

Date 10/10/23

# PROGRAM-1

## ODD OR EVEN

Aim:- Write a java program to check whether a number is odd or even.

**Program:-**

```
class Evenodd_24{
    public static void main(String args[]){
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter a number");
        int n=sc.nextInt();
        if(num%2==0)
        {
            System.out.println("Given number is even");
        }
        else
        {
            System.out.println("Given number is odd");
        }
    }
}
```

## OUTPUT

Enter a number  
24  
Given number is even.

Enter a number  
33  
Given number is odd

Result:- Program executed successfully.

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## PROGRAM-2

### LARGEST OF 3

Aim:- Write a java program to find the largest of 3 numbers.

Program:-

```
class Largestof3_24{
public static void main(String args[]){
    Scanner sc=new Scanner(System.in);
    System.out.println("Enter 3 numbers:");
    int num1=sc.nextInt();
    int num2=sc.nextInt();
    int num3=sc.nextInt();
    if(num1>num2&&num1>num3)
    {
        System.out.println(num1+"is larger");
    }
    else if(num2>num1&&num2>num3)
    {
        System.out.println(num2+"is larger");
    }
    else
    {
        System.out.println(num3+"is larger");
    }
}
}
```

### OUTPUT

```
Enter 3 numbers: 5
                  8
                  2
8 is larger
```

Result:- Program executed successfully.

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## PROGRAM-3

### SUM OF n NUMBERS

Aim:- Write a java program to find the sum of n numbers.

**Program:-**

```
class Sumofn_24{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a number:");
        Int n=sc.nextInt();
        Int sum=0;
        for(i=0;i<=n;i++)
        {
            sum=sum+i;
        }
        System.out.println("Sum of first "+n+" natural numbers is
"+sum);
    }
}
```

### OUTPUT

```
Enter a number: 8
Sum of first 8 numbers is 36
```

Result:- Program executed successfully.

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## PROGRAM-4

### SUM OF DIGITS

**Aim:-** Write a java program to find the sum of digits of a given number.

**Program:-**

```
class Digitsum_24
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a number:")
        int n = sc.nextInt();
        int sum=0
        while(n!=0)
        {
            r=n%10;
            sum=sum+r;
            n=n/10;
        }
        System.out.println("Sum of digits is "+sum);
    }
}
```

### OUTPUT

```
Enter a number: 561
Sum of digits is 12
```

**Result:-** Program executed successfully.

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## PROGRAM-5

### WEEK

**Aim:-** Write a java program to print day name corresponding to day number as input.

**Program:-**

```
class Week_24
```

```
{
```

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

```
    {
```

```
        Scanner sc=new Scanner(System.in);
```

```
        System.out.println("Enter day no(1-7)");
```

```
        int n=sc.nextInt();
```

```
        switch(n)
```

```
        {
```

```
        case(1):
```

```
            System.out.println("Sunday");
```

```
            break;
```

```
        case(2):
```

```
            System.out.println("Monday");
```

```
            break;
```

```
        case(3):
```

```
            System.out.println("Tuesday");
```

```
            break;
```

```
        case(4):
```

```
            System.out.println("Wednesday");
```

```
            break;
```

```
        case(5):
```

```
            System.out.println("Thursday");
```

```
            break;
```

```
        case(6):
```

```
            System.out.println("Friday");
```

```
            break;
```

```
        case(7):
```

```
            System.out.println("Saturday");
```

```
            break;
```

```
        default:
```

```
            System.out.println("Error");
```

```
        }
```

```
    }
```

```
}
```

## OUTPUT

Enter day no(1-7)

2

Monday

Enter day no(1-7)

6

Friday

Result:-Program executed successfully.

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## PROGRAM-6

### PALLINDROME

**Aim:-** Write a java program to reverse and find the given string is palindrome or not.

**Program:-**

```
class Pallindrome_24{
    public static void main(String args[]){
        String str;
        Scanner sc = new Scanner(System.in);
        String rev;
        char r;
        int x=0;
        System.out.println("Enter the string:");
        str=sc.nextLine();
        for(int i=0;i<str.length();i++)
        {
            rev=str.charAt(i)+rev;
        }
        System.out.println("Reversed string:"+rev);
        for(int i=0;i<str.length();i++)
        if(str.charAt(i)==rev.charAt(i))
        {
            x++;
        }
        if(x==str.length())
        {
            System.out.println("The string is pallindrome");
        }
        else
        {
            System.out.println("The string is not pallindrome");
        }
    }
}
```

## OUTPUT

**Enter the string: malayalam**  
**Reversed string: Malayalam**  
**The string is palindrome**

**Enter the string: apple**  
**Reversed string : elppa**  
**The string is not pallindrome**

**Result:** -Program executed successfully.



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## PROGRAM-7

### SECOND SMALLEST ELEMENT IN ARRAY

Aim:- Write a java program to find the second smallest element in an array.

Program:-

```
class Secondsmallest 24{  
    public static void main(String args[]){  
        int arr[]={4,2,3,5,8,6,};  
        for(int i=0;j<arr.length-1;i++)  
        {  
            for(int j=i+1;j<arr.length-i-1;j++)  
            {  
                if(arr[i]>arr[j])  
                {  
                    int temp=arr[i];  
                    arr[i]=arr[j];  
                    arr[j]=temp;  
                }  
            }  
        }  
        nt secondsmallest=arr[1];  
        System.out.println("Second smallest element in array is:  
        "+secondsmallest);  
    }  
}
```

### OUTPUT

The second smallest element in array is: 3

Result:- Program executed successfully.

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## PROGRAM-8

### FREQUENCY

**Aim:-** Write a java program to find the frequency of a given character in a string.

**Program:-**

```
class Frequency_24{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter string:");
        String str=sc.nextLine();
        str=str.toLowerCase();
        System.out.println("Frequency of character:");
        for(char ch='a':ch<='z';ch++)
        {
            Int x=0;
            for(int i=0;i<str.length();i++)
            {
                If ch=str.charAt(i)}
                x++;
            }
            If(x!=0)
                System.out.println(ch+"\t\t"+x);
        }
    }
}
```

### OUTPUT

```
Enter string:- malayalam
Frequency of characters:
m 2
a 4
l 2
y 1
```

**Result:-**Program executed successfully.

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## PROGRAM-9

### BINARY AND DECIMAL CONVERSION

Aim:- Write a java program to convert a decimal number to binary and a binary number to decimal.

**Program:-**

```
import java.util.Scanner;

public class DecimalBinaryConverter_24 {

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

        while (true) {
            System.out.println("Choose an option:");
            System.out.println("1. Convert Decimal to Binary");
            System.out.println("2. Convert Binary to Decimal");
            System.out.println("3. Exit");

            int choice = scanner.nextInt();

            switch (choice) {
                case 1:
                    System.out.println("Enter a decimal number:");
                    int decimalNumber = scanner.nextInt();
                    String binaryResult = decimalToBinary(decimalNumber);
                    System.out.println("Binary equivalent: " + binaryResult);
                    break;
                case 2:
                    System.out.println("Enter a binary number:");
                    String binaryNumber = scanner.next();
                    int decimalResult = binaryToDecimal(binaryNumber);
                    System.out.println("Decimal equivalent: " + decimalResult);
                    break;
                case 3:
                    System.out.println("Exiting the program. Goodbye!");
                    break;
                default:
                    System.out.println("Invalid choice. Please enter a valid option.");
            }
        }
    }
}
```

```
    }  
  }  
}  
  
private static String decimalToBinary(int decimalNumber) {  
    return Integer.toBinaryString(decimalNumber);  
}  
  
private static int binaryToDecimal(String binaryNumber) {  
    return Integer.parseInt(binaryNumber, 2);  
}  
}
```

## OUTPUT

Choose an option:

1.Convert Decimal to Binary

2.Convert Binary to Decimal

3.Exit

1

Enter a decimal number: 8

Binary equivalent: 1000

Choose an option:

1.Convert Decimal to Binary

2.Convert Binary to Decimal

3.Exit

Enter a binary number: 0100

Decimal equivalent: 4

Result:-Program executed successfully.

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## PROGRAM-10

### MATRIX OPERATIONS

**Aim:-** Write a java program to perform matrix operations such as Addition, Subtraction, Multiplication and Transpose.

**Program:-**

```
import java.util.Scanner;
public class Matrix_24 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter the number of rows for matrices:");
        int rows = scanner.nextInt();
        System.out.println("Enter the number of columns for matrices:");
        int cols = scanner.nextInt();
        int[][] matrixA = new int[rows][cols];
        int[][] matrixB = new int[rows][cols];
        System.out.println("Enter elements for Matrix A:");
        fillMatrix(matrixA, scanner);
        System.out.println("Enter elements for Matrix B:");
        fillMatrix(matrixB, scanner);
        int choice;
        do {
            System.out.println("\nMatrix Operations Menu:");
            System.out.println("1. Matrix Addition");
            System.out.println("2. Matrix Subtraction");
            System.out.println("3. Matrix Multiplication");
            System.out.println("4. Transpose of Matrix A");
            System.out.println("5. Transpose of Matrix B");
            System.out.println("0. Exit");
            System.out.println("Enter your choice:");
            choice = scanner.nextInt();
            switch (choice) {
                case 1:
                    printMatrix(addMatrices(matrixA, matrixB));
                    break;
                case 2:
                    printMatrix(subtractMatrices(matrixA, matrixB));
                    break;
```

```

        case 3:
            printMatrix(multiplyMatrices(matrixA,
            matrixB));
            break;
        case 4:
            printMatrix(transposeMatrix(matrixA));
            break;
        case 5:
            printMatrix(transposeMatrix(matrixB));
            break;
        case 0:
            System.out.println("Exiting program.
            Goodbye!");
            break;
        default:
            System.out.println("Invalid choice. Please
            enter a valid option.");
    }
    } while (choice != 0);
    scanner.close();
}

private static void fillMatrix(int[][] matrix, Scanner scanner) {
    for (int i = 0; i < matrix.length; i++) {
        for (int j = 0; j < matrix[0].length; j++) {
            System.out.println("Enter element at position (" + (i + 1)
            + ", " + (j + 1) + "):");
            matrix[i][j] = scanner.nextInt();
        }
    }
}

private static int[][] addMatrices(int[][] matrixA, int[][] matrixB) {
    int rows = matrixA.length;
    int cols = matrixA[0].length;
    int[][] result = new int[rows][cols];
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            result[i][j] = matrixA[i][j] + matrixB[i][j];
        }
    }
    return result;
}

```

```
private static int[][] subtractMatrices(int[][] matrixA, int[][] matrixB) {
    int rows = matrixA.length;
    int cols = matrixA[0].length;
    int[][] result = new int[rows][cols];
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            result[i][j] = matrixA[i][j] - matrixB[i][j];
        }
    }
    return result;
}
```

```
private static int[][] multiplyMatrices(int[][] matrixA, int[][] matrixB) {
    int rowsA = matrixA.length;
    int colsA = matrixA[0].length;
    int colsB = matrixB[0].length;
    int[][] result = new int[rowsA][colsB];
    for (int i = 0; i < rowsA; i++) {
        for (int j = 0; j < colsB; j++) {
            for (int k = 0; k < colsA; k++) {
                result[i][j] += matrixA[i][k] * matrixB[k][j];
            }
        }
    }
    return result;
}
```

```
private static int[][] transposeMatrix(int[][] matrix) {
    int rows = matrix.length;
    int cols = matrix[0].length;
    int[][] result = new int[cols][rows];
    for (int i = 0; i < cols; i++) {
        for (int j = 0; j < rows; j++) {
            result[i][j] = matrix[j][i];
        }
    }
    return result;
}
```

```
private static void printMatrix(int[][] matrix) {
    System.out.println("Resultant Matrix:");
}
```

```
for(int j=0;j<matrix[0].length;j++){  
    System.out.print(matrix[i][j]+"");  
}  
System.out.println();  
}
```

## OUTPUT

Enter the number of rows for matrices:

3

Enter the number of columns for matrices:

3

Enter elements for Matrix A:

Enter element at position (1,1):

1

Enter element at position (1,2):

2

Enter element at position (1,3):

3

Enter element at position (2,1):

4

Enter element at position (2,2):

5

Enter element at position (2,3):

6

Enter element at position (3,1):

7

Enter element at position (3,2):

8

Enter element at position (3,3):

9

Enter elements for Matrix B:

Enter element at position (1,1):

9

Enter element at position (1,2):

8

Enter element at position (1,3):

7

Enter element at position (2,1):

6



Enter element at position (2,2):

5

Enter element at position (2,3):

4

Enter element at position (3,1):

3

Enter element at position (3,2):

2

Enter element at position (3,3):

1

Matrix Operations Menu:

1. Matrix Addition
2. Matrix Subtraction
3. Matrix Multiplication
4. Transpose of Matrix A
5. Transpose of Matrix B
0. Exit

Enter your choice:

1

Resultant Matrix:

10 10 10

10 10 10

10 10 10

Matrix Operations Menu:

1. Matrix Addition
2. Matrix Subtraction
3. Matrix Multiplication
4. Transpose of Matrix A
5. Transpose of Matrix B
0. Exit

Enter your choice:

2

Resultant Matrix:

-8 -6 -4

-2 0 2

4 6 8

Matrix Operations Menu:

1. Matrix Addition
2. Matrix Subtraction
3. Matrix Multiplication
4. Transpose of Matrix A
5. Transpose of Matrix B
0. Exit

Enter your choice:

3

Resultant Matrix:

30 24 18

84 69 54

138 114 90

Matrix Operations Menu:

1. Matrix Addition

2. Matrix Subtraction

3. Matrix Multiplication

4. Transpose of Matrix A

5. Transpose of Matrix B

0. Exit

Enter your choice:

4

Resultant Matrix:

1 4 7

2 5 8

3 6 9

Matrix Operations Menu:

1. Matrix Addition

2. Matrix Subtraction

3. Matrix Multiplication

4. Transpose of Matrix A

5. Transpose of Matrix B

0. Exit

Enter your choice:

5

Resultant Matrix:

9 6 3

8 5 2

7 4 1

Matrix Operations Menu:

1. Matrix Addition

2. Matrix Subtraction

3. Matrix Multiplication

4. Transpose of Matrix A

5. Transpose of Matrix B

0. Exit

Enter your choice:

0

Exiting program. Goodbye!

Result:- Program executed successfully.

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## PROGRAM-11

### PATTERN

Aim:- Write a java program to print the pattern

```
*****
****
***
**
*
```

Program:-

```
class Pattern 24{
    public static void main(String args[]){
        int n=5;
        for(int i=n;i>0;i--)
        {
            for(int j=0;j<i;j++)
            {
                System.out.print("*");
            }
            System.out.println();
        }
    }
}
```

### OUTPUT

```
*****
****
***
**
*
```

Result:- Program executed successfully.

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## PROGRAM-12

### EMPLOYEE SALARY

**Aim:-** Implement a class program to accept the n employees' details such as employee number, name and basic pay. The gross salary is calculated as (DA = 20% of basic pay, HRA = 5% of basic pay, Gross salary = Basic pay + DA + HRA).

**Program:-**

```
import java .util.Scanner;
class Employee_24{
    int empno;
    String empname;
    int basicpay;

    void employeeedetails(int no,String name,int pay)
    {
        empno=no;
        empname=name;
        basicpay=pay;
    }

    double grosspay()
    {
        double grosssalary=basicpay+.2*basicpay+.5*basicpay;
        return grosssalary;
    }

    void show()
    {
        System.out.println("Name: "+empname+" Number: "+empno+"
        Salary: "+basicpay);
    }
}

class Employee_24
{
    public static void main(String args[])
    {
        Scanner s=new Scanner(System.in);
```

```

        System.out.println("Enter no of employees");
        int n=s.nextInt();
        for(int i=0;i<n;i++)
        {
            Employee emp=new Employee();
            System.out.println("Enter employee number:");
            int emplno=s.nextInt();
            System.out.println("Enter employee name:");
            String emplname=s.next();
            System.out.println("Enter Salary:");
            int emplpay=s.nextInt();
            emp.employeedetails(emplno,emplname,emplpay);
            emp.show();
            double salary=emp.grosspay();
            System.out.println("Gross Salary: "+salary);
        }
    }
}

```

## OUTPUT

```

Enter no of employees
5
Enter employee number:
11
Enter employee name:
Sara
Enter Salary:
45000
Name: Sara Number: 11 Salary: 45000
Gross Salary: 76500.0
Enter employee number:
12
Enter employee name:
Shifa
Enter Salary:
50000
Name: Shifa Number: 12 Salary: 50000
Gross Salary: 85000.0
Enter employee number:

```

**Enter employee number:**

**13**

**Enter employee name:**

**Anakha**

**Enter Salary:**

**35000**

**Name: Anakha Number: 13 Salary: 35000**

**Gross Salary: 59500.0**

**Enter employee number:**

**14**

**Enter employee name:**

**Akhila**

**Enter Salary:**

**60000**

**Name: Akhila Number: 14 Salary: 60000**

**Gross Salary: 102000.0**

**Enter employee number:**

**15**

**Enter employee name:**

**Angel**

**Enter Salary:**

**47000**

**Name: Angel Number: 15 Salary: 47000**

**Gross Salary: 79900.0**

**Result:-**Program executed successfully.

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## PROGRAM-13

### EMPLOYEE DETAILS

**Aim:-** Write a Java program which creates a class named 'Employee' having the following members: Name, Age, Phone number, Address, Salary. It also has a method named 'printSalary()' which prints the salary of the Employee. Two classes 'Officer' and 'Manager' inherits the 'Employee' class. The 'Officer' and 'Manager' classes have data members 'specialization' and 'department' respectively. Now, assign name, age, phone number, address and salary to an officer and a manager by making an object of both of these classes and print the same.

**Program:-**

```
import java.util.Scanner;
class EmployeeDetails_24{
    public String name;
    public int age;
    public String phno;
    public String address;
    public float salary;

    void printSalary()
    {
        System.out.println("Salary of employee is: "+salary);
    }
    void display()
    {
        System.out.println("Name: "+name);
        System.out.println("Age: "+age);
        System.out.println("Phone number: "+phno);
        System.out.println("Address: "+address);
    }
}

class Officer extends Employee{
    public String specialization;
}

class Manager extends Employee{
    public String department;
}
```

```
class Employee_24{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);
        Officer o = new Officer();
        Manager m = new Manager();
        System.out.println("Enter officer details");
        System.out.println("Enter officer Name");
        o.name=sc.nextLine();
        System.out.println("Enter officer Address");
        o.address=sc.nextLine();
        System.out.println("Enter officer Specialization");
        o.specialization=sc.nextLine();
        System.out.println("Enter officer Phone number");
        o.phno=sc.next();
        System.out.println("Enter officer Salary");
        o.salary=sc.nextFloat();
        System.out.println("Enter officer Age");
        o.age=sc.nextInt();

        System.out.println("Enter manager details");
        System.out.println("Enter manager Name");
        m.name=sc.next();
        System.out.println("Enter manager Address");
        m.address=sc.next();
        System.out.println("Enter manager Department");
        m.department=sc.next();
        System.out.println("Enter manager Phone number");
        m.phno=sc.next();
        System.out.println("Enter manager Salary");
        m.salary=sc.nextFloat();
        System.out.println("Enter manager Age");
        m.age=sc.nextInt();
        System.out.println("Displaying officer details:");
        o.display();
        o.printSalary();
        System.out.println("Officer specialization is:
        "+o.specialization);
        System.out.println("Displaying manager details:");
        m.display();
        m.printSalary();
        System.out.println("Manager department is: }
```



```
        "+m.department);  
    }  
}
```

## OUTPUT

```
Enter officer details  
Enter officer Name  
Sara  
Enter officer Address  
ABC House  
Enter officer Specialization  
Accounts  
Enter officer Phone number  
8263549965  
Enter officer Salary  
60000  
Enter officer Age  
31  
Enter manager details  
Enter manager Name  
Subhash  
Enter manager Address  
XYZ House  
Enter manager Department  
Sales  
Enter manager Phone number  
752433778  
Enter manager Salary  
80000  
Enter manager Age  
45  
Displaying officer details:  
Name: Sara  
Age: 31  
Phone number: 8263549965  
Address: ABC House  
Salary of employee is: 60000.0  
Officer specialization is: Accounts
```

**Displaying manager details:**

**Name: Subhash**

**Age: 45**

**Phone number: 752433778**

**Address: XYZ**

**Salary of employee is: 80000.0**

**Manager department is: House**

**Result:-**Program executed successfully.

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## PROGRAM-14

### COMPLEX NUMBERS

**Program:-**

```
import java.util.*;
class Complexno_24
{
    int real;
    int image;
    Complexno(int real,int image)
    {
        this.real=real;
        this.image=image;
    }
    void product(Complexno C)
    {
        int realpart;
        int imagepart;
        realpart=(real*C.real)-(image*C.image);
        imagepart=(image*C.real)+(real*C.image);
        System.out.print(+imagepart+"i"+"realpart);
    }
}
class Complexno_24{
    public static void main(String args[])
    {
        Scanner s=new Scanner(System.in);
        System.out.println("real of 1");
        int a =s.nextInt();
        System.out.println("image of 1");
        int b =s.nextInt();
        System.out.println("real of 2");
        int c =s.nextInt();
        System.out.println("image of 2");
        int d =s.nextInt();
        Complexno C1=new Complexno(a,b);
        Complexno C2=new Complexno(c,d);
        C1.product(C2);
    }
}
```

## OUTPUT

```
real of 1
2 image of 1
3
real of 2
5 image of 2
4
23i+-2
```

Result:-Program executed successfully.

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## PROGRAM-15

### ABSTRACT CLASS-SHAPES

**Aim:-** Write a java program to create an abstract class named Shape that contains an empty method named numberOfSides(). Provide three classes named Rectangle, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method numberOfSides() that shows the number of sides in the given geometrical structures.

**Program:-**

**abstract class Shapes**

```
{
    abstract void numofSides();
}
```

**class Triangle extends Shapes{**

```
    public void numofSides()
    {
        System.out.println("No of sides in a triangle is 3");
    }
}
```

**class Rectangle extends Shapes{**

```
    public void numofSides()
    {
        System.out.println("No of sides in a rectangle is 4");
    }
}
```

**class Hexagon extends Shapes{**

```
    public void numofSides()
    {
        System.out.println("No of sides in a hexagon is 6");
    }
}
```

**Class Shape\_24{**

```
    public static void main(String args[])
    {
        Triangle t=new Triangle();
    }
```

```
Rectangle r=new Rectangle();  
Hexagon h=new Hexagon();  
t.numofSides();  
r.numofSides();  
h.numofSides();  
}  
}
```

## OUTPUT

```
No of sides in a triangle is 3  
No of sides in a rectangle is 4  
No of sides in a hexagon is 6
```

Result:-Program executed successfully.

Date 06/11/23

## PROGRAM-16

### INTERFACE-AREA

**Aim:-** Create an Interface Polygon with a method findarea(int dim1, int dim2). Create two classes Rectangle and Triangle which implements this Interface.

**Program:-**

```
import java.util.*;
interface Polygon
{
    void findarea(int dim1,int dim2);
}

class Rectangle implements Polygon
{
    public void findarea(int dim1,int dim2)
    {
        double area=dim1*dim2;
        System.out.println("Area of rectangle " +area);
    }
}

class Triangle implements Polygon{
    public void findarea(int dim1,int dim2)
    {
        double area=0.5*dim1*dim2;
        System.out.println("Area of triangle " +area);
    }
}

class PolygonMain_24
{
    public static void main(String args[])
    {
        Scanner input=new Scanner(System.in);
        System.out.println("Enter sides of rectangle");
        int n1=input.nextInt();
        int n2=input.nextInt();
        Rectangle ob=new Rectangle();
        ob.findarea(n1,n2);
    }
}
```

```
        System.out.println("Enter sides of triangle");  
        int n3=input.nextInt();  
        int n4=input.nextInt();  
        Triangle ob2=new Triangle();  
        ob2.findarea(n3,n4);  
    }  
}
```

### OUTPUT

```
Enter sides of rectangle  
34  
Area of rectangle 12.0  
Enter sides of triangle  
64  
Area of triangle 12.0
```

Result:-Program executed successfully.



Date 06/11/23

## PROGRAM-17

### EXCEPTION HANDLING-VOTER

**Aim:-** Create a user defined exception to display a message ,voter is not eligible to vote if age of the person is less than 18.

```
import java.util.Scanner;
class Voter_24
{
    public static void main(String args[]){
        System.out.println("Enter the age");
        try{
            Scanner s=new Scanner(System.in);
            int age=s.nextInt();
            if(age>=18)
            {
                System.out.println("Eligible to vote");
            } else
            {
                MyException me=new MyException();
                throw me;
            }
        } catch(MyException e)
        {
            System.out.println(e);
        }
    }
}
class MyException extends RuntimeException{
    public String toString()
    {
        return "Age must be above 18";
    }
}
```

### OUTPUT

Enter the age

4

Age must be above 18

Enter the age

19

Eligible to vote

**Result:-** Program executed successfully.

Date 06/11/23

## PROGRAM-18

### FILE-ODD AND EVEN

**Aim:-** Write a java program to separate odd and even numbers from a file containing a set of integers.

**Program:-**

```
import java.io.*;
public class Test_24
{
    public static void main(String ars[])
    {
        int i;
        String str;
        try
        {
            str="";
            FileInputStream fr=new FileInputStream(new
File("int.txt"));
            FileOutputStream fw1=new FileOutputStream(new
File("even.txt"));
            FileOutputStream fw2=new FileOutputStream(new
File("odd.txt"));
            while((i=fr.read())!=-1)
            {
                if((char)i !='\n')
                    str=str+(char)i;
                else
                {
                    System.out.println(str);
                    int num=Integer.parseInt(str);
                    if (num%2==0)
                    {
                        fw1.write(str.getBytes());
                        fw1.write("\n".getBytes());
                    }
                    else
                    {

```

```
                fw2.write(str.getBytes());
                fw2.write("\n".getBytes());
            }
            str="";
        }
    }
    fr.close();
    fw1.close();
    fw2.close();
}
catch(Exception e)
{
    e.printStackTrace();
}
}
```

## OUTPUT

```
Int.txt :-    12
                33
                76
                81
                9
                46

even.txt :-   12
                76
                46

odd.txt:-     33
                81
                9
```

**Result:-**Program executed successfully.

Date 13/11/23

## PROGRAM-19

### FILE-COPYING CONTENT

**Aim:-** Write a java program to copy the contents of a file into another

**Program:-**

```
import java.io.*;
import java.util.*;
public class CopyFromFile_24
{
    public static void copyContent(File a, File b)
    throws Exception
    {
        FileInputStream in = new FileInputStream(a);
        FileOutputStream out = new FileOutputStream(b);
        try{
            int n;
            while ((n = in.read()) != -1)
            {
                out.write(n);
            }
        }
        finally
        {
            if (in != null)
            {
                in.close();
            }
            if (out != null)
            {
                out.close();
            }
        }
        System.out.println("File Copied");
    }
    public static void main(String[] args) throws Exception
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the source file name
        from where you have to read/copy :");
    }
}
```

```
String a = sc.nextLine();  
File x = new File(a);  
System.out.println("Enter the destination filename  
where you have to write/paste :");  
String b = sc.nextLine();  
File y = new File(b);  
copyContent(x, y);  
    }  
}
```

## OUTPUT

Enter the source file name from where you have to read/copy: text.txt  
Enter the destination filename where you have to write/paste: output.txt

**File copied**

text.txt :- hi hello good morning  
output.txt :-hi hello good morning

Result:-Program executed successfully.

Date 13/11/23

## PROGRAM-20

### FILE-COUNT

**Aim:-** Write a java program to count the number of characters , number of words and number of lines in a file.

**Program:-**

```
import java.io.BufferedReader;
import java.io.FileReader;
import java.io.IOException;
public class File_24
{
    public static void main(String[] args)
    {
        BufferedReader reader = null;
        int charCount = 0;
        int wordCount = 0;
        int lineCount = 0;
        try
        {
            reader = new BufferedReader(new FileReader("input.txt"));
            String currentLine = reader.readLine();
            while (currentLine != null)
            {
                lineCount++;
                String[] words = currentLine.split(" ");
                wordCount = wordCount + words.length;
                for (String word : words)
                {
                    charCount = charCount + word.length();
                }
                currentLine = reader.readLine();
            }
            System.out.println("Number of characters in file :
"+charCount);
            System.out.println("Number of words in file :
"+wordCount);
            System.out.println("Number of lines in file :
"+lineCount);
        }
    }
}
```

```
        catch (IOException e)
        {
            e.printStackTrace();
        }
        finally
        {
            try
            {
                reader.close();
            } catch (IOException e)
            {
                e.printStackTrace();
            }
        }
    }
}
```

## OUTPUT

input.txt :- hi  
how  
are  
you

**Number of characters in a file: 11**

**Number of words in file: 4**

**Number of lines in file: 4**

Result:- Program executed successfully,

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## PROGRAM-21

### PACKAGE-STACK

**Aim:-** Write a java program to create a package to implement stack operations.

**Program:-**

```
package p;
import java.util.Scanner;

class Stack{
    int top=-1;
    int MAX=5;
    int stack[]=new int[5];

    void push(int el)
    {
        if(top==MAX-1)
        {
            System.out.println("Stackfull");
        }
        else
        {
            top++;
            stack[top]=el;
        }
    }

    void pop()
    {
        int data;
        if(top==--1)
        {
            System.out.println("Stack empty");
            return;
        }
        else{
            data=stack[top];
            top--;
        }
        System.out.println(data);
    }
}
```



```

}

void display()
{
    if(top== -1)
    {
        System.out.println("Stack empty");
        return;
    }
    else
    {
        for(int i=top; i>=0; i--)
        {
            System.out.print(stack[i]+"\\t");
        }
        System.out.println();
    }
}

}

class Package_24{
    public static void main(String args[])
    {
        int choice;
        Stack s1=new Stack();
        do{
            System.out.println("Enter your choice");
            System.out.println("1.Push");
            System.out.println("2.Pop");
            System.out.println("3.Display");
            System.out.println("4.Exit");

            Scanner s=new Scanner(System.in);
            choice =s.nextInt();
            switch(choice)
            {
                case (1):
                    System.out.println("Enter the element");
                    int a=s.nextInt();
                    s1.push(a);
                    break;
            }
        }
    }
}

```

```
break;

        case(4):
            System.out.println("Exiting the program");
            break;
        }
    }
    while(choice!=4);
}
```

## OUTPUT

Enter your choice

1.Push

2.Pop

3.Display

4.Exit

1

Enter the element

5

Enter your choice

1.Push

2.Pop

3.Display

4.Exit

1

Enter the element

6

Enter your choice

1.Push

2.Pop

3.Display

4.Exit

1

Enter the element

7

Enter your choice

1.Push

2.Pop

3.Display

4.Exit

Enter your choice

1.Push

2.Pop

3.Display

4.Exit

3

7      6      5

Enter your choice

1.Push

2.Pop

3.Display

4.Exit

2

7

Enter your choice

1.Push

2.Pop

3.Display

4.Exit

2

6

Enter your choice

1.Push

2.Pop

3.Display

4.Exit

2

5

Enter your choice

1.Push

2.Pop

3.Display

4.Exit

2

Stack empty

Enter your choice

1.Push

2.Pop

3.Display

4.Exit

4

Exiting the program

Date 20/11/23

## PROGRAM-22

### ODD AND EVEN THREAD

Aim:- Write a java program to print odd even thread and implement multithreading using thread sleep method

#### Program:-

```
class EvenThread implements Runnable{
    String name;
    Thread t;
    EvenThread(String name){
        this.name=name;
        t=new Thread(this,name);
        System.out.println("New thread: "+t);
        t.start();
    }
    public void run(){
        try{
            for(int i=10;i>0;i--){
                if(i%2==0){
                    System.out.println(name+" : "+i);
                    Thread.sleep(1000);
                }
            }
        }catch(InterruptedException e){
            System.out.println(name + "Interrupted");
        }
        System.out.println(name + " exiting.");
    }
}

class OddThread implements Runnable{
    String string;
    Thread th;
    OddThread(String string){
        this.string = string;
        th = new Thread(this,string);
        System.out.println("New thread: " + th);
        th.start();
    }
    public void run() {
        try {
```

```

        for(int i=10;i>0;i--) {
            if(i%2!=0){
                System.out.println(string + ": " + i);
                Thread.sleep(1000);
            }
        }
    }catch (InterruptedException e){
        System.out.println(string + "Interrupted");
    }
    System.out.println(string + " exiting.");
}
}
}
Class OddEvenThread_21{
    public static void main(String args[]) {
        new EvenThread("Even");
        new OddThread("Odd");
        try{
            Thread.sleep(10000);
        }catch (InterruptedException e) {
            System.out.println("Main thread Interrupted");
        }
        System.out.println("Main thread exiting.");
    }
}

```

## OUTPUT

```

New thread: Thread[Even,5,main]
New thread: Thread[Odd,5,main]
Even : 10
Odd: 9
Even : 8
Odd: 7
Even : 6
Odd: 5
Even : 4
Odd: 3
Even : 2
Odd: 1
Even exiting.
Odd exiting.   Main thread exiting.

```

**Result:-** Program executed successfully.

Date:-20/11/23

## PROGRAM-23

### ODD AND EVEN THREAD USING JOIN

**Aim :** Write a java program to print odd even thread and implement multithreading using methods join and isAlive.

**Program:-**

```
class EvenThread implements Runnable{
    String name;
    Thread t;
    EvenThread(String name){
        this.name=name;
        t=new Thread(this,name);
        System.out.println("New thread: "+t);
        t.start();
    }
    public void run(){
        try{
            for(int i=10;i>0;i--){
                if(i%2==0){
                    System.out.println(name+" : "+i);
                    Thread.sleep(1000);
                }
            }
        }catch(InterruptedException e){
            System.out.println(name + "Interrupted");
        }
        System.out.println(name + " exiting.");
    }
}

class OddThread implements Runnable{
    String string;
    Thread th;
    OddThread(String string){
        this.string = string;
        th = new Thread(this,string);
        System.out.println("New thread: " + th);
        th.start();
    }
    public void run() {
        try {
```

```

        for(int i=10;i>0;i--) {
            if(i%2!=0){
                System.out.println(string + ": " + i);
                Thread.sleep(1000);
            }
        }
    }catch (InterruptedException e){
        System.out.println(string + "Interrupted");
    }
    System.out.println(string + " exiting.");
}
}

```

```

class OddEvenJoin_21{
    public static void main(String args[]) {
        EvenThread et = new EvenThread("Even");
        OddThread ot = new OddThread("Odd");
        System.out.println("Thread even is alive: "+ et.t.isAlive());
        System.out.println("Thread odd is alive: "+ ot.th.isAlive());
        try{
            System.out.println("Waiting for threads to finish.");
            et.t.join();
            ot.th.join();
        }catch (InterruptedException e) {
            System.out.println("Main thread Interrupted");
        }
        System.out.println("Thread even is alive: "+ et.t.isAlive());
        System.out.println("Thread odd is alive: "+ ot.th.isAlive());
        System.out.println("Main thread exiting.");
    }
}

```

## OUTPUT

```

New thread: Thread[Even,5,main]
New thread: Thread[Odd,5,main]
Thread even is alive: true
Thread odd is alive: true
Waiting for threads to finish
Even : 10
Odd: 9

```

```
Even : 6
Odd: 5
Even : 4
Odd: 3
Even : 2
Odd: 1
Even exiting.
Odd exiting.
Thread even is alive: false
Thread odd is alive: false
Main thread exiting..
```

**Result:-** Program executed successfully



Date:-20/11/23

## PROGRAM-24

### THREAD SYNCHRONIZATION

Aim : Write a java program to show how synchronization works in multithreading.

**Program:-**

```
class Callme{
    synchronized void call(String msg){
        System.out.print("₹" + msg);
        try{
            Thread.sleep(1000);
        }catch(InterruptedException e){
            System.out.println("Interrupted");
        }
        System.out.println("/-");
    }
}

class Caller implements Runnable{
    String msg;
    Callme target;
    Thread t;
    public Caller(Callme targ, String s) {
        target = targ;
        msg = s;
        t = new Thread(this);
        t.start();
    }
    public void run() {
        target.call(msg);
    }
}

class Main{
    public static void main(String args[]) {
        Callme target = new Callme();
        Caller ob1 = new Caller(target, "100");
        Caller ob2 = new Caller(target, "2000");
        Caller ob3 = new Caller(target, "8000");
        try {
            ob1.t.join();
            ob2.t.join();
            ob3.t.join();
        }
    }
}
```

```
    } catch (InterruptedException e) {  
        System.out.println("Interrupted");  
    }  
}  
}
```

## OUTPUT

₹100/-  
₹4000/-  
₹8000/-

**Result:-** Program executed successfully.

Date:-27/11/23

## PROGRAM-25

### CALCULATOR-GUI

Aim : Write a java program to create a gui for a calculator.

**Program:-**

```
import javax.swing.*;
import java.awt.event.*;
class Calculator_21 implements ActionListener
{
    JFrame f;
    JTextField t;
    JButton
    b1,b2,b3,b4,b5,b6,b7,b8,b9,b0,bdiv,bmul,bsub,badd,bdec,beq,bdel,bclr;

    static double a=0,b=0,result=0;
    static int operator=0;

    Calc()
    {
        f=new JFrame("Calculator");
        t=new JTextField();
        b1=new JButton("1");
        b2=new JButton("2");
        b3=new JButton("3");
        b4=new JButton("4");
        b5=new JButton("5");
        b6=new JButton("6");
        b7=new JButton("7");
        b8=new JButton("8");
        b9=new JButton("9");
        b0=new JButton("0");
        bdiv=new JButton("/");
        bmul=new JButton("*");
        bsub=new JButton("-");
        badd=new JButton("+");
        bdec=new JButton(".");
        beq=new JButton("=");
        bdel=new JButton("Delete");
        bclr=new JButton("Clear");
        t.setBounds(30,40,280,30);
        b7.setBounds(40,100,50,40);
```

```
b4.setBounds(40,170,50,40);
b5.setBounds(110,170,50,40);
b6.setBounds(180,170,50,40);
bmul.setBounds(250,170,50,40);
b1.setBounds(40,240,50,40);
b2.setBounds(110,240,50,40);
b3.setBounds(180,240,50,40);
bsub.setBounds(250,240,50,40);
bdec.setBounds(40,310,50,40);
b0.setBounds(110,310,50,40);
beq.setBounds(180,310,50,40);
badd.setBounds(250,310,50,40);
bdel.setBounds(60,380,100,40);
bclr.setBounds(180,380,100,40);
f.add(t);
f.add(b7);
f.add(b8);
f.add(b9);
f.add(bdiv);
f.add(b4);
f.add(b5);
f.add(b6);
f.add(bmul);
f.add(b1);
f.add(b2);
f.add(b3);
f.add(bsub);
f.add(bdec);
f.add(b0);
f.add(beq);
f.add(badd);
f.add(bdel);
f.add(bclr);
f.setLayout(null);
f.setVisible(true);
f.setSize(350,500);
f.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
f.setResizable(false);
b1.addActionListener(this);
b2.addActionListener(this);
b3.addActionListener(this);
b4.addActionListener(this);
```

1  
Enter the element

8  
Enter your choice

1.Push  
2.Pop  
3.Display  
4.Exit

1  
Enter the element

9  
Enter your choice

1.Push  
2.Pop  
3.Display  
4.Exit

1  
Enter the element

10  
Stackfull

Enter your choice

1.Push  
2.Pop  
3.Display  
4.Exit

3  
9      8      7      6      5

Enter your choice

1.Push  
2.Pop  
3.Display  
4.Exit

2  
9  
Enter your choice

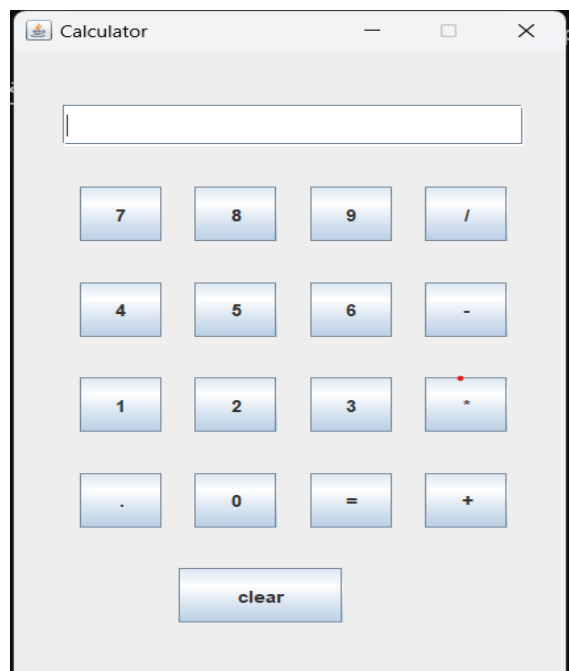
1.Push  
2.Pop  
3.Display  
4.Exit

2  
8  
Enter your choice

```
operator=1;
t.setText("");
if(e.getSource()==bsub)
{
a=Double.parseDouble(t.getText());
operator=2;
t.setText("");
}
if(e.getSource()==bmul)
{
a=Double.parseDouble(t.getText());
operator=3;
t.setText("");
}
if(e.getSource()==bdiv)
{
a=Double.parseDouble(t.getText());
operator=4;
t.setText("");
}
if(e.getSource()==beq)
{
b=Double.parseDouble(t.getText());
switch(operator)
{
case 1: result=a+b;
break;
case 2: result=a-b;
break;
case 3: result=a*b;
break;
case 4: result=a/b;
break;
default: result=0;
}
t.setText(""+result);
}
if(e.getSource()==bclr)
t.setText("");
if(e.getSource()==bdel)
{
String s=t.getText();
```

```
t.setText("");  
for(int i=0;i<s.length()-1;i++)  
t.setText(t.getText()+s.charAt(i));  
}  
}  
public static void main(String...s)  
{  
new Calc();  
}  
}
```

## OUTPUT



```
b5.addActionListener(this);
b6.addActionListener(this);
b7.addActionListener(this);
b8.addActionListener(this);
b9.addActionListener(this);
b0.addActionListener(this);
badd.addActionListener(this);
bdiv.addActionListener(this);
bmul.addActionListener(this);
bsub.addActionListener(this);
bdec.addActionListener(this);
beq.addActionListener(this);
bdel.addActionListener(this);
bclr.addActionListener(this);
}

public void actionPerformed(ActionEvent e)
{
    if(e.getSource()==b1)
        t.setText(t.getText().concat("1"));
    if(e.getSource()==b2)
        t.setText(t.getText().concat("2"));
    if(e.getSource()==b3)
        t.setText(t.getText().concat("3"));
    if(e.getSource()==b4)
        t.setText(t.getText().concat("4"));
    if(e.getSource()==b5)
        t.setText(t.getText().concat("5"));
    if(e.getSource()==b6)
        t.setText(t.getText().concat("6"));
    if(e.getSource()==b7)
        t.setText(t.getText().concat("7"));
    if(e.getSource()==b8)
        t.setText(t.getText().concat("8"));
    if(e.getSource()==b9)
        t.setText(t.getText().concat("9"));
    if(e.getSource()==b0)
        t.setText(t.getText().concat("0"));
    if(e.getSource()==bdec)
        t.setText(t.getText().concat("."));
    if(e.getSource()==badd)
    {
        a=Double.parseDouble(t.getText());
```