbers: " + quotient);

        }
   }
```

**Output:**

Enter the first number**:** 45

Enter the second number**:** 25

Sum of the numbers: 70

Product of the numbers: 1125

Difference of the numbers: 20

Quotient of the numbers: 1.8

**Write a program to accept value of marks of 5 subjects and Calculated percentage and display it.**

```
import java.util.Scanner;
public class MarksPercentage
{
    public static void main(String[] args)
     {
          Scanner scanner = new Scanner(System.in);
          System.out.println("Enter marks of 5 subjects: ");

          int totalMarks = 0;
          for (int i = 0; i < 5; i++)
          {
               System.out.print("Enter marks for subject " + (i + 1) + ": ");

               int marks = scanner.nextInt();
               totalMarks += marks;
          }
             double percentage = (double) totalMarks / 500 * 100;
             System.out.println("Percentage: " + percentage);
    }
}
```

**Output**:

Enter marks of 5 subjects:

Enter marks for subject 1: 89

Enter marks for subject 2: 94

Enter marks for subject 3: 98

Enter marks for subject 4: 75

Enter marks for subject 5: 88

Percentage: 88.8

**Write a program to assign value of radius then calculate the area and perimeter of circle,area of triangle and area of rectangle by using method calling(use arithmetic promotion).**

```
import java.util.Scanner;
public class Area
{
                static double area_of_Triangle()
                {
                      Scanner sc = new Scanner(System.in);
                      System.out.println("Enter The Height of the Triangle = ");
                      double Height = sc.nextDouble();
                      System.out.println("Enter The Base of the Triangle = ");
                       double Base = sc.nextDouble();
                      double area_of_triangle = (Height*Base)/2;
                      return (area_of_triangle);
                }

               static double area_of_Rectangle()
                 {
                    System.out.println("Enter The one side of the Rectangle = ");
                    Scanner sc = new Scanner(System.in);
                    double Side_1 = sc.nextDouble();
                   System.out.println("Enter The second side of the Rectangle =");
                   double Side_2 = sc.nextDouble();
                   double area_of_Rectangle = Side_1*Side_2;
                   return (area_of_Rectangle);
                 }

                  static double area_of_Circle()
                   {
                          Scanner sc = new Scanner(System.in);
                          System.out.println("Enter The Radius of the Circle = ");
                          double Radius = sc.nextDouble();
                          double area_of_Circle = 3.142*Radius*Radius;
                          return (area_of_Circle);
                    }
                   static double area_of_Square()
                   {
                          Scanner sc = new Scanner(System.in);
                          System.out.println("Enter The Side of the Square = ");
                          double Side = sc.nextDouble();
                          double area_of_Square = Side*4;
```

```
        return (area_of_Square);
    }

    public static void main(String[] args)
    {
        System.out.println("The Area of Triangle is =
        "+Area.area_of_Triangle()+" sq.unit");
        System.out.println("");
        System.out.println("The Area of Rectangle is =
        "+Area.area_of_Rectangle()+" sq.unit");
        System.out.println("");
        System.out.println("The Area of Circle is =
        "+Area.area_of_Circle()+" sq.unit");
        System.out.println("");
        System.out.println("The Area of Square is =
        "+Area.area_of_Square()+" sq.unit");
    }

}
```

**Output**:

```
Enter The Height of the Triangle =
15
Enter The Base of the Triangle =
10
The Area of Triangle is = 75.0 sq.unit
Enter The one side of the Rectangle =
10
Enter The second side of the Rectangle =
20
The Area of Rectangle is = 200.0 sq.unit
Enter The Radius of the Circle =
15
The Area of Circle is = 706.9499999999999 sq.unit
Enter The Side of the Square =
4
The Area of Square is = 16.0 sq.unit
```

**Write a program to assign value of radius then calculate the area and perimeter of circle, area of triangle and area of rectangle by using method calling (use arithmetic promotion).**

```
import java.util.Scanner;
public class Perimeter
 {
          static double Perimeter_of_Triangle()
          {
                Scanner sc = new Scanner(System.in);
                System.out.println("Enter The side a of the Triangle = ");
                double side_a = sc.nextDouble();
                System.out.println("Enter The side b of the Triangle = ");
                double side_b = sc.nextDouble();
                System.out.println("Enter The side c of the Triangle = ");
                double side_c = sc.nextDouble();
                double perimeter_of_triangle = side_a+side_b+side_c;
                 return (perimeter_of_triangle);
          }
          static double Perimeter_of_Rectangle()
          {
                 System.out.println("Enter The Length of the Rectangle = ");
                 Scanner sc = new Scanner(System.in);
                 double length = sc.nextDouble();
                 System.out.println("Enter The Breadth of the Rectangle = ");
                 double breadth = sc.nextDouble();
                 double perimeter_of_Rectangle = 2*(length+breadth);
                 return (perimeter_of_Rectangle);
          }
          static double Perimeter_of_Circle()
          {
                 Scanner sc = new Scanner(System.in);
                 System.out.println("Enter The Radius of the Circle = ");
                 double Radius = sc.nextDouble();
                 double perimeter_of_Circle = 3.142*Radius*2;
                 return (perimeter_of_Circle);
          }
          static double Perimeter_of_Square()
          {
                Scanner sc = new Scanner(System.in);
                System.out.println("Enter The Side of the Square = ");
                double Side = sc.nextDouble();
                double perimeter_of_Square = Side*4;
```

```
            return (perimeter_of_Square);
        }
        public static void main(String[] args)
        {
            System.out.println("The Perimeter of Triangle is =
            "+Perimeter.Perimeter_of_Triangle()+" unit length");
            System.out.println("");
            System.out.println("The Perimeter of Rectangle is =
            "+Perimeter.Perimeter_of_Rectangle()+" unit length");
            System.out.println("");
            System.out.println("The Perimeter of Circle is =
            "+Perimeter.Perimeter_of_Circle()+" unit length");
            System.out.println("");
            System.out.println("The Perimeter of Square is =
            "+Perimeter.Perimeter_of_Square()+" unit length");
        }
}
```

**Output**:

```
Enter The side a of the Triangle =
1
Enter The side b of the Triangle =
2
Enter The side c of the Triangle =
3
The Perimeter of Triangle is = 6.0 unit length
Enter The Length of the Rectangle =
12
Enter The Breadth of the Rectangle =
16
The Perimeter of Rectangle is = 56.0 unit length
Enter The Radius of the Circle =
15
The Perimeter of Circle is = 94.25999999999999 unit length
Enter The Side of the Square =
15
The Perimeter of Square is = 60.0 unit length
```

**Write a program to perform mathematical operations by using different methods of Math class.**

```
import java.util.*;
public class Mathoperationui
{
        static int Max()
        {
                Scanner sc = new Scanner(System.in);
                System.out.println("Find The Maximum of Two Number”);
                System.out.println("Enter The Value Of a - ");
                int a = sc.nextInt();
                System.out.println("Enter The Value Of b - ");
                int b = sc.nextInt();
                return Math.max(a,b);
        }
        static int Min()
        {
                 Scanner sc = new Scanner(System.in);
                 System.out.println("Find The Minimum of Two  Number”);
                 System.out.println("Enter The Value Of a - ");
                 int a = sc.nextInt();
                 System.out.println("Enter The Value Of b - ");
                 int b = sc.nextInt();
                 return Math.min(a,b);
        }

        static int Roundup()
        {
                Scanner sc = new Scanner(System.in);
                System.out.println("Enter The Value to be Rounded - ");
                float a = sc.nextFloat();
                return Math.round(a);
        }
        public static void main(String[] args)
        {
                System.out.println("The max is = "+ Max());
                System.out.println("The min is = "+ Min());
                System.out.println("The Rounded Value is = "+ Roundup());
        }
 }
```

**Output**:

```
Find The Maximum of Two Numbers
Enter The Value Of a -
20
Enter The Value Of b -
40
The max is = 40
Find The Minimum of Two Numbers
Enter The Value Of a -
45
Enter The Value Of b -
5
The min is = 5
Enter The Value to be Rounded -
4.5
The Rounded Value is = 5
```

**Write a program to accept the string from the user to perform string related**
**operations by using different methods of String class.**

```
import java.util.*;
class Stringoperation
{
        public static void main(String[] args)
        {
                Scanner sc = new Scanner(System.in);
                System.out.println("Enter Your First Name:-");
                String str1 = sc.nextLine();
                System.out.println("Enter Your Last Name:- ");
                String str2 = sc.nextLine();
                // Concatenate two strings
                String str3 = str1 + " " + str2;
               System.out.println("The Concatenation of the string is: " + str3);
                // Get the length of a string
                int length = str1.length();
               System.out.println("The Length of the String is: " + length);
               // Find the index of a character in a string
                int index = str1.indexOf('A');
               System.out.println("A character is at index:- " + index);
              // Convert a string to uppercase
              String str4 = str3.toUpperCase();
              System.out.println("UpperCase of the string is:- " + str4);
              // Convert a string to lowercase
              String str5 = str3.toLowerCase();
             System.out.println("LowerCase of the string is:- " + str5);
             sc.close();
        }
 }
```

**Output**:

```
Enter Your First Name:-
Prasad
Enter Your Last Name:-
Kolte
The Concatenation of the string is: Prasad kolte
The Length of the String is: 6
A character is at index:- -1
UpperCase of the string is:- PRASAD KOLTE
LowerCase of the string is:- prasad Kolte
```

**1.Write a program to perform addition by changing the number of arguments using function overloading.**

**2.Write a program to perform multiplication by changing the data types using function overloading.**

```
public class MethodOverloading
{
	public static int sum(int a,int b)
	{
		int c = a + b;
		return c;
	 }
	 public static double sum(double a,double b,double c)
	{
		double d = a + b + c;
		return d;
	}
	public static int multiplication(int a,int b)
	{
		int c = a*b;
		return c;
	}
	public static double multiplication(double a,double b,double c)
	{
		double d = a*b*c;
		return d;
	 }
	 public static void main(String[] args)
	{
		System.out.print("\nThe Sum Of The Two Number is: " +
		MethodOverloading.sum(4, 6));
		System.out.print("\nThe Sum Of The Three Number is: " +
		MethodOverloading.sum(5, 10, 5));
		System.out.print("\nThe Multiplication Of The Two Number is :" +
		MethodOverloading.multiplication(5, 3));
		System.out.print("\nThe Multiplication Of The Three Number is: " +
		MethodOverloading.multiplication(5, 2, 10));
	 }
 }
```

**Output**:
The Sum Of The Two Number is: 10
The Sum Of The Three Number is :20.0
The Multiplication Of The Two Number is :15
The Multiplication Of The Three Number is: 100.0

**Write a program to declare class student having data member id and name, initialized it using default constructor for two object of class and display all records.**

```
public class StudentConstructor
 {
        int Roll_No;
        String name;
        float marks;
        StudentConstructor(int RN, String N, float M)
        {
            Roll_No = RN;
            name = N;
            marks = M;
        }
       void display()
       {
            System.out.print("\nRoll Number of the student is :- " + Roll_No);
            System.out.print("\nName of the student is :- " + name);
            System.out.print("\nMarks of the student is :- " + marks);
            System.out.print("\n");
       }
       public static void main(String[] args)
      {
          StudentConstructor s1 = new StudentConstructor(02,"Prasad",100);
          StudentConstructor s2 = new StudentConstructor(64,"kaustubh",99);
          StudentConstructor s3 = newStudentConstructor(02,"Sudarshan",100);
          s1.display();
          s2.display();
          s3.display();
       }
}
```

**Output**:

```
Roll Number of the student is :- 2
Name of the student is :- Prasad
Marks of the student is :- 100.0
Roll Number of the student is :- 64
Name of the student is :- Kaustubh
Marks of the student is :- 99.0
Roll Number of the student is :- 2
Name of the student is :- Sudarshan
Marks of the student is :- 100.0
```

**Write a program to declare class Book having data member id, name and price, initialized it using parameterized constructor for two object of class and displayall records.**

```
class Book
{
	int id;
	String name;
	double price;

	public Book(int id, String name, double price)
	{
		this.id = id;
		this.name = name;
		this.price = price;
	 }
	public void display()
	{
		System.out.println("Book ID: " + id);
		System.out.println("Book Name: " + name);
		System.out.println("Book Price: " + price);
	}
 }

public class BookRecords
{
	public static void main(String[] args)
	{
		Book book1 = new Book(101, "Engineering MathematicsIII",270);
		Book book2 = new Book(102, "Let us C", 300.75);
		book1.display();
		book2.display();
	}
}
```

**Output**:

Book ID: 502
Book Name: Engineering Mathematics III
Book Price: 270.
Book ID: 504
Book Name: Let us  C
Book Price: 370.75

**Write a program to accepts three numbers from user and find largest number.**

```
public class ControlStatement1
{
	public static void main(String[] args)
	{
		System.out.println("Enter The First Integer\na = ");
		Scanner sc = new Scanner(System.in);
		int a = sc.nextInt();
		System.out.println("Enter The Second Integer\nb = ");
		int b = sc.nextInt();
		System.out.println("Enter The Third Integer\nc = ");
		int c = sc.nextInt();
		sc.close();
		if(a>b)
		{
		  if(b>c)
		  {System.out.println(a + " Is The Largest Number");}
		  else {System.out.println(c + " Is The Largest Number");}
		}
		else
		{
		if(b>c)
		{
		    System.out.println(b + " Is The Largest Integer ");
		}
		else {
		    System.out.println(c + " Is The Largest Number");
		}
	  }
}
```

**Output:**

```
Enter The First Integer
a =10
Enter The Second Integer
b =30
Enter The Third Integer
c = 20
30 Is The Largest Integer
```

**Write a program to accept number from user and calculate factorial of given number.**

```
import java.util.*;
public class ControlStatement2
 {
      public static void main(String[] args)
      {
        System.out.println("Enter An Integer To Find The Factorial Of It.\na =  );
        Scanner sc = new Scanner(System.in);
        int a = sc.nextInt();
        sc.close();
        int fact = 1;
        int i;
        for(i=a;i>0;i--)
        {
              fact = fact*i;
        }
            System.out.println("The Factorial Is = " + fact);
      }
 }
```

**Output:**

```
Enter An Integer To Find The Factorial Of It.
a = 6
The Factorial Is = 720
```

**Write a program to accept number from user and check number is palindrome or not.**

```
import java.util.Scanner;
public class ControlStatement3
{
        public static void main(String[] args)
        {
           System.out.println("Enter An Integer To it is palindrome or Not.\na = ");
           Scanner sc = new Scanner(System.in);
          int a = sc.nextInt();
          sc.close();
          String original = String.valueOf(a);
          String rev = "";
         char ch ;
         for(int i=0; i<original.length(); i++)
         {
              ch= original.charAt(i);
              rev= ch+rev;
         }
           // System.out.println(original);
           // System.out.println(rev);
         if(original.equals(rev))
          {
                System.out.println("The Number Is Palindrome");
           }
        else
        {
                System.out.println("The number is not palindrome");
         }
     }
}
```

**Output:**

Enter An Integer To it is palindrome or Not.
a = 6556
The Number Is Palindrome

**Write a program to accept number from user and check number is Armstrong or not.**

```
public class ArmstrongNumber
{
        public static void main(String[] args)
        {
            int num,org_no,r,res=0;
            Scanner sc=new Scanner(System.in);
            System.out.println("Enter a Number to Check Armstrong ");
            num=sc.nextInt();
             org_no=num;
            while(org_no!=0)
            {
                 r=org_no%10;
                res+=Math.pow(r,3);
                org_no/=10;
            }
            if(res==num)
            {
                    System.out.println("It is Armstrong Number");
             }
            else
             {
                    System.out.println("It is not Armstrong Number");
             }
         }
}
```

**Output:**

```
Enter a Number to Check Armstrong
152
It is not Armstrong Number
```

**Write a program to accept number from user and check number is prime or not.**

```
import java.util.Scanner;
public class ControlStatement4
{
	public static void main(String[] args)
{
System.out.println("Enter An Integer To check Whether it is Prime or Not.\na =
");
Scanner sc = new Scanner(System.in);
int a = sc.nextInt();
sc.close();
int prime = 1;
for(int i = 2;i<a;i++)
{
if(a%i==0)
{
prime = 0;
break;
}
}
if(prime==0) {System.out.println("The Number Is Not Prime");}
else {System.out.println("The Number Is Prime");}
}
}
```

**Output:**

```
Enter An Integer To check Whether it is Prime or Not.
a = 71
The Number Is Prime
```

**Write a program to accept 'n' number from user to store in array and finds largest number in an array.**

```
import java.util.Scanner;
public class LargestNumber
{
        public static void main(String[] args)
        {
                Scanner scanner = new Scanner(System.in);
                System.out.print("Enter the number of elements: ");
                int n = scanner.nextInt();
                int[] arr = new int[n];
                System.out.println("Enter the elements:");
                for (int i = 0; i < n; i++)
                {
                   arr[i] = scanner.nextInt();
                 }
                 int max = arr[0];
               for (int i = 1; i < arr.length; i++)
               {
                     if (arr[i] > max)
                   {
                       max = arr[i];
                    }
                 }
                        System.out.println("The largest number is: " + max);
         }
}
```

**Output:**

```
Enter the number of elements: 5
Enter the elements:
45
150
165
20
80
The largest number is: 165
```

**Write a program accept 'n' number store in array and perform linear search.**

```
import java.util.Scanner;
public class LinearSearch
 {
        public static void main(String[] args)
        {
            Scanner scanner = new Scanner(System.in);
            // Get the number of elements in the array
           System.out.print("Enter the number of elements: \n");
           int n = scanner.nextInt();
           // Create an array of size n
           int[] arr = new int[n];
           // Read the array elements
            System.out.print("Enter the array elements: \n");
           for (int i = 0; i < n; i++)
            {
                  arr[i] = scanner.nextInt();
             }
             // Get the element to search for
             System.out.print("Enter the element to search for: ");
             int key = scanner.nextInt();
              // Perform linear search
            int index = linearSearch(arr, key);
            // Check if the element was found
            if (index != -1)
            {
                  System.out.println("Element found at index: " + index);
             }
            else
              {
                    System.out.println("Element not found.");
              }
    }

         public static int linearSearch(int[] arr, int key)
         {
              for (int i = 0; i < arr.length; i++)
              {
                     if (arr[i] == key)
                     {
                            return i;
```

```
                }
            }
            return -1;
        }
    }
```

**Output:**

```
Enter the number of elements:
5
Enter the array elements:
35
37
38
31
32
Enter the element to search for: 37
Element found at index: 1
```

**Write a program to accept 3x3 Matrix and calculate addition of two matrixes and display it.**

```
import java.util.*;
public class Matrix
 {
        public static void main(String[] args)
        {
           int A[][] =new int[3][3];
           int B[][] =new int[3][3];
           int C[][] =new int[3][3];
           Scanner SC = new Scanner(System.in);
           System.out.println("Enter The Elements Of Matrix A");
            for(int i=0; i<3;i++)
            {
                  for(int j=0; j<3;j++)
                  {
                      A[i][j] = SC.nextInt();
                   }
            }
             System.out.println("Enter The Elements Of Matrix B");
            for(int i=0; i<3;i++)
           {
               for(int j=0; j<3;j++)
               {
                    B[i][j] = SC.nextInt();
                }
           }
               System.out.println("Display Matrix A");
          for(int i=0; i<3;i++)
          {
               for(int j=0; j<3;j++)
               {
                    System.out.print(A[i][j] +" ");
                }
                      System.out.println();
          }
                 System.out.println("Display Matrix B");
                   for(int i=0; i<3;i++)
                   {
                         for(int j=0; j<3;j++)
                          {
                               System.out.print(B[i][j] +" ");
```

```
                    }
                        System.out.println();
                }
                    System.out.println("Addition of the matrix A and B:");
                for(int i=0;i<3 ; i++)
                {
                    for(int j=0;j<3;j++)
                    {
                        C[i][j]=A[i][j]+B[i][j];
                        System.out.print(C[i][j]+" ");
                    }
                    System.out.println();
                }
                    SC.close();
            }
}
```

**Output:**

```
Enter The Elements Of Matrix A
1
2
3
4
5
6
7
8
9
Enter The Elements Of Matrix B
9
8
7
6
5
4
3
2
1
Display Matrix A
1 2 3
4 5 6
7 8 9
Display Matrix B
```

9 8 7
6 5 4
3 2 1
Addition of the matrix A and B:
10 10 10
10 10 10
10 10 10

**Write a program to declare class Employee having data member emp_id, name and salary. Accept records for 5 employee and display that records whose salary is greater than 5000.**

```
import java.util.Scanner;
class Employee {
int employee_id;
String name;
double salary;
Employee(int id, String name, double salary) {
this.employee_id = id;
this.name = name;
this.salary = salary;
}
public void displayEmployeeDetails() {
System.out.println("Employee ID: " + employee_id);
System.out.println("Name: " + name);
System.out.println("Salary: " + salary);
System.out.println();
}
}
public class EmployeeRecords {
public static void main(String[] args) {
Scanner sc = new Scanner(System.in);
System.out.println("Enter employee records:");
for (int i = 0; i < 5; i++) {
System.out.println("Enter employee ID: ");
int id = sc.nextInt();
System.out.println("Enter employee name: ");
String name = sc.nextLine();
sc.nextLine();
System.out.println("Enter employee salary: ");
double salary = sc.nextDouble();
Employee employee = new Employee(id, name, salary);
if (employee.salary > 5000) {
employee.displayEmployeeDetails();
}
}
sc.close();
}
}
```

----------Output----------

```
Enter employee records:
```

Enter employee ID: 1
Enter employee name: Shubham
Enter employee salary: 1000
Enter employee ID: 2
Enter employee name: Nishikant
Enter employee salary: 2000
Enter employee ID: 3
Enter employee name: Prasad
Enter employee salary: 3500
Enter employee ID: 4
Enter employee name: Kausthub
Enter employee salary: 5000
Enter employee ID: 5
Enter employee name: Pavan
Enter employee salary: 7000
Employee ID: 5
Name: Pavan
Salary: 7000.0

**Write a program to declare class Product having data member id, name, price accepts records for 5 products and display all records and also display total price of products.**

```
import java.util.Scanner;
class Product
 {
      int productId;
     String productName;
     double price;
      public Product(int productId, String productName, double price)
     {
       this.productId = productId;
       this.productName = productName;
       this.price = price;
     }
 }
       public class ProductRecords
       {
          public static void main(String[] args)
        {
             Scanner input = new Scanner(System.in);
             Product[] products = new Product[5];
             double totalPrice = 0;
             System.out.println("Enter details for 5 products:");
             for (int i = 0; i < 5; i++)
        {
            System.out.println("Product " + (i + 1) + ":");
            System.out.print("Product ID: ");
            int productId = input.nextInt();
            input.nextLine(); // Consume the newline character
            System.out.print("Product Name: ");
            String productName = input.nextLine();
            System.out.print("Price: ");
           double price = input.nextDouble();
            products[i] = new Product(productId, productName, price);
           totalPrice += price;
        }
           System.out.println("All product records:");
           for (Product product : products)
           {
                System.out.println("Product ID: " + product.productId);
                System.out.println("Product Name: " + product.productName);
```

```
                System.out.println("Price: " + product.price +"RS");
                System.out.println();
            }
            System.out.println("Total Price of all products: " + totalPrice+"Rs");
        }
}
```

**Output:**

```
Enter details for 5 products:
Product 1:
Product ID: 2001
Product Name: abc
Price: 200
Product 2:
Product ID: 2022
Product Name: def
Price: 200
Product 3:
Product ID: 2003
Product Name: ghi
Price: 200
Product 4:
Product ID: 2023
Product Name: jkl
Price: 200
Product 5:
Product ID: 2005
Product Name: mno
Price: 200
All product records:
Product ID: 2001
Product Name: abc
Price: 200.0RS
Product ID: 2022
Product Name: def
Price: 200.0RS
Product ID: 2003
Product Name: ghi
Price: 200.0RS
Product ID: 2023
Product Name: jkl
Price: 200.0RS
Product ID: 2005
```

Product Name: mno
Price: 200.0RS
Total Price of all products: 1000.0Rs

**Write a program to implement following inheritance. Assume suitable methods.**
**Superclass**
**Class Name: Student**
**Member variables: Roll_no, Name**
**Subclass:**
**Class Name: Library**
**Member variables: Member_No**

```
class Student
{
       private int roll_no;
        private String name;
        public Student(int roll_no, String name)
        {
            this.roll_no = roll_no;
            this.name = name;
        }
          public int getRoll_no()
        {
            return roll_no;
        }
        public void setRoll_no(int roll_no)
        {
            this.roll_no = roll_no;
        }
          public String getName()
        {
          return name;
        }
             public void setName(String name)
         {
          this.name = name;
         }
}
   Class Library extends Student
  {
      private int member_no;
       public Library(int roll_no, String name, int member_no)
       {
```

```
        super(roll_no, name);
      this.member_no = member_no;
}
public int getMember_no()
{
return member_no;
}
    public void setMember_no(int member_no)
 {
       this.member_no = member_no;
  }
}
public class Inheritance1
{
        public static void main(String[] args)
        {
          Library student1 = new Library(02, "Prasad", 2004);
          System.out.println("Roll No: " + student1.getRoll_no());
          System.out.println("Name: " + student1.getName());
          System.out.println("Member No: " + student1.getMember_no());
}
}
```

**Output:**

Roll No: 2
Name: Prasad
Member No: 2004

**Write a program to implement following multilevel inheritance. Assume suitable**
**methods.**
**a. Class Name: Student**
**Member variables: Roll_no, Name**
**b. Class Name: Marks**
**Member variables: Marks1, Marks2,Total**
**c. Class Name: Result**
**Member variables: Percentage**

```
class Student {
int roll_no;
String name;
Student(int roll_no, String name) {
this.roll_no = roll_no;
this.name = name;
}
}
class Marks extends Student {
int marks1;
int marks2;
int total;
Marks(int roll_no, String name, int marks1, int marks2) {
super(roll_no, name);
this.marks1 = marks1;
this.marks2 = marks2;
this.total = marks1 + marks2;
}
}
class Result extends Marks {
double percentage;
Result(int roll_no, String name, int marks1, int marks2) {
super(roll_no, name, marks1, marks2);
this.percentage = (double) this.total / 200 * 100;
}
void display() {
System.out.println("Roll No: " + roll_no);
System.out.println("Name: " + name);
System.out.println("Marks1: " + marks1);
System.out.println("Marks2: " + marks2);
System.out.println("Total: " + total);
System.out.println("Percentage: " + percentage);
}
```

```
}
public class Inheritance2 {
public static void main(String[] args) {
Result s1 = new Result(2, "Sudarshan", 91, 92);
s1.display();
}
}
```

Output:
Roll No: 2
Name: Sudarshan
Marks1: 91
Marks2: 92
Total: 183
Percentage: 91.5

**Write a Java program to create a base class Bank with method with interest_rate ().**
**Create two subclasses SBI and ICICI. Override the interest_rate () method to find**
**out interest rate.**

```
class Bank {
public void interestRate() {
System.out.println("Base Bank Interest Rate: 5%");
}
}
class SBI extends Bank {
public void interestRate() {
System.out.println("SBI Interest Rate: 8%");
}
}
class ICICI extends Bank {
public void interestRate() {
System.out.println("ICICI Interest Rate: 7%");
}
}
public class IntrestRate {
public static void main(String[] args) {
Bank sbi = new SBI();
sbi.interestRate();
Bank icici = new ICICI();
icici.interestRate();
}
}
```

**Output:**

```
SBI Interest Rate: 8%
ICICI Interest Rate: 7%
```

**Write a program to declare class Shape then calculate Area of circle, Area of Triangle, Area of Rectangle and area of Square using Constructor overloading**

```
public class Shape
{
  private double radius, length, width, base, height;
  // Constructor for circle
  public Shape(double radius)
  {
    this.radius = radius;
  }
   // Constructor for rectangle
   public Shape(int length, int width)
   {
      this.length = length;
      this.width = width;
   }
     // Constructor for triangle
    public Shape(double base, double height)
    {
      this.base = base;
       this.height = height;
   }
// Constructor for square
public Shape(int side) {
this.length = side;
this.width = side;
}
// Method to calculate area of circle
public double calculateAreaCircle() {
return Math.PI * radius * radius;
}
// Method to calculate area of rectangle
public double calculateAreaRectangle() {
return length * width;
}
// Method to calculate area of triangle
public double calculateAreaTriangle() {
return 0.5 * base * height;
}
// Method to calculate area of square
public double calculateAreaSquare() {
```

```
return length * length;
}
public static void main(String[] args)
 {
     // Create objects for circle, rectangle, triangle, and square
     Shape circle = new Shape(5.0);
     Shape rectangle = new Shape(10, 5);
      Shape triangle = new Shape(6.0, 8.0);
      Shape square = new Shape(4);
      / / Calculate and display the area of each shape
     System.out.println("Area of circle: " + circle.calculateAreaCircle());
      System.out.println("Area of rectangle: " +
      rectangle.calculateAreaRectangle());
     System.out.println("Area of triangle: " +
     triangle.calculateAreaTriangle());
     System.out.println("Area of square: " + square.calculateAreaSquare());
  }
}
```

**Output:**

```
Area of circle: 78.53981633974483
Area of rectangle: 50.0
Area of triangle: 24.0
Area of square: 16.0
```

**Write a program to declare class Box with data member length, width, height, initialized three object using different constructors and calculate Volume of Box and display records.**

```
class Box {
// Data members
double length;
double width;
double height;
// Default constructor
Box() {
length = 0.0;
width = 0.0;
height = 0.0;
}
// Parameterized constructor
Box(double l, double w, double h) {
length = l;
width = w;
height = h;
}
// Method to calculate volume of the box
double volume() {
return length * width * height;
}
}
public class BoxDemo {
public static void main(String[] args) {
// Create three objects using different constructors
Box box1 = new Box(); // Default constructor
Box box2 = new Box(10.0, 20.0, 30.0); // Parameterized constructor
Box box3 = new Box(15.0, 25.0, 35.0); // Parameterized constructor
// Calculate and display volume of each box
System.out.println("Volume of Box1: " + box1.volume());
System.out.println("Volume of Box2: " + box2.volume());
System.out.println("Volume of Box3: " + box3.volume());
}
}
```

**Output:**

```
Volume of Box1: 0.0
Volume of Box2: 6000.0
Volume of Box3: 13125.0
```

```
class Student
{
  int rollno;
  String name;
  Student(int a,String b)
  {
   rollno=a;
   name=b;
  }
}
    interface Sports
    {
      final int sport_wt=5;
      void show();
    }
   class Result extends Student implements Sports
   {
    int mark1,mark2;
    double per;
    Result(int a,String b,int c,int d)
    {
      super(a,b);
      mark1=c;
      mark2=d;
    }
      void Calpercentage()
    {
        int Percentage = ((mark1+mark2)*100)/200;
        System.out.println("Percentage: "+Percentage);
}
public void show()
{
System.out.println("\nName: "+name);
System.out.println("Roll No: "+rollno);
System.out.println("Sports Weight: "+sport_wt);
}
}
class Interface1
{
public static void main(String[] args)
{
Result ob =new Result(02,"Prasad",90,91);
ob.show();
```

```
    ob.Calpercentage();
  }
}
```

**Output:**

Name: Prasad
Roll No: 2
Sports Weight: 45
Percentage: 91

```
import java.util.Scanner;
class Student
{
protected int rollNo;
protected String name;
void input()
{
Scanner sc=new Scanner(System.in);
System.out.println("Enter the Name :");
name=sc.next();
System.out.println("Enter the Roll no :");
rollNo=sc.nextInt();
}
void output()
{
System.out.println("\nName: " + name);
System.out.println("\nRoll No: " + rollNo);
}
}
interface Employee
{
double B_SALARY = 50000; // Base salary
double HDR = 10000; // House Rent Allowance
double DA = 8000; // Dearness Allowance
void show();
}
class Manager extends Student implements Employee
{
int M_id=2003;
double totalSalary;
void calculateSalary()
{
totalSalary = B_SALARY + HDR + DA;
}
public void show()
{
System.out.println("\nManager ID: " +M_id);
System.out.println("\nTotal Salary: " + totalSalary);
}
}
class interface2
{
public static void main(String[] args)
```

```
{
Manager m= new Manager();
m.input();
m.output();
m.calculateSalary();
m.show();
}
}
```

**Output:**

```
Enter the Name :
Prasad
Enter the Roll no :
02
Name: Prasad
Roll No: 2
Manager ID: 2004
Total Salary: 70000.0
```

**Write a program to create own exception (user defined exception) to accept no. from user and throw an exception if the number is not even.**

```
import java.util.Scanner;
public class Exception1 {
static void checkEvenOdd() {
int n;
Scanner s = new Scanner(System.in);
System.out.print("Enter the number you want to check:");
n = s.nextInt();
if (n% 2 == 0) {
throw new ArithmeticException("Even no");
}
else {
System.out.println("Odd no");
}
}
public static void main(String[] args) {
checkEvenOdd();
}
}
```

**Output:**

```
Enter the number you want to check:2
Exception in thread "main" java.lang.ArithmeticException: Even no
at EvenOddException.checkEvenOdd(EvenOddException.java:9)
at EvenOddException.main(EvenOddException.java:16)
Enter the number you want to check:25
Odd no
```

**Write a program to create own exception (user defined exception) to accept no. from user and throw an exception if the number is not prime**

```
import java.util.Scanner;
public class Exception2 {
static void checkAge() {
int age;
Scanner s = new Scanner(System.in);
System.out.print("Enter the number you want to check:");
age = s.nextInt();
if (age < 0) {
throw new ArithmeticException("Age cannot be Negative");
}
else {
System.out.println("Welcome");
}
}
public static void main(String[] args) {
checkAge();
}
}
```

**Output:**

```
Enter a number: -1
Number must be greater than 1
```

**Write a program to create own exception (user defined exception) to accept age from**
**user and throw an exception if the age is negative**.

```
import java.util.Scanner;
public class Exception2 {
static void checkAge() {
int age;
Scanner s = new Scanner(System.in);
System.out.print("Enter you'r age : ");
age = s.nextInt();
if (age < 0) {
throw new ArithmeticException("Age cannot be Negative");
}
else {
System.out.println("Welcome");
}
}
public static void main(String[] args) {
checkAge();
}
}
```

**Output:**

```
Enter you'r age : -1
Exception in thread "main" java.lang.ArithmeticException: Age cannot be
Negative
at Exception2.checkAge(Exception2.java:9)
at Exception2.main(Exception2.java:16
```

**Write a program to create own exception (user defined exception) to accept Stringfrom user and throw an exception if the string is not starting character‘s’.**

```
import java.util.Scanner;
class InvalidStringException extends Exception
{
      public InvalidStringException(String message)
     {
         super(message);
      }
}
       public class StringException
       {
          public static void main(String[] args)
          {
              Scanner scanner = new Scanner(System.in);
              System.out.print("Enter a string: ");
              String input = scanner.nextLine();
             if (!input.startsWith("s"))
             {
                try {
                        throw new InvalidStringException("String must start with
character
's'");
}            catch (InvalidStringException e)
    {
      System.out.println(e.getMessage());
    }
}
        else {
         System.out.println("String starts with character 's': " + input);
      }
  }
}
```

**Output:**

Enter a string: Aradhya
String must start with character 's’ \

**Write a program to create own exception (user defined exception) to accept Password from user and throw an "Authentication Failure" exception if the password is incorrect.**

```
import java.util.Scanner;
class AuthenticationFailure extends Exception
{
   public AuthenticationFailure(String message)
   {
    super(message);
   }
}
public class PasswordException
{
    public static void main(String[] args) throws AuthenticationFailure
    {
       Scanner scanner = new Scanner(System.in);
       System.out.print("Enter password: ");
       String password = scanner.nextLine();
     if (!password.equals("correctPassword"))
     {
       throw new AuthenticationFailure("Authentication failure");
     }
   System.out.println("Authentication successful.");
}
}
```

**Output:**

```
Enter password: Pass@123
Exception in thread "main" AuthenticationFailure: Authentication failure
at PasswordException.main(PasswordException.java:16)
```

**Write a java program that illustrates the following**
**i. Creation of simple package**
**ii. Accessing a package**
**iii. Implementing interfaces.**

a) Creation of simple package

```
package create;
public class Circle
{
   public int radius=4;
   public double calculateArea()
   {
    return 3.14 * radius * radius;
    }
}
```

b) Accessing a package

```
package access;
import create.*;
public class AreaOfCircle
{
   public static void main(String[] args)
  {
    Circle c = new Circle();
   double area = c.calculateArea();
  System.out.println("Area of the circle is: " + area);
   }
}
```

**Output:**
Area of the circle is: 50.24

**Write a javascript program to take input number from user calculate arithmetic operation such as addition subtraction, multiplication and division using button click event**

```
<!DOCTYPE html>
<html>
<body>
<script type="text/javascript"> function multiply(){
a=Number(document.my_cal.first.value);
b=Number(document.my_cal.second.value);
c=a*b;
document.my_cal.total.value=c; }
function addition(){
a=Number(document.my_cal.first.value);
b=Number(document.my_cal.second.value);
c=a+b;
document.my_cal.total.value=c; }
function subtraction()
{ a=Number(document.my_cal.first.value);
b=Number(document.my_cal.second.value);
c=a-b;
document.my_cal.total.value=c; }
function division()
{ a=Number(document.my_cal.first.value);
b=Number(document.my_cal.second.value);
c=a/b;
document.my_cal.total.value=c; }
</script> <!-- Opening a HTML Form. -->
<form name="my_cal">
<!-- Here user will enter 1st number. -->
Number 1: <input type="text" name="first">
<!-- Here user will enter 2nd number. -->
Number 2: <input type="text" name="second">
<br><br>
<input type="button" value="ADD" onclick="javascript:addition();">
<input type="button" value="SUB" onclick="javascript:subtraction();">
<input type="button" value="MUL" onclick="javascript:multiply();">
<input type="button" value="DIV" onclick="javascript:division();">
<br><br>
<!-- Here result will be displayed. -->
Get Result: <input type="text" name="total">
</body>
</html>
```

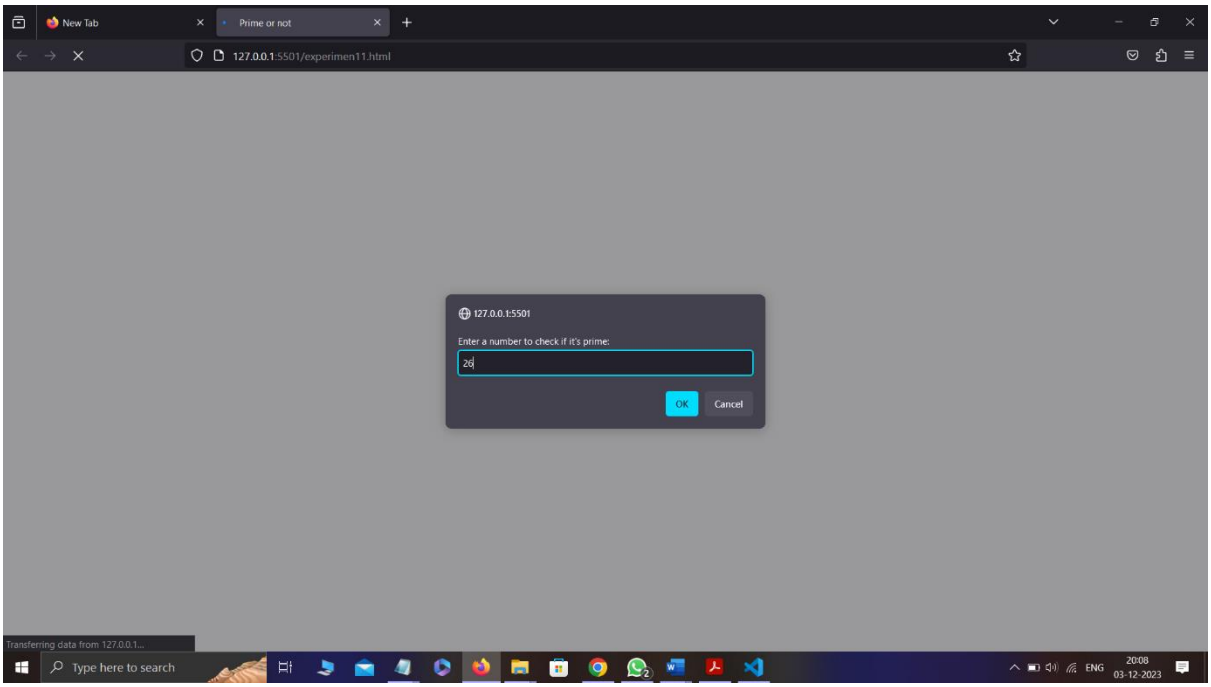
**Write a javascript program to take input from the user check the number is prime**
**or not.**

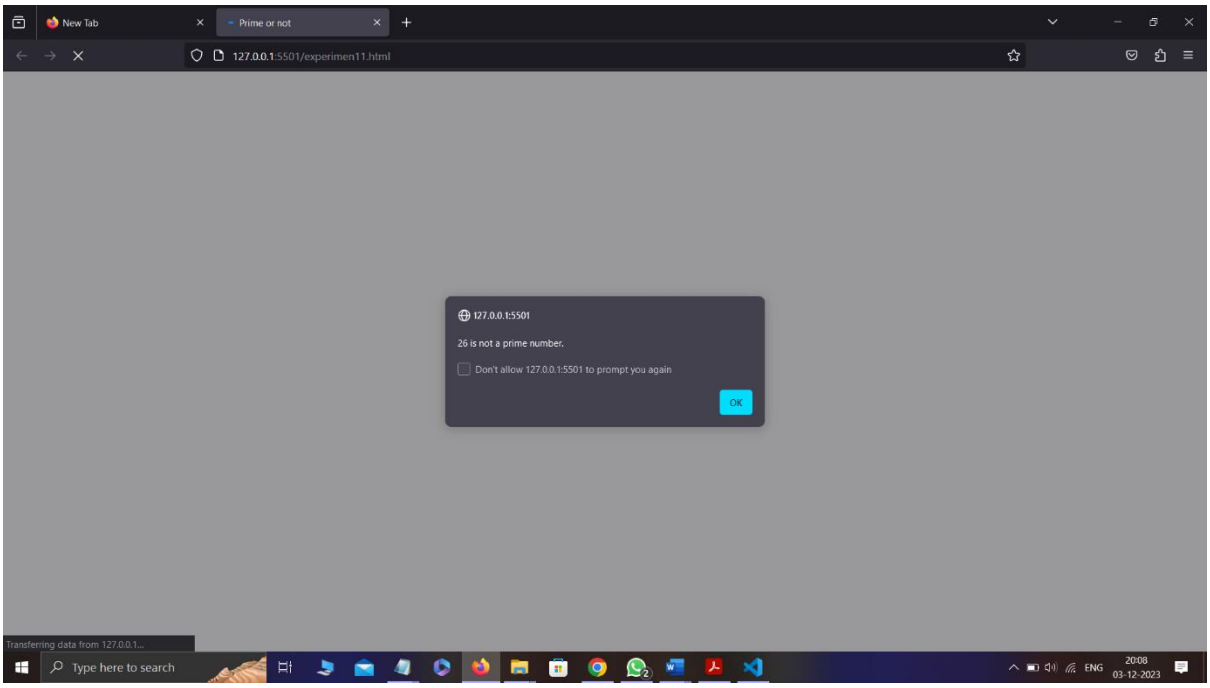
```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>Prime or not</title>
</head>
<body>
<script>
function checkPrime(num) {
if (num <= 1) {
return false;
}
for (let i = 2; i < num; i++) {
if (num % i === 0) {
return false;
}
}
return true;
}
// Get input from the user
let inputNum = parseInt(prompt("Enter a number to check if it's prime: "));
// Check if the number is prime
let isPrime = checkPrime(inputNum);
// Display the result
if (isPrime) {
alert(inputNum + " is a prime number.");
} else {
alert(inputNum + " is not a prime number.");
}
</script>
</body>
</html>
```

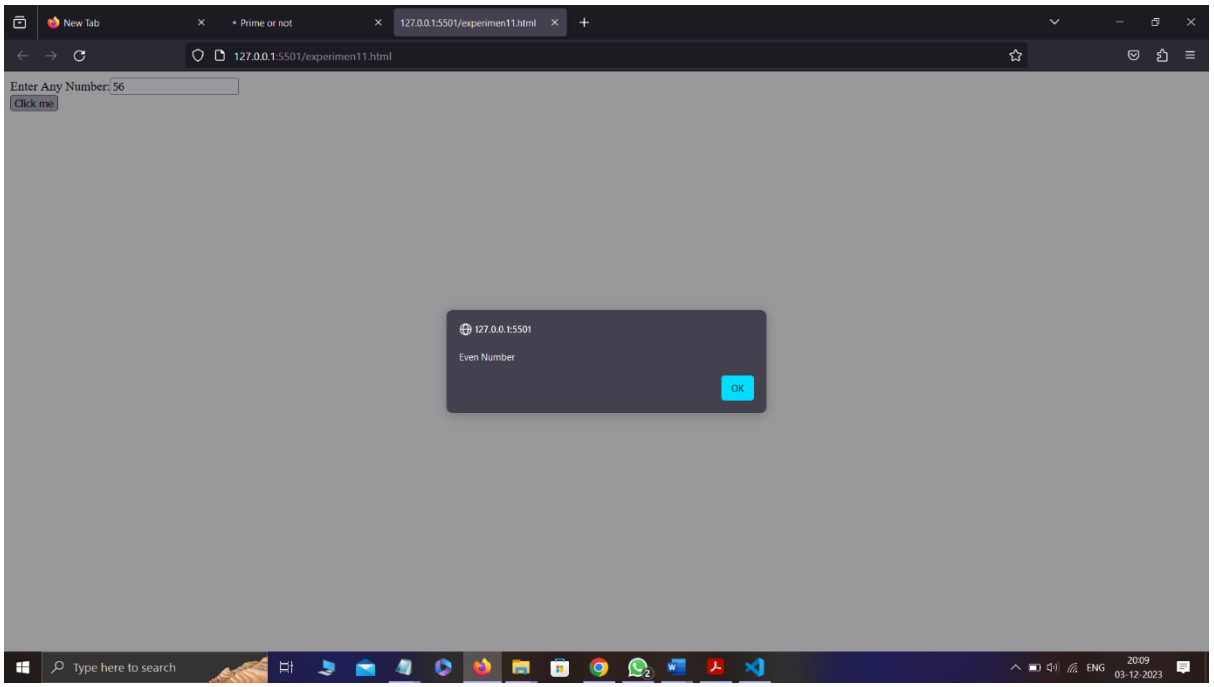
**Program on validation using object function in JavaScript**

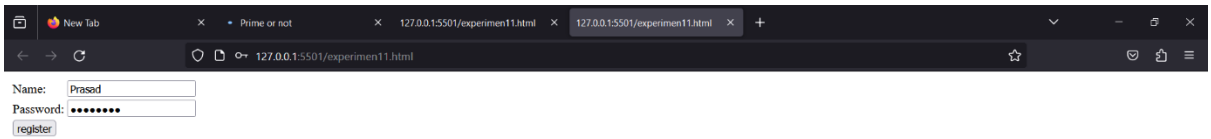
```
<html>
<body>
<script type="text/javascript">
function validate(){
var name=document.f1.name.value;
var passwordlength=document.f1.password.value.length;
var status=false;
if(name==""){
document.getElementById("namelocation").innerHTML=" <img
src='http://www.javatpoint.com/javascriptpages/images/unchecked.gif'/> Please
enter
your name";
status=false;
}else{
document.getElementById("namelocation").innerHTML=" <img
src='http://www.javatpoint.com/javascriptpages/images/checked.gif'/>";
status=true;
}
if(passwordlength<6){
document.getElementById("passwordlocation").innerHTML=
" <img src='http://www.javatpoint.com/javascriptpages/images/unchecked.gif'/>
Password must be greater than 6";
status=false;
}else{
document.getElementById("passwordlocation").innerHTML=" <img
src='http://www.javatpoint.com/javascriptpages/images/checked.gif'/>";
}
return status;
}
</script>
<form name="f1" action="http://www.javatpoint.com/javascriptpages/valid.jsp"
onsubmit="return validate()">
<table>
<tr><td>Name:</td><td><input type="text" name="name"/>
<span id="namelocation" style="color:red"></span></td></tr>
<tr><td>Password:</td><td><input type="password" name="password"/>
<span id="passwordlocation" style="color:red"></span></td></tr>
<tr><td colspan="2"><input type="submit" value="register"/> </td></tr>
</table>
</form>
```

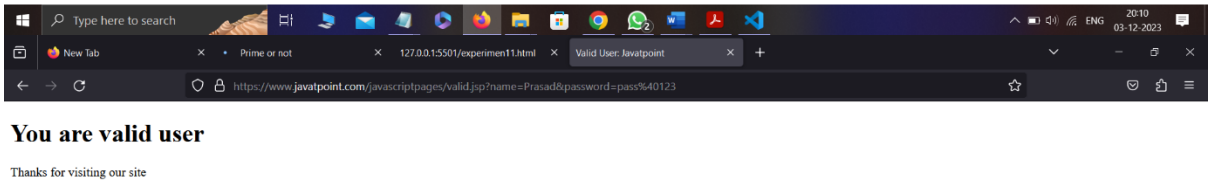
```
</body>
</html>
```


New Tab
Prime or not
127.0.0.1:5501/experimen11.html
127.0.0.1:5501
Enter a number to check if it's prime:
26
OK
Cancel
Transferring data from 127.0.0.1...
Type here to search
ENG
20:08
03-12-2023

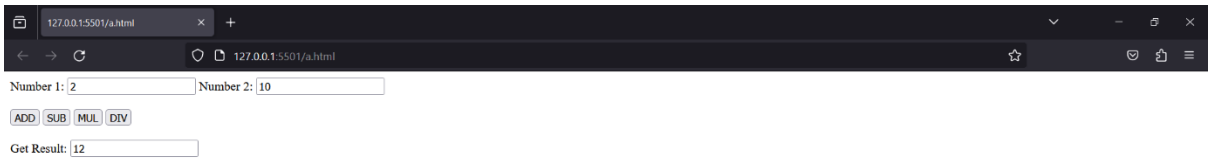

New Tab
Prime or not
127.0.0.1:5501/experimen11.html
127.0.0.1:5501
26 is not a prime number.
Don't allow 127.0.0.1:5501 to prompt you again
OK
Transferring data from 127.0.0.1...
Type here to search
ENG
20:08
03-12-2023

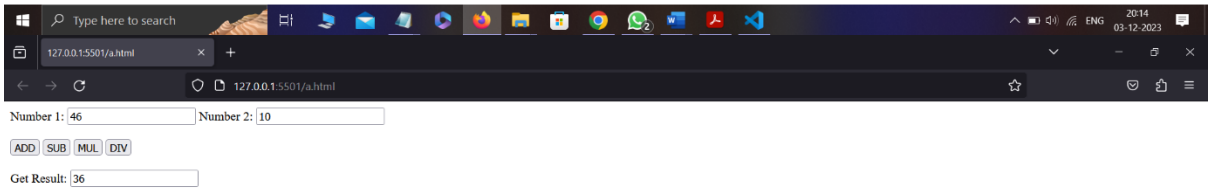

New Tab
Prime or not
127.0.0.1:5501/experimen11.html
127.0.0.1:5501/experimen11.html
Enter Any Number: 56
Click me
127.0.0.1:5501
Even Number
OK
Type here to search
ENG
20:09
03-12-2023


New Tab
Prime or not
127.0.0.1:5501/experimen11.html
127.0.0.1:5501/experimen11.html
127.0.0.1:5501/experimen11.html
Name: Prasad
Password: ••••••••
register

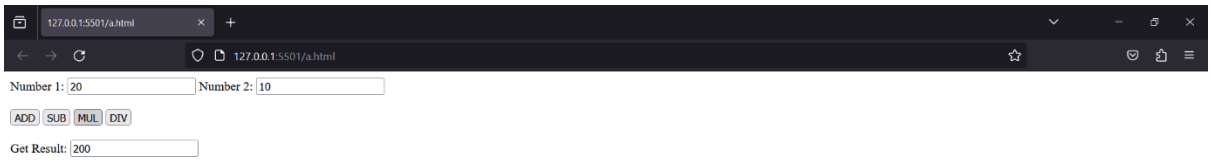

Type here to search
ENG
20:10
03-12-2023
New Tab
Prime or not
127.0.0.1:5501/experimen11.html
Valid User: Javatpoint
https://www.javatpoint.com/javascriptpages/valid.jsp?name=Prasad&password=pass%40123
You are valid user
Thanks for visiting our site

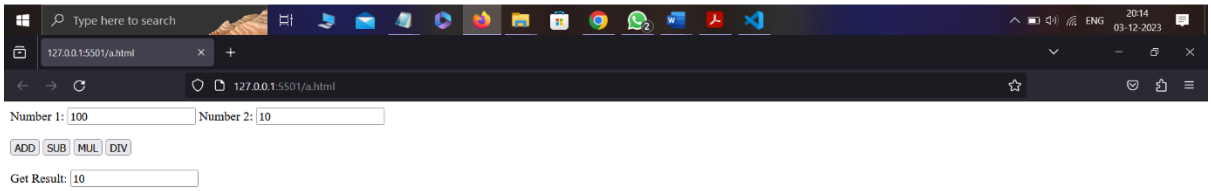

Type here to search
ENG
20:11
03-12-2023


127.0.0.1:5501/a.html
127.0.0.1:5501/a.html
Number 1: 2
Number 2: 10
ADD SUB MUL DIV
Get Result: 12


Type here to search
ENG
20:14
03-12-2023
127.0.0.1:5501/a.html
127.0.0.1:5501/a.html
Number 1: 46
Number 2: 10
ADD SUB MUL DIV
Get Result: 36


Type here to search
ENG
20:14
03-12-2023


127.0.0.1:5501/a.html
127.0.0.1:5501/a.html
Number 1: 20
Number 2: 10
ADD SUB MUL DIV
Get Result: 200


Type here to search
ENG
20:14
03-12-2023
127.0.0.1:5501/a.html
127.0.0.1:5501/a.html
Number 1: 100
Number 2: 10
ADD SUB MUL DIV
Get Result: 10


Type here to search
ENG
20:14
03-12-2023