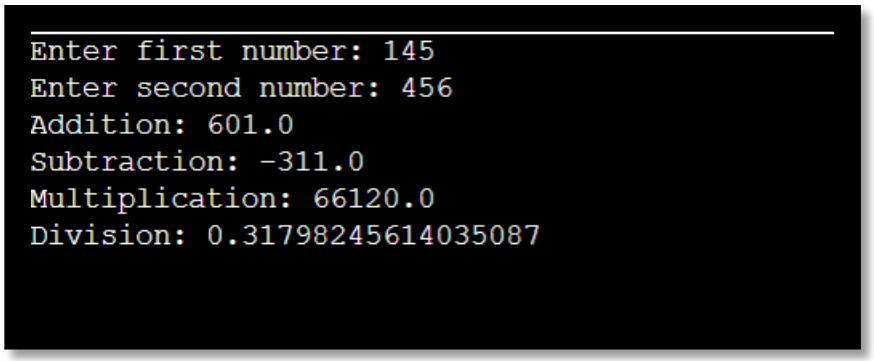
Experiment No. : 01

Write a program to input 2 numbers from the user and display their addition, multiplication, subtraction, 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 first number: ");
        double num1 = scanner.nextDouble();

        System.out.print("Enter second number: ");
        double num2 = scanner.nextDouble();

        double sum = num1 + num2;
        double difference = num1 - num2;
        double product = num1 * num2;

        // Check if num2 is not zero to avoid division by zero
        double division = num2 != 0 ? num1 / num2 : Double.POSITIVE_INFINITY;

        System.out.println("Addition: " + sum);
        System.out.println("Subtraction: " + difference);
        System.out.println("Multiplication: " + product);
        System.out.println("Division: " + division);

        scanner.close();
```

```
    }
}
```

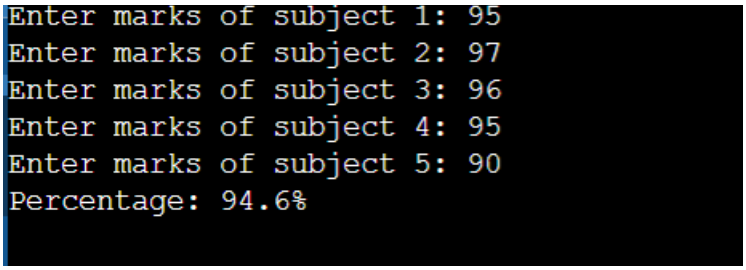
OUTPUT:


Enter first number: 145
Enter second number: 456
Addition: 601.0
Subtraction: -311.0
Multiplication: 66120.0
Division: 0.31798245614035087

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

```
import java.util.Scanner;

public class CalculatePercentage {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int totalSubjects = 5;
        int totalMarks = 500; // Assuming each subject is out of 100

        int sum = 0;
        for (int i = 1; i <= totalSubjects; i++) {
            System.out.print("Enter marks of subject " + i + ": ");
            int marks = scanner.nextInt();
            sum += marks;
        }

        double percentage = (sum * 100.0) / totalMarks;
        System.out.println("Percentage: " + percentage + "%");

        scanner.close();
    }
}
```

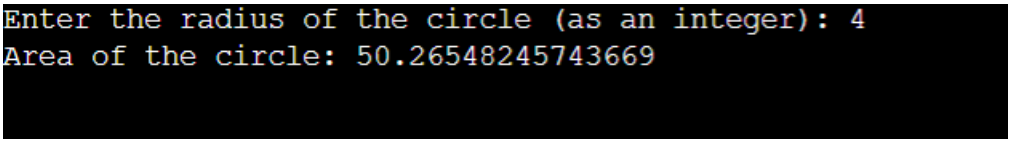
OUTPUT:



Write a program to assign value of radius then calculate the area of circle by using method calling (use arithmetic promotion).

```
import java.util.Scanner;

public class CircleArea {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the radius of the circle (as an integer): ");
        int radiusInt = scanner.nextInt(); // Taking radius as an integer for demonstration

        double area = calculateCircleArea(radius);
        System.out.println("Area of the circle: " + area);

        scanner.close();
    }

    public static double calculateCircleArea(double radius) {
        return Math.PI * radius * radius;
    }
}
```

OUTPUT:

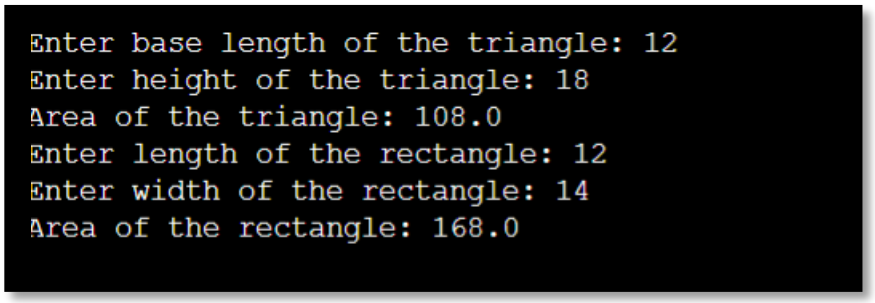


Write a program to calculate area of triangle and area of rectangle by using method calling.

```
import java.util.Scanner;


public class GeometryArea {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);


        System.out.print("Enter base length of the triangle: ");
        double base = scanner.nextDouble();
        System.out.print("Enter height of the triangle: ");
        double height = scanner.nextDouble();


        double triangleArea = calculateTriangleArea(base, height);
        System.out.println("Area of the triangle: " + triangleArea);


        System.out.print("Enter length of the rectangle: ");
        double length = scanner.nextDouble();
        System.out.print("Enter width of the rectangle: ");
        double width = scanner.nextDouble();


        double rectangleArea = calculateRectangleArea(length, width);
        System.out.println("Area of the rectangle: " + rectangleArea);


        scanner.close();
    }


    public static double calculateTriangleArea(double base, double height) {
```

```
        return 0.5 * base * height;
    }

    public static double calculateRectangleArea(double length, double width) {
        return length * width;
    }
}
```

OUTPUT:



Experiment No. : 02

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

```
import java.util.Scanner;

public class MathOperations {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.println("Enter a number: ");
        double number = scanner.nextDouble();

        double squareRoot = Math.sqrt(number);
        double absoluteValue = Math.abs(number);
        double powerOfTwo = Math.pow(number, 2);
        double randomValue = Math.random() * 100; // Random value between 0 and 100

        System.out.println("Square root: " + squareRoot);
        System.out.println("Absolute value: " + absoluteValue);
        System.out.println(number + " raised to the power of 2: " + powerOfTwo);
        System.out.println("Random value between 0 and 100: " + randomValue);

        scanner.close();
    }
}
```

OUTPUT:

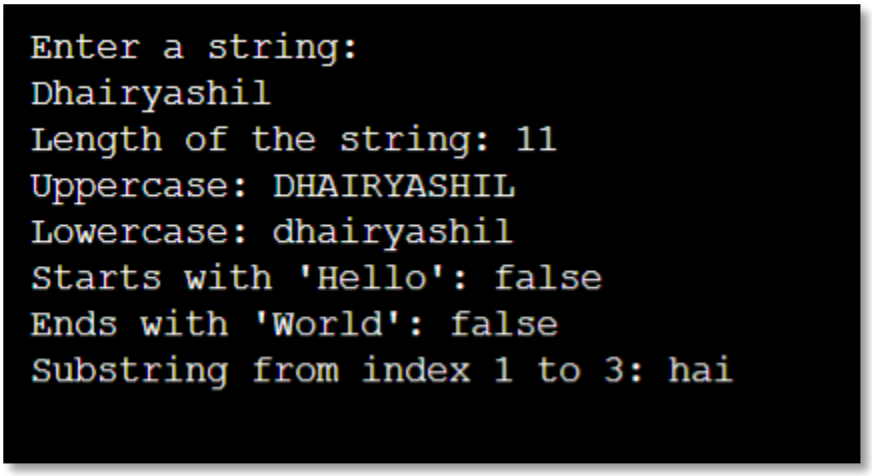
```
Enter a number:
2
Square root: 1.4142135623730951
Absolute value: 2.0
2.0 raised to the power of 2: 4.0
Random value between 0 and 100: 5.223716372012966
```

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.Scanner;
public class StringOperations {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.println("Enter a string: ");
        String userInput = scanner.nextLine();

        int length = userInput.length();
        String upperCase = userInput.toUpperCase();
        String lowerCase = userInput.toLowerCase();
        boolean startsWithHello = userInput.startsWith("Hello");
        boolean endsWithWorld = userInput.endsWith("World");
        String substring = userInput.substring(1, 4); // Substring from index 1 to 3

        System.out.println("Length of the string: " + length);
        System.out.println("Uppercase: " + upperCase);
        System.out.println("Lowercase: " + lowerCase);
        System.out.println("Starts with 'Hello': " + startsWithHello);
        System.out.println("Ends with 'World': " + endsWithWorld);
        System.out.println("Substring from index 1 to 3: " + substring);

        scanner.close();
    }
```

}

OUTPUT:


Enter a string:
Dhairyashil
Length of the string: 11
Uppercase: DHAIRYASHIL
Lowercase: dhairyashil
Starts with 'Hello': false
Ends with 'World': false
Substring from index 1 to 3: hai

Experiment No. : 03

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

```
public class Addition {
    public static void main(String[] args) {
        System.out.println("Addition with different number of arguments:");
        System.out.println("Sum of 2 and 3 is: " + add(2, 3));
        System.out.println("Sum of 2, 3, and 4 is: " + add(2, 3, 4));
        System.out.println("Sum of 2, 3, 4, and 5 is: " + add(2, 3, 4, 5));
    }

    public static int add(int a, int b) {
        return a + b;
    }
    public static int add(int a, int b, int c) {
        return a + b + c;
    }
    public static int add(int a, int b, int c, int d) {
        return a + b + c + d;
    }
}
```

OUTPUT:

```
Addition with different number of arguments:
Sum of 2 and 3 is: 5
Sum of 2, 3, and 4 is: 9
Sum of 2, 3, 4, and 5 is: 14
```

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

```
public class Multiplication {
    public static void main(String[] args) {
        System.out.println("Multiplication with different data types:");
        System.out.println("Product of 2 and 3 (integers): " + multiply(2, 3));
        System.out.println("Product of 2.5 and 3.5 (doubles): " + multiply(2.5, 3.5));
        System.out.println("Product of 2.5, 3, and 4 (mixed types): " + multiply(2.5, 3, 4));
    }

    public static int multiply(int a, int b) {
        return a * b;
    }
    public static double multiply(double a, double b) {
        return a * b;
    }
    public static double multiply(double a, int b, int c) {
        return a * b * c;
    }
}
```

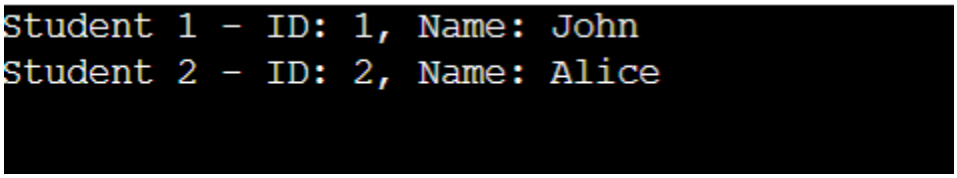
OUTPUT:

```
Multiplication with different data types:
Product of 2 and 3 (integers): 6
Product of 2.5 and 3.5 (doubles): 8.75
Product of 2.5, 3, and 4 (mixed types): 30.0
```

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 Student {
    private int id;
    private String name;

    public Student() {
        // Default constructor
    }

    public static void main(String[] args) {
        Student student1 = new Student();
        student1.id = 1;
        student1.name = "John";
        Student student2 = new Student();
        student2.id = 2;
        student2.name = "Alice";
        System.out.println("Student 1 - ID: " + student1.id + ", Name: " + student1.name);
        System.out.println("Student 2 - ID: " + student2.id + ", Name: " + student2.name);
    }
}
```

OUTPUT:



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 display all records.

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

    public Book(int id, String name, double price) {
        this.id = id;
        this.name = name;
        this.price = price;
    }
    public static void main(String[] args) {
        Book book1 = new Book(101, "Introduction to Java", 25.5);
        Book book2 = new Book(102, "Data Structures and Algorithms", 30.0);

        System.out.println("Book 1 - ID: " + book1.id + ", Name: " + book1.name + ", Price: $"
+ book1.price);
        System.out.println("Book 2 - ID: " + book2.id + ", Name: " + book2.name + ", Price: $"
+ book2.price);
    }
}
```

OUTPUT:

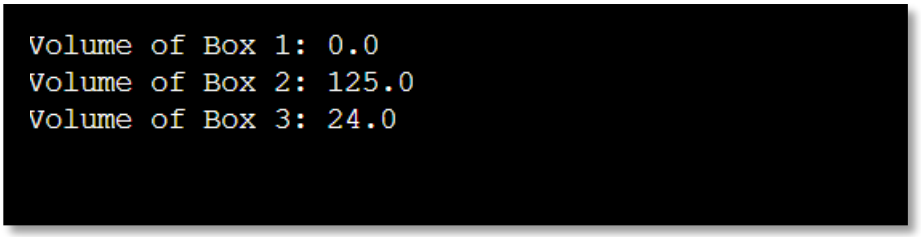
```
Book 1 - ID: 101, Name: Introduction to Java, Price: $25.5
Book 2 - ID: 102, Name: Data Structures and Algorithms, Price: $30.0
```

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.

```
public class Box {
    private double length;
    private double width;
    private double height;

    public Box() {
        // Default constructor
    }

    public Box(double side) {
        this.length = side;
        this.width = side;
        this.height = side;
    }

    public Box(double length, double width, double height) {
        this.length = length;
        this.width = width;
        this.height = height;
    }

    public double calculateVolume() {
        return length * width * height;
    }

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

```
        Box box1 = new Box();
        Box box2 = new Box(5.0);
        Box box3 = new Box(2.0, 3.0, 4.0);

        System.out.println("Volume of Box 1: " + box1.calculateVolume());
        System.out.println("Volume of Box 2: " + box2.calculateVolume());
        System.out.println("Volume of Box 3: " + box3.calculateVolume());
    }
}
```

OUTPUT:

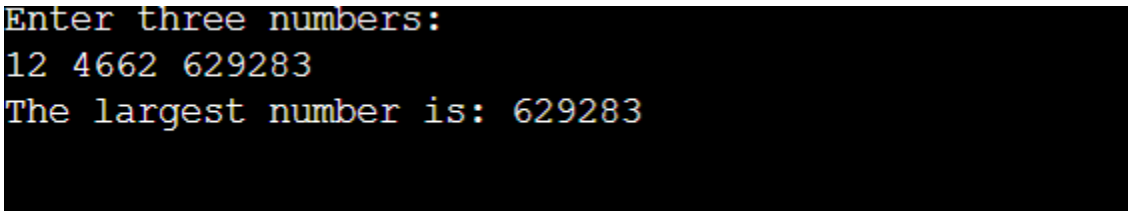


Experiment No. : 04

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

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

      System.out.println("Enter three numbers:");
      int num1 = scanner.nextInt();
      int num2 = scanner.nextInt();
      int num3 = scanner.nextInt();
      int largest = num1;
      if (num2 > largest) {
         largest = num2;
      }
      if (num3 > largest) {
         largest = num3;
      }

      System.out.println("The largest number is: " + largest);
      scanner.close();
   } }
```

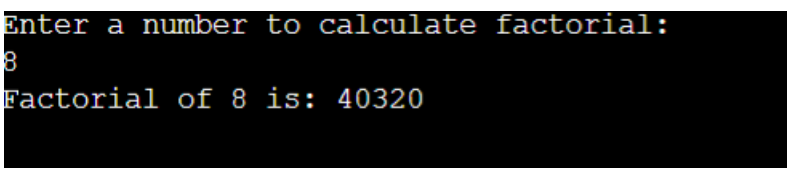
OUTPUT:



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

```
import java.util.Scanner;

public class Factorial {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.println("Enter a number to calculate factorial:");
        int number = scanner.nextInt();

        long factorial = 1;
        for (int i = 1; i <= number; i++) {
            factorial *= i;
        }

        System.out.println("Factorial of " + number + " is: " + factorial);

        scanner.close();
    }
}
```

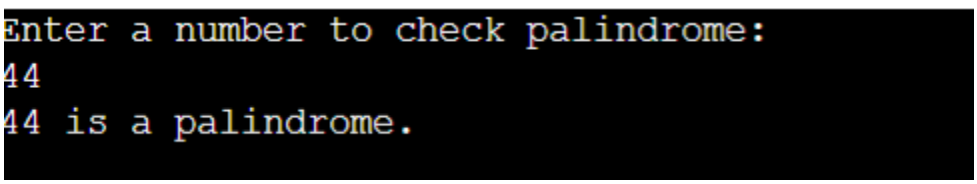
OUTPUT:



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

```
import java.util.Scanner;
public class PalindromeCheck {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter a number to check palindrome:");
        int number = scanner.nextInt();
        int original = number;
        int reversed = 0;
        while (number != 0) {
            int digit = number % 10;
            reversed = reversed * 10 + digit;
            number /= 10;
        }
        if (original == reversed) {
            System.out.println(original + " is a palindrome.");
        } else {
            System.out.println(original + " is not a palindrome.");
        }
        scanner.close();
    }
}
```

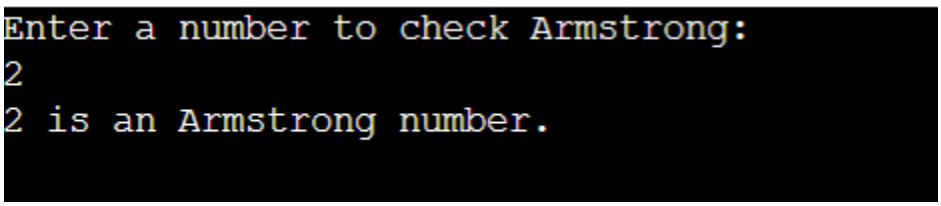
OUTPUT:



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

```
import java.util.Scanner;
public class ArmstrongCheck {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);
      System.out.println("Enter a number to check Armstrong:");
      int number = scanner.nextInt();
      int original = number;
      int digitCount = String.valueOf(number).length();
      int sum = 0;
      while (number != 0) {
         int digit = number % 10;
         sum += Math.pow(digit, digitCount);
         number /= 10;
      }
      if (original == sum) {
         System.out.println(original + " is an Armstrong number.");
      } else {
         System.out.println(original + " is not an Armstrong number."); }
      scanner.close();
   } }
```

OUTPUT:



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

```
import java.util.Scanner;
public class PrimeCheck {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);
      System.out.println("Enter a number to check prime:");
      int number = scanner.nextInt();
      boolean isPrime = true;
      if (number <= 1) {
         isPrime = false;
      } else {
         for (int i = 2; i <= Math.sqrt(number); i++) {
            if (number % i == 0) {
               isPrime = false;
               break;
            } } }
      if (isPrime) {
         System.out.println(number + " is a prime number.");
      } else {
         System.out.println(number + " is not a prime number.");
      }
      scanner.close();
   }
}
```

OUTPUT:

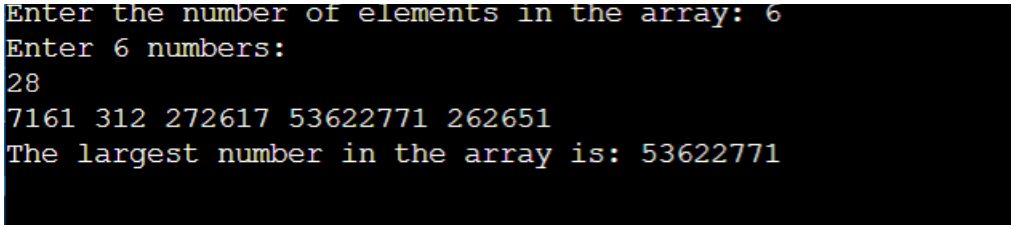
```
Enter a number to check prime:
3
3 is a prime number.
```

Experiment No. : 05

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 LargestNumberInArray {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number of elements in the array: ");
        int n = scanner.nextInt();
        int[] array = new int[n];
        System.out.println("Enter " + n + " numbers:");
        for (int i = 0; i < n; i++) {
            array[i] = scanner.nextInt();
        }
        int largest = array[0];
        for (int i = 1; i < n; i++) {
            if (array[i] > largest) {
                largest = array[i];
            }
        }
        System.out.println("The largest number in the array is: " + largest);
        scanner.close();
    }
}
```

OUTPUT:

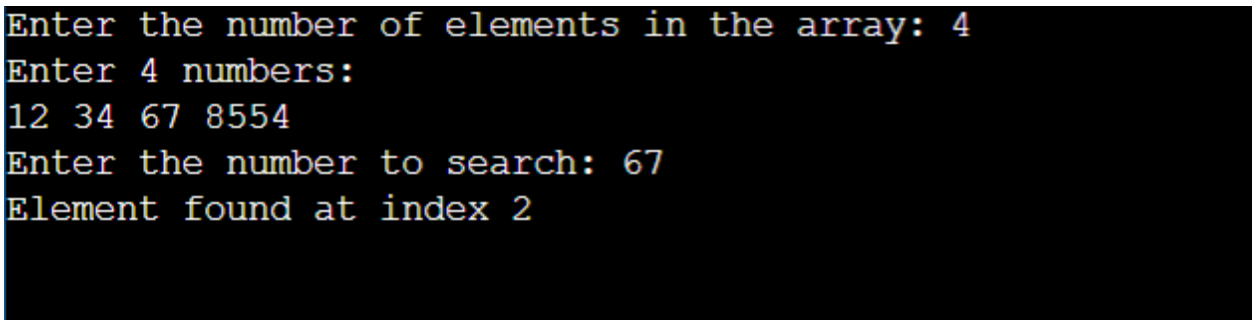


Write a program accept ‘n’ number store in array and perform linear search.

```
import java.util.Scanner;

public class LinearSearch {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the number of elements in the array: ");
        int n = scanner.nextInt();

        int[] array = new int[n];
        System.out.println("Enter " + n + " numbers:");
        for (int i = 0; i < n; i++) {
            array[i] = scanner.nextInt();
        }

        System.out.print("Enter the number to search: ");
        int searchElement = scanner.nextInt();

        int index = -1;
        for (int i = 0; i < n; i++) {
            if (array[i] == searchElement) {
                index = i;
                break;
            }
        }
        if (index != -1) {
            System.out.println("Element found at index " + index);
        } else {
```

```
            System.out.println("Element not found in the array.");
        }

        scanner.close();
    }
}
```

OUTPUT:

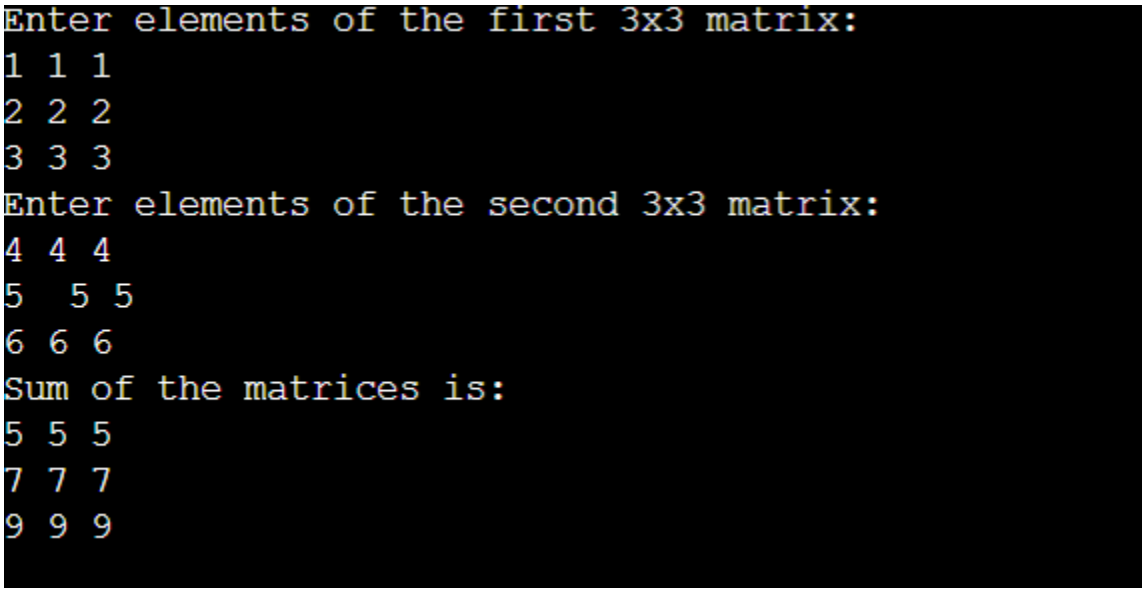


Write a program to accept 3x3 Matrix and calculate addition of two matrix and display it.

```
import java.util.Scanner;

public class MatrixAddition {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        int[][] matrix1 = new int[3][3];
        int[][] matrix2 = new int[3][3];
        int[][] sumMatrix = new int[3][3];

        System.out.println("Enter elements of the first 3x3 matrix:");
        for (int i = 0; i < 3; i++) {
            for (int j = 0; j < 3; j++) {
                matrix1[i][j] = scanner.nextInt();
            }
        }

        System.out.println("Enter elements of the second 3x3 matrix:");
        for (int i = 0; i < 3; i++) {
            for (int j = 0; j < 3; j++) {
                matrix2[i][j] = scanner.nextInt();
            }
        }

        // Adding matrices
        for (int i = 0; i < 3; i++) {
            for (int j = 0; j < 3; j++) {
                sumMatrix[i][j] = matrix1[i][j] + matrix2[i][j];
```

```
            }
        }

        System.out.println("Sum of the matrices is:");
        for (int i = 0; i < 3; i++) {
            for (int j = 0; j < 3; j++) {
                System.out.print(sumMatrix[i][j] + " ");
            }
            System.out.println();
        }

        scanner.close();
    }
}
```

OUTPUT:

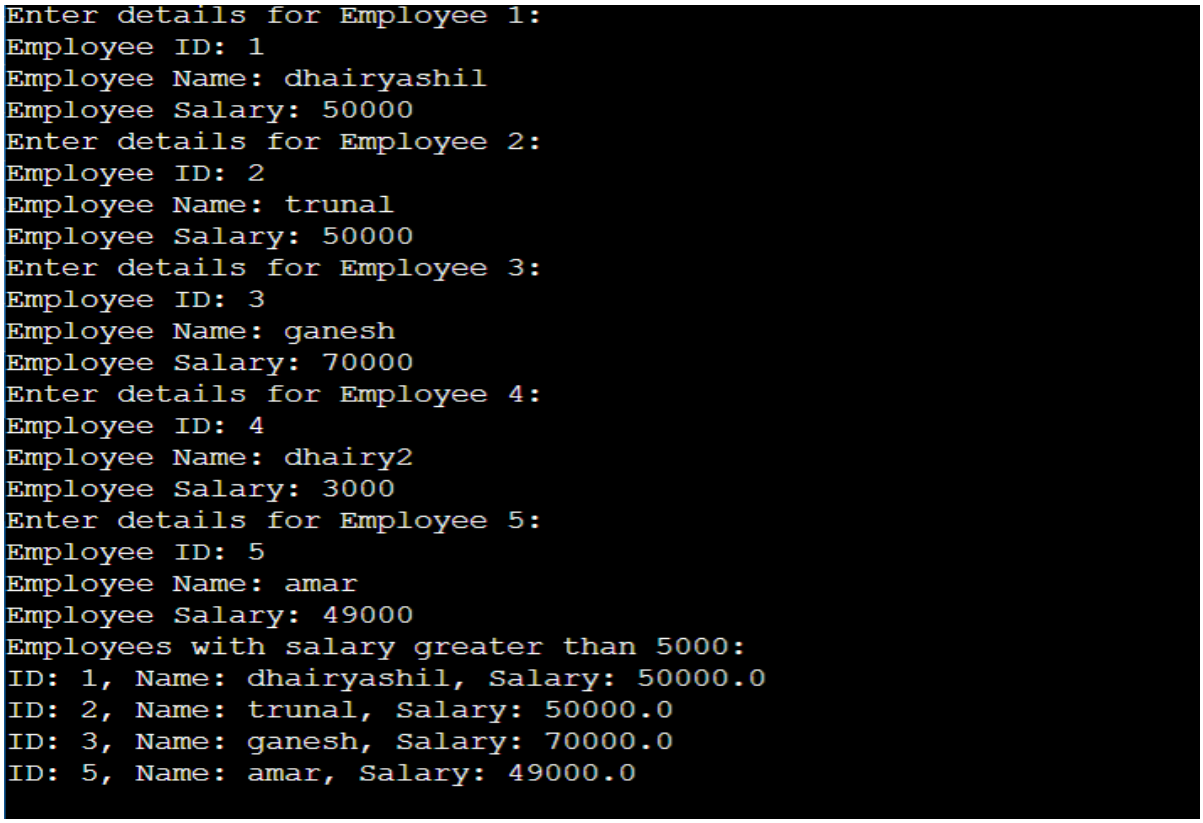


Write a program to declare class Employee having data member emp id, name and salary. Accept records for 5 employee and display that records whose salary is greater than 5000.

```
import java.util.Scanner;

class Employee {
    int empId;
    String name;
    double salary;

    Employee(int empId, String name, double salary) {
        this.empId = empId;
        this.name = name;
        this.salary = salary;
    }
}

public class EmployeeRecords {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Employee[] employees = new Employee[5];

        for (int i = 0; i < 5; i++) {
            System.out.println("Enter details for Employee " + (i + 1) + ":");
            System.out.print("Employee ID: ");
            int empId = scanner.nextInt();
            scanner.nextLine(); // Consume newline
            System.out.print("Employee Name: ");
            String name = scanner.nextLine();
            System.out.print("Employee Salary: ");
```

```
            double salary = scanner.nextDouble();
            employees[i] = new Employee(empId, name, salary);
        }
        System.out.println("Employees with salary greater than 5000:");
        for (Employee emp : employees) {
            if (emp.salary > 5000) {
                System.out.println("ID: " + emp.empId + ", Name: " + emp.name + ", Salary: " +
emp.salary);
            }
        }
        scanner.close();
    }
}
```

OUTPUT:



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 id;
    String name;
    double price;

    Product(int id, String name, double price) {
        this.id = id;
        this.name = name;
        this.price = price;
    }
}

public class ProductRecords {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Product[] products = new Product[5];
        double totalPrice = 0;

        for (int i = 0; i < 5; i++) {
            System.out.println("Enter details for Product " + (i + 1) + ":");
            System.out.print("Product ID: ");
            int id = scanner.nextInt();
            scanner.nextLine(); // Consume newline
            System.out.print("Product Name: ");
            String name = scanner.nextLine();
```

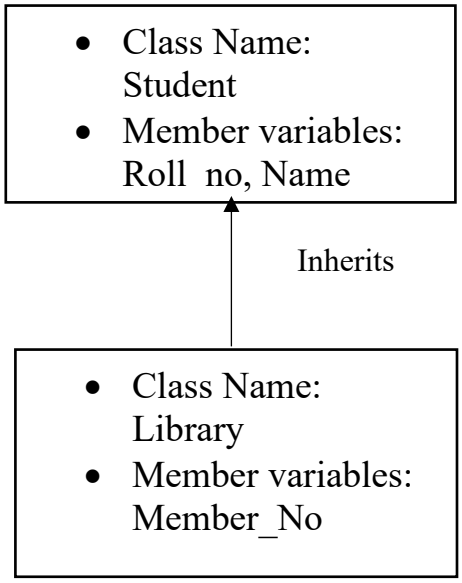
```
            System.out.print("Product Price: ");
            double price = scanner.nextDouble();

            products[i] = new Product(id, name, price);
            totalPrice += price;
        }

        System.out.println("Product Records:");
        for (Product product : products) {
            System.out.println("ID: " + product.id + ", Name: " + product.name + ", Price: " +
product.price);
        }

        System.out.println("Total Price of Products: " + totalPrice);

        scanner.close();
    }
}
```

OUTPUT:

```
Enter details for Product 1:
Product ID: 1
Product Name: campus
Product Price: 500
Enter details for Product 2:
Product ID: 2
Product Name: goodluck
Product Price: 50
Enter details for Product 3:
Product ID: 3
Product Name: classmets
Product Price: 70
Enter details for Product 4:
Product ID: 4
Product Name: jordan
Product Price: 80000
Enter details for Product 5:
Product ID: 5
Product Name: lays
Product Price: 10
Product Records:
ID: 1, Name: campus, Price: 500.0
ID: 2, Name: goodluck , Price: 50.0
ID: 3, Name: classmets, Price: 70.0
ID: 4, Name: jordan, Price: 80000.0
ID: 5, Name: lays, Price: 10.0
Total Price of Products: 80630.0
```

Experiment No. : 06

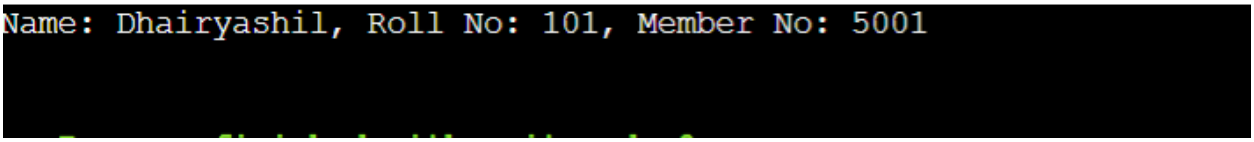
Write a program to implement following inheritance. Assume suitable methods.



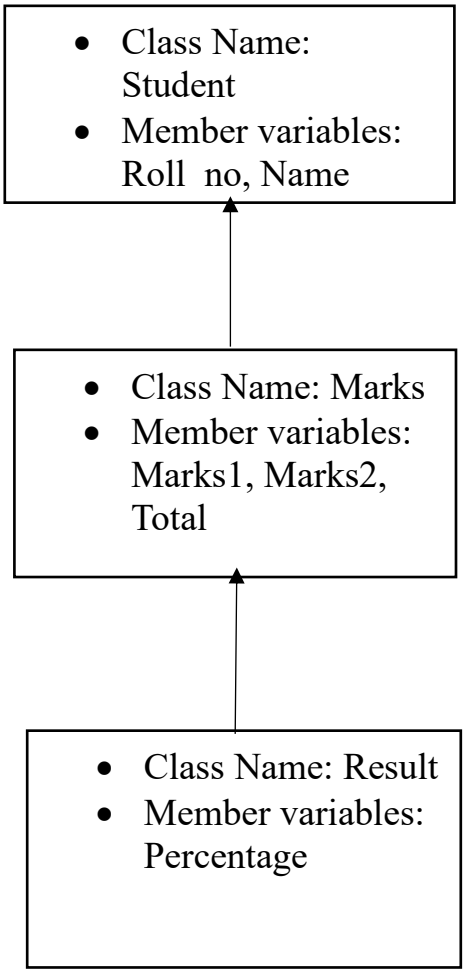

```
// Superclass
class Student {
    int rollNo;
    String name;

    Student(int rollNo, String name) {
        this.rollNo = rollNo;
        this.name = name;
    }
}

// Subclass
class Library extends Student {
    int memberNo;

    Library(int rollNo, String name, int memberNo) {
        super(rollNo, name);
        this.memberNo = memberNo;
    }

    void displayInfo() {
        System.out.println("Name: " + name + ", Roll No: " + rollNo + ", Member No: " +
memberNo);
    }
}
```

```
// Usage
public class Main {
    public static void main(String[] args) {
        Library student1 = new Library(101, "Dhairyashil", 5001);
        student1.displayInfo();
    }
}
```

OUTPUT:



Write a program to implement following multilevel inheritance. Assume suitable methods.

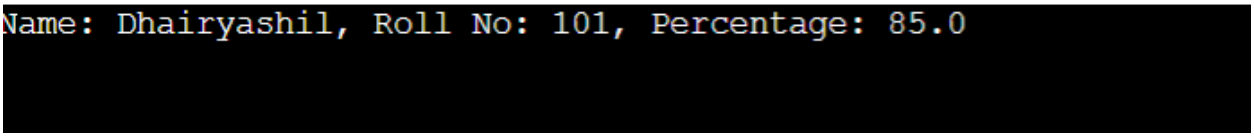



```
// Class 1
class Student {
    int rollNo;
    String name;

    Student(int rollNo, String name) {
        this.rollNo = rollNo;
        this.name = name;
```

```
    }
}

// Class 2
class Marks extends Student {
    int marks1;
    int marks2;
    int total;

    Marks(int rollNo, String name, int marks1, int marks2) {
        super(rollNo, name);
        this.marks1 = marks1;
        this.marks2 = marks2;
        this.total = this.marks1 + this.marks2;
    }
}

// Class 3
class Result extends Marks {
    double percentage;

    Result(int rollNo, String name, int marks1, int marks2) {
        super(rollNo, name, marks1, marks2);
        this.percentage = (this.total / 200.0) * 100;
    }

    void displayResult() {
        System.out.println("Name: " + name + ", Roll No: " + rollNo + ", Percentage: " +
percentage);
    }
```

```
}

// Usage
public class Main {
    public static void main(String[] args) {
        Result student1 = new Result(101, "Dhairyashil", 80, 90);
        student1.displayResult();
    }
}
```

OUTPUT:



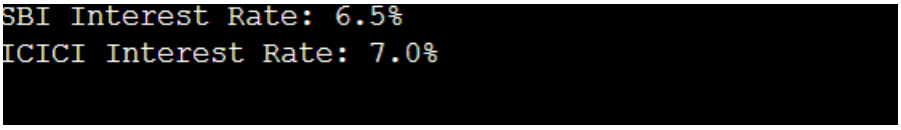
Experiment No. : 07

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.

```
// Base class Bank
class Bank {
    double interestRate;

    void interestRate() {
        System.out.println("Base class interest rate");
    }
}

// Subclass SBI
class SBI extends Bank {
    void interestRate() {
        interestRate = 6.5; // Set SBI interest rate
        System.out.println("SBI Interest Rate: " + interestRate + "%");
    }
}

// Subclass ICICI
class ICICI extends Bank {
    void interestRate() {
        interestRate = 7.0; // Set ICICI interest rate
        System.out.println("ICICI Interest Rate: " + interestRate + "%");
    }
```

```
}

// Usage
public class Main {
    public static void main(String[] args) {
        SBI sbi = new SBI();
        sbi.interestRate(); // Calls overridden method in SBI class

        ICICI icici = new ICICI();
        icici.interestRate(); // Calls overridden method in ICICI class
    }
}
```

OUTPUT:

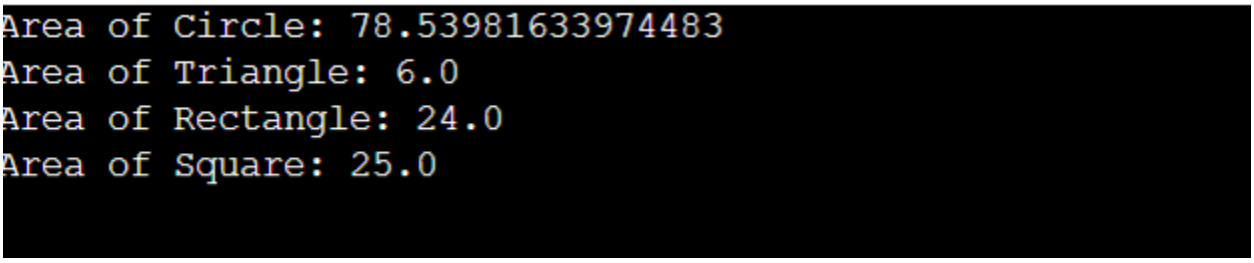


Write a program to declare class Shape then calculate Area of circle, Area of Triangle, Area of Rectangle and area of Square using Constructor overloading.

```
class Shape {
    double area;

    Shape(double radius) {
        area = Math.PI * radius * radius; // Area of circle
        System.out.println("Area of Circle: " + area);
    }

    Shape(double base, double height) {
        area = 0.5 * base * height; // Area of triangle
        System.out.println("Area of Triangle: " + area);
    }

    Shape(double length, double width, String shape) {
        if (shape.equalsIgnoreCase("Rectangle")) {
            area = length * width; // Area of rectangle
            System.out.println("Area of Rectangle: " + area);
        } else if (shape.equalsIgnoreCase("Square")) {
            area = length * length; // Area of square
            System.out.println("Area of Square: " + area);
        } else {
            System.out.println("Invalid Shape!");
        }
    }
```

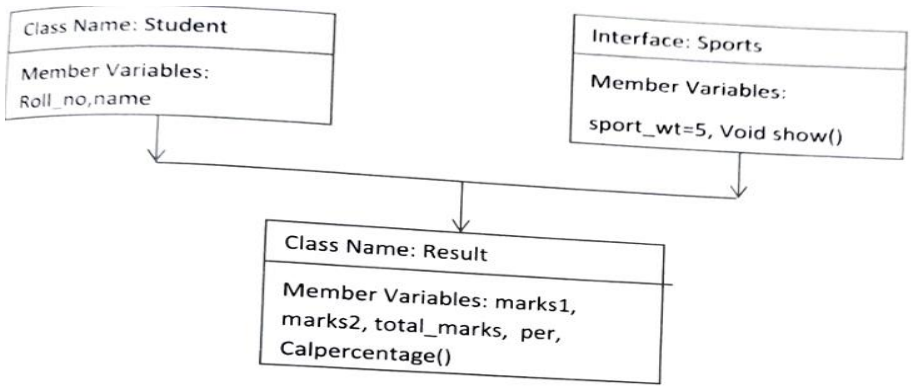
```
    public static void main(String[] args) {
        Shape circle = new Shape(5.0);
        Shape triangle = new Shape(4.0, 3.0);
        Shape rectangle = new Shape(6.0, 4.0, "Rectangle");
        Shape square = new Shape(5.0, 5.0, "Square");
    }
}
```

OUTPUT:



Experiment No. : 08

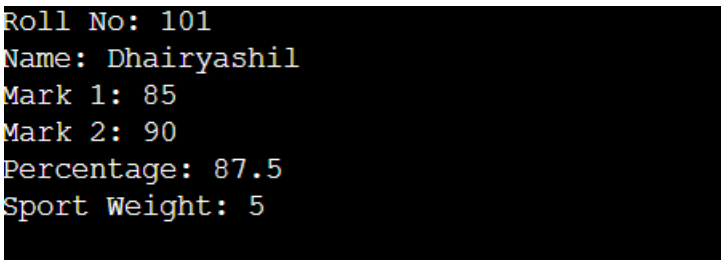
Write a program to implement following inheritance. Assume suitable methods.



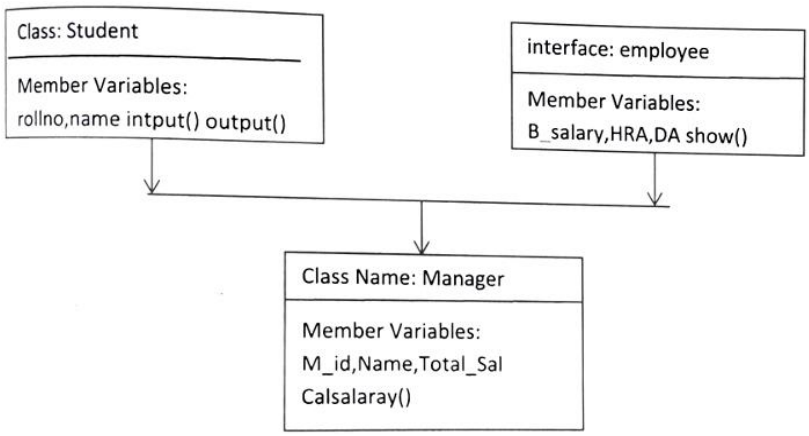

```
class Student {
    protected int rollNo;
    protected String name;

    public Student(int rollNo, String name) {
        this.rollNo = rollNo;
        this.name = name;
    }
}
 interface Sports {
    int SPORT_WT = 5;
    void show();
}
class Result extends Student implements Sports {
    int mark1;
    int mark2;
  double percentage;
    public Result(int rollNo, String name, int mark1, int mark2) {
        super(rollNo, name);
```

```
        this.mark1 = mark1;
        this.mark2 = mark2;
        this.percentage = calculatePercentage();
    }
    public double calculatePercentage() {
        return ((mark1 + mark2) / 2.0);
    }
    @Override
    public void show() {
        System.out.println("Sport Weight: " + SPORT_WT);
    }
}
public class Main {
    public static void main(String[] args) {
        Result result = new Result(101, "Dhairyashil", 85, 90);
        System.out.println("Roll No: " + result.rollNo);
        System.out.println("Name: " + result.name);
        System.out.println("Mark 1: " + result.mark1);
        System.out.println("Mark 2: " + result.mark2);
        System.out.println("Percentage: " + result.percentage);
        result.show();
    }
}
```

OUTPUT:



Write a program to implement following inheritance. Assume suitable methods.




```
class Student {
    protected int rollNo;
    protected String name;

    public void input(int rollNo, String name) {
        this.rollNo = rollNo;
        this.name = name;
    }

    public void output() {
        System.out.println("Roll No: " + rollNo);
        System.out.println("Name: " + name);
    }
}
 interface Employee {
    double B_SALARY = 50000; // Base salary
    double HDR = 10000; // House Rent Allowance
    double DA = 8000; // Dearness Allowance

    public void show();


}
 class Manager extends Student implements Employee {

    public  void show(){
        System.out.println("Base salary:" +B_SALARY);
        System.out.println("House rent Allowance:" +HDR);
        System.out.println("Dearness Allowance:" +DA);
```

```
    }


    public void calSalary() {
        double totalSalary = B_SALARY + HDR + DA;
        System.out.println("totalSalary is:" +totalSalary);
    }
}
public class Main {
    public static void main(String[] args) {
        Manager manager = new Manager();
        manager.input(76,"dhairyashil");
        manager.output();
        manager.show();
        manager.calSalary();


    }
}
```

OUTPUT:

```
Roll No: 76
Name: dhairyashil
Base salary:50000.0
House rent Allowance:10000.0
Dearness Allowance:8000.0
totalSalary is:68000.0
```

Experiment No. : 09

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.*;
class NotEvenException extends Exception {
   NotEvenException() {
      super("Number is not even!");
   }
}

public class CheckEvenNumber {
   static void checkEven(int num) throws NotEvenException {
      if (num % 2 != 0) {
         throw new NotEvenException();
      } else {
         System.out.println("Number is even.");
      }
   }

   public static void main(String[] args) {
      try {
         int userInput ;
         System.out.println("enter the Number:");
         Scanner sc = new Scanner (System.in);
         userInput = sc.nextInt();
         checkEven(userInput);
      } catch (NotEvenException e) {
         System.out.println(e.getMessage());
      }
```

```
  }
}
```

OUTPUT:

```
enter the Number:
5
Number is not even!
```

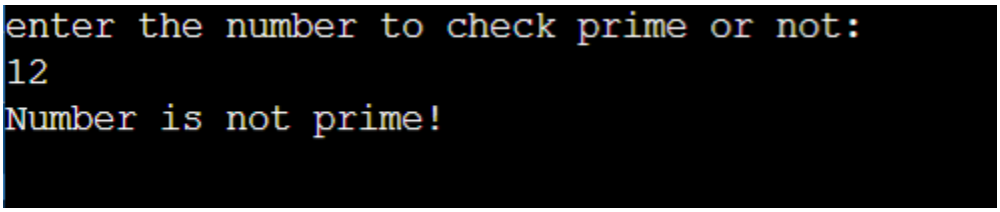
```
enter the Number:
21427292
Number is even.
```

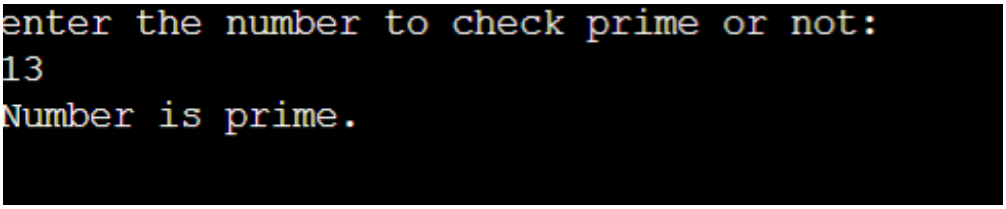
Write a program to create own exception (user defined exception) to accept no. from user and throw an exception if the number is not Prime.

```
import java.util.*;
class NotPrimeException extends Exception {
    NotPrimeException() {
        super("Number is not prime!");
    }
}

public class CheckPrimeNumber {
    static boolean isPrime(int num) {
        if (num <= 1)
            return false;
        for (int i = 2; i <= Math.sqrt(num); i++) {
            if (num % i == 0)
                return false;
        }
        return true;
    }

    static void checkPrime(int num) throws NotPrimeException {
        if (!isPrime(num)) {
            throw new NotPrimeException();
        } else {
            System.out.println("Number is prime.");
        }
    }

    public static void main(String[] args) {
        try {
```

```
            System.out.println("enter the number to check prime or not:");
            Scanner sc = new Scanner (System.in);
            int userInput = sc.nextInt();
            checkPrime(userInput);
        } catch (NotPrimeException e) {
            System.out.println(e.getMessage());
        }
    }
}
```

OUTPUT:





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.*;
class NegativeAgeException extends Exception {
    NegativeAgeException() {
        super("Age cannot be negative!");
    }
}

public class CheckAge {
    static void checkAge(int age) throws NegativeAgeException {
        if (age < 0) {
            throw new NegativeAgeException();
        } else {
            System.out.println("Age is valid.");
        }
    }

    public static void main(String[] args) {
        try {
            int userInput ;
            System.out.println("enter the Age:");
            Scanner sc = new Scanner (System.in);
            userInput = sc.nextInt();
            checkAge(userInput);
        } catch (NegativeAgeException e) {
            System.out.println(e.getMessage());
        }
    }
}
```

OUTPUT:

```
enter the Age:
19
Age is valid.
```

```
enter the Age:
-1
Age cannot be negative!
```

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

```
import java.util.*;
class NotStartsWithSException extends Exception {
   NotStartsWithSException() {
      super("String does not start with 's'!");
   }
}

public class CheckStringStartsWithS {
   static void checkString(String input) throws NotStartsWithSException {
      if (!input.startsWith("s")) {
         throw new NotStartsWithSException();
      } else {
         System.out.println("String starts with 's'.");
      }
   }

   public static void main(String[] args) {
      try {
         System.out.println("enter the String:");
         Scanner sc = new Scanner (System.in);
         String  userInput = sc.nextLine();
         checkString(userInput);
      } catch (NotStartsWithSException e) {
         System.out.println(e.getMessage());
      }
   }
}
```

OUTPUT :

```
enter the String:
dhairyashil
String does not start with 's'!
```

```
enter the String:
sangita
String starts with 's'.
```

Write a program to create own exception (user defined exception) to accept Password from user and throw an “AuthenticationFailure” exception if the password is incorrect.

```
import java.util.*;
class AuthenticationFailureException extends Exception {
   AuthenticationFailureException() {
      super("Authentication Failure: Incorrect Password!");
   }
}

public class CheckPassword {
   static void authenticate(String password) throws AuthenticationFailureException {
      String correctPassword = "Password123"; // Replace with actual correct password
      if (!password.equals(correctPassword)) {
         throw new AuthenticationFailureException();
      } else {
         System.out.println("Authentication Successful.");
      }
   }

   public static void main(String[] args) {
      try {
         String userInput ;
         System.out.println("enter the password:");
         Scanner sc = new Scanner (System.in);
         userInput = sc.nextLine();
         authenticate(userInput);
      } catch (AuthenticationFailureException e) {
         System.out.println(e.getMessage());
      }
```

```
    }
}
```

OUTPUT:

```
enter the password:
pass
Authentication Failure: Incorrect Password!
```

```
enter the password:
Password123
Authentication Successful.
```

Experiment No. : 10

Write a Java program that illustrates the following

a) Creation of simple package.

```
package geometry;

public class Circle {
   private double radius;

   public Circle(double radius) {
      this.radius = radius;
   }

   public double calculateArea() {
      return Math.PI * radius * radius;
   }
}
```

b) Accessing a package.

```
import geometry.Circle;

public class Main {
   public static void main(String[] args) {
      Circle circle = new Circle(5.0);
      double area = circle.calculateArea();
      System.out.println("Area of the circle: " + area);
   }
}
```

OUTPUT:

```
Microsoft Windows [Version 10.0.22621.2715]
(c) Microsoft Corporation. All rights reserved.

E:\B.tech(sem3)\java_programs\pakages>javac -d . Circle.java

E:\B.tech(sem3)\java_programs\pakages>javac Main.java

E:\B.tech(sem3)\java_programs\pakages>java Main
Area of the circle: 78.53981633974483

E:\B.tech(sem3)\java_programs\pakages>
```

c) Implementing interfaces.

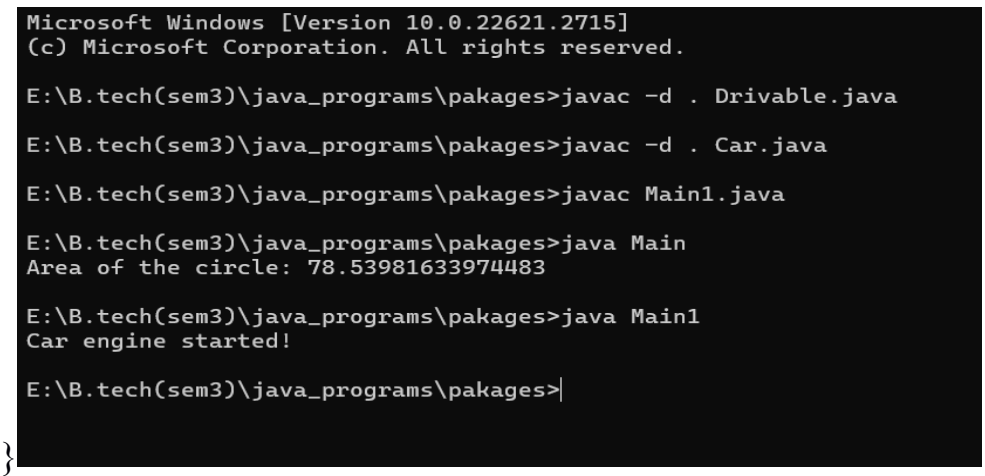
```
package vehicles;

public interface Drivable {
   void startEngine();
}
```

```
package vehicles;

public class Car implements Drivable {
   public void startEngine() {
      System.out.println("Car engine started!");
   }
}
```

Implementation:

```
import vehicles.Car;
import vehicles.Drivable;

public class Main {
   public static void main(String[] args) {
      Car myCar = new Car();
      myCar.startEngine();
   }
}
```

OUTPUT:



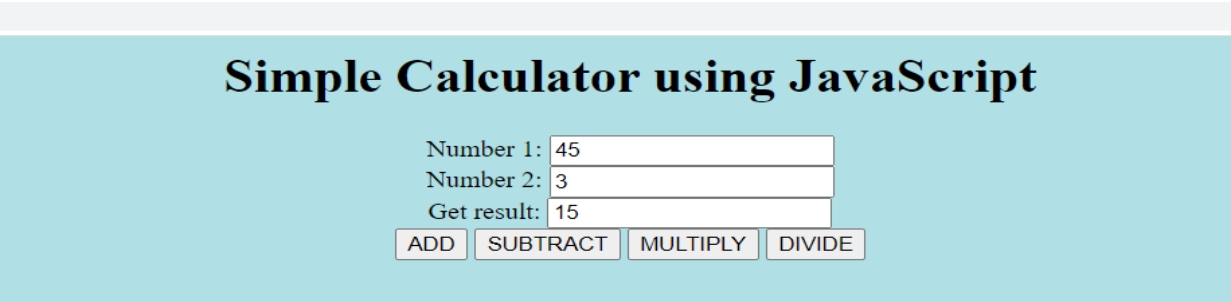
Experiment No. : 11

Write JavaScript program for client side scripting:

```
<html>
<body style="background-color:powderblue;">
 <head>
 <center><h1>Simple Calculator using JavaScript</h1>
 </head>
 <form name="form1">
 Number 1: <input type="text" name="First"> <br>
 Number 2: <input type="text" name="Second"><br>
Get result: <input type="text" name="Total"><br>
 <input type="button" value="ADD" onclick="addition();">
 <input type="button" value="SUBTRACT" onclick="substraction();">
 <input type="button" value="MULTIPLY" onclick="multiplication();">
 <input type="button" value="DIVIDE" onclick="division();">

 </form>
 <script>
 function addition() {
 let a = Number(document.form1.First.value);
 let b = Number(document.form1.Second.value);
 let c = a + b;
 document.form1.Total.value = c;
 }
 function substraction() {
 let a = Number(document.form1.First.value);
 let b = Number(document.form1.Second.value);
```

```
let c = a - b;
document.form1.Total.value = c;
}
function multiplication() {
let a = Number(document.form1.First.value);
let b = Number(document.form1.Second.value);
let c = a * b;
document.form1.Total.value = c;
}
function division() {
let a = Number(document.form1.First.value);
let b = Number(document.form1.Second.value);
let c = a / b;
document.form1.Total.value = c;
}
</script>
</center>
</body>
</html>
```

OUTPUT:

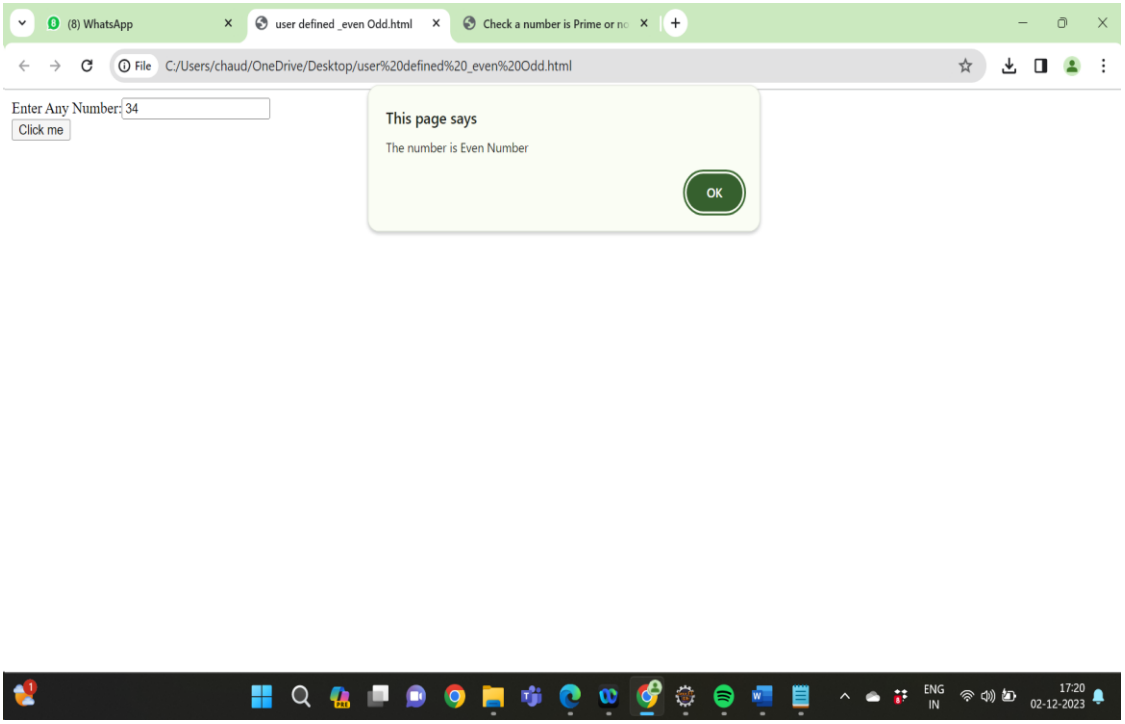


Experiment No. : 12

Write a JavaScript program on user defined function in JavaScript:

```
<html>
<head>
<script>
function odd_even(){
var no;
no=Number(document.getElementById("no_input").value);
if(no%2==0)
{
alert("The number is Even Number");
}
else
{
alert("The number is Odd Number");
}
}
</script>
</head>
<body>
Enter Any Number:<input id="no_input"><br />
<button onclick="odd_even()">Click me</button>
</body>
</html>
```

OUTPUT:

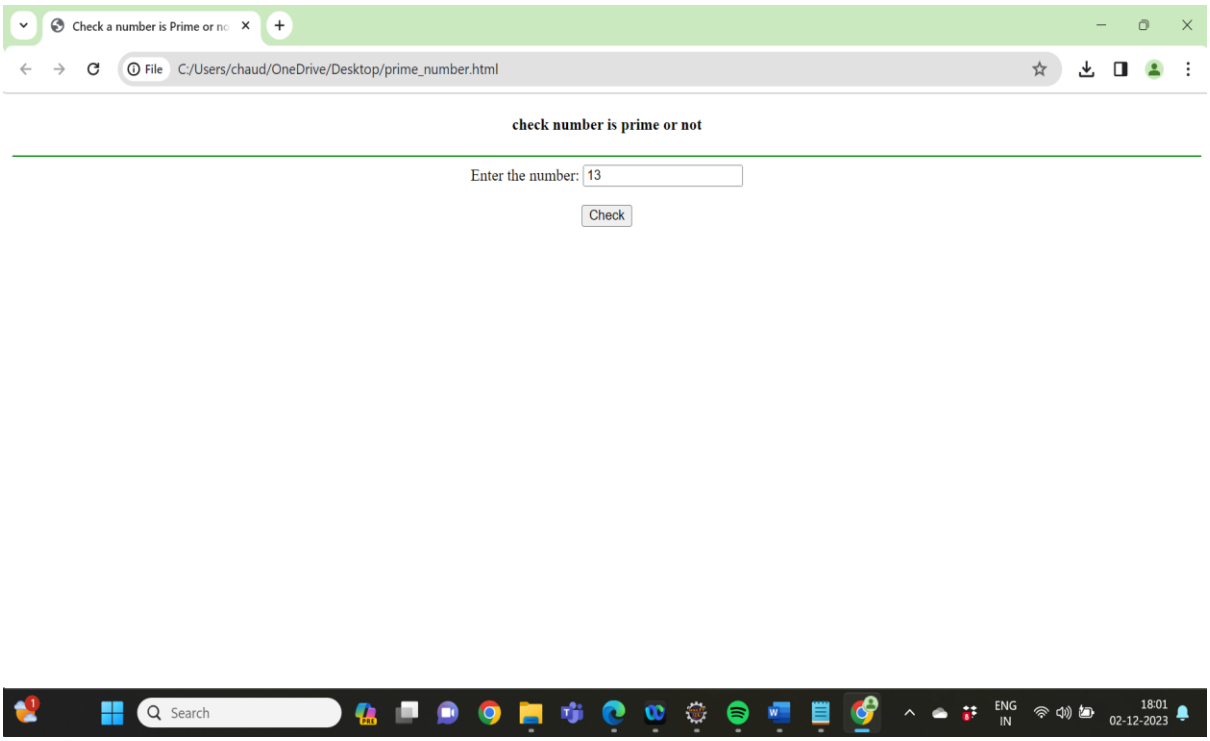

(8) WhatsApp
user defined _even Odd.html
Check a number is Prime or no
File
C:/Users/chaud/OneDrive/Desktop/user%20defined%20_even%20Odd.html
Enter Any Number: 34
Click me
This page says
The number is Even Number
OK
ENG
IN
17:20
02-12-2023

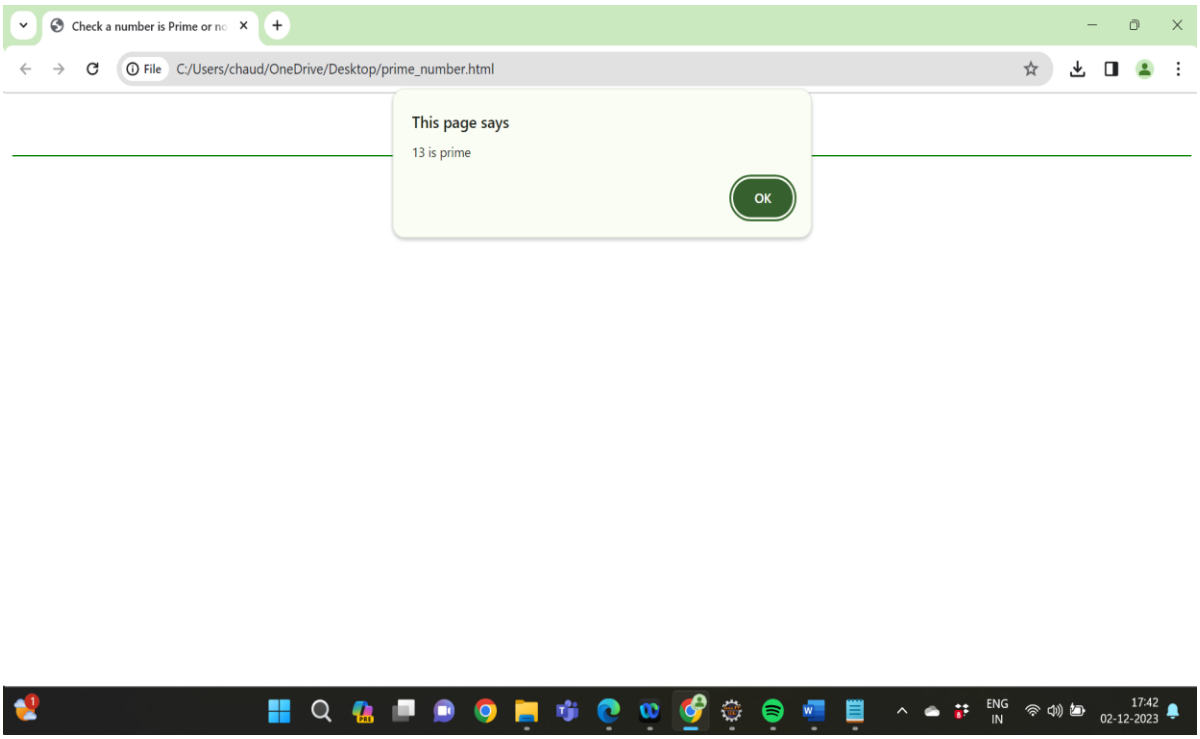
Write a javascript program to take input from the user and check the number is Prime or not.

```
<!DOCTYPE html>
<html>
<head>
 <title>
      Check a number is Prime or not using JavaScript
  </title>
   <script type="text/javascript">
      function check(p)
      {
            for(let i = 3; i <= Math.sqrt(p); i+=2)
            if (p % i === 0)
            {
               return true;
            }
              return false;
      }
      // Function to check prime number
      function p() {
       var n;
          // Getting the value form text
          // field using DOM
          n = document.myform.n.value;
          n = parseInt(n)
          // Check and display alert message
          if( n % 2 === 0 )
                alert(n + " is not prime");
```

```
        else if(check(n))
            alert(n + " is not prime");
        else
            alert(n + " is prime");
    }
</script>
</head>
<body>
 <center>
    <h4>check number is prime or not</h4>
    <hr color="Green">
    <form name="myform">
        Enter the number:
        <input type="text" name=n value="">
        <br><br>
        <input type="button" value="Check" onClick="p()">
        <br>
      </form>
   </center>
 </body>
</ html>
```

OUTPUT:


Check a number is Prime or nc
File C:/Users/chaud/OneDrive/Desktop/prime_number.html
check number is prime or not
Enter the number: 13
Check
Search
ENG
IN
18:01
02-12-2023


Check a number is Prime or nc
File C:/Users/chaud/OneDrive/Desktop/prime_number.html
This page says
13 is prime
OK
ENG
IN
17:42
02-12-2023

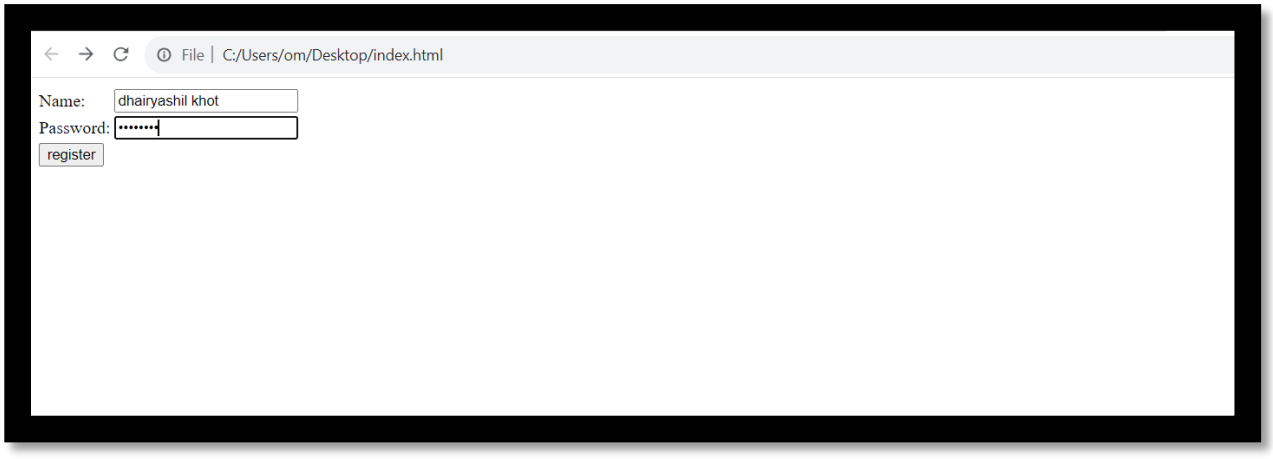
Experiment No. : 13

Programs on JavaScript validations using Object Functions :

```
<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>
```

OUTPUT:




javatpoint.com/javascriptpages/valid.jsp?name=dhairyashil+khot&password=Dddddkk*
You are valid user
Thanks for visiting our site