# Lab Record

## of

# OOP

## (01CT0105)



**Submitted to :-**

Dr. Chirag Joshi
Assistant Professor
Dept of ICT
MU

**Submitted by :-**

Aryan Dilipbhai Langhanoja
92200133030
ICT – 2TK1
2nd Semester

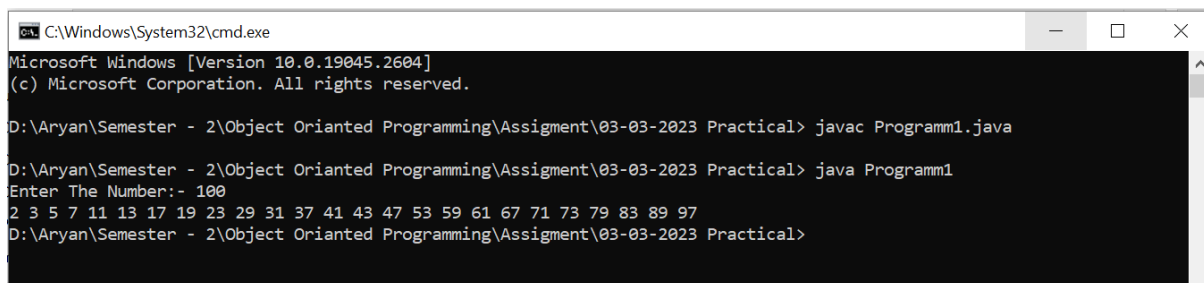| | **Marwadi University** |
|---|---|
| ![Marwadi University Logo] Marwadi University | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP (01CT0105)** | **Aim:-** Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer. |
| **Experiment No:-** 1 | **Date:-** 03-03-2023 | **Enrolment No:-** 92200133030 |

# Experiment – 1

**Objective :-** Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer.

**Code:-**

```java
import java.util.*;
public class Programm1
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner (System.in);
        int n,j,i;
        System.out.print("Enter The Number:-");
        n = sc.nextInt();
        for(i=2;i<=n;i++){
            for(j=2;j<i;j++){
                if(i%j==0){
                    break;
                }}
            if(i==j){
                System.out.print(i + " ");
            }}}}
```

**Output:-**

```
C:\Windows\System32\cmd.exe                                    —    □    ×
Microsoft Windows [Version 10.0.19045.2604]
(c) Microsoft Corporation. All rights reserved.

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\03-03-2023 Practical> javac Programm1.java

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\03-03-2023 Practical> java Programm1
Enter The Number:- 100
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97
D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\03-03-2023 Practical>
```

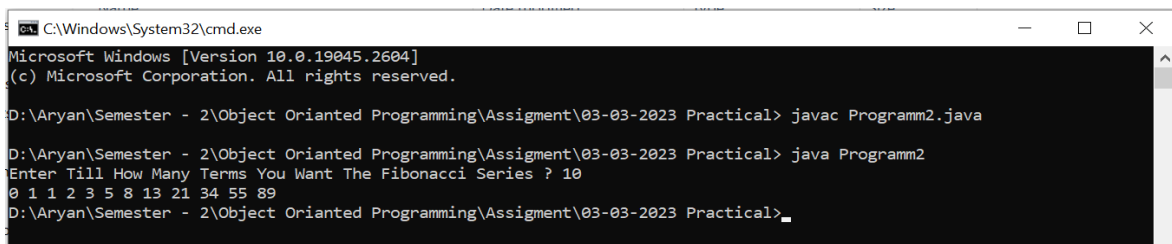| | Marwadi University<br><br>Faculty of Technology<br><br>Department of Information and Communication Technology |
|---|---|
| **Subject:- OOP**<br>**(01CT0105)** | **Aim:-** Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer. |
| **Experiment No:-** 2 | **Date:-**<br>03-03-2023 | **Enrolment No:- 92200133030** |

# Experiment – 2

**Objective :-** Write a java program to find the Fibonacci series using non-recursive Functions.

**Code:-**

```
import java.util.*;

public class Programm2
{
    public static void main (String args[])
    {
        Scanner sc = new Scanner (System.in);
        int a=0,b=1,num;
        System.out.print("Enter Till How Many Terms You Want The Fibonacci Series ?");
        num = sc.nextInt();
        System.out.print(a + " " + b + " ");
        Fibonacci(num); }
    public static  void Fibonacci(int num)
    {
        int a=0,b=1,c;
        for(int i=1;i<=num;i++) {
            c = a + b;
            System.out.print(c + " ");
            a=b;
            b=c; } } }
```

**Output:-**



*Object Oriented Programming*                    *Student Roll No:- 922001333030*
Department of Information and Communication Technology

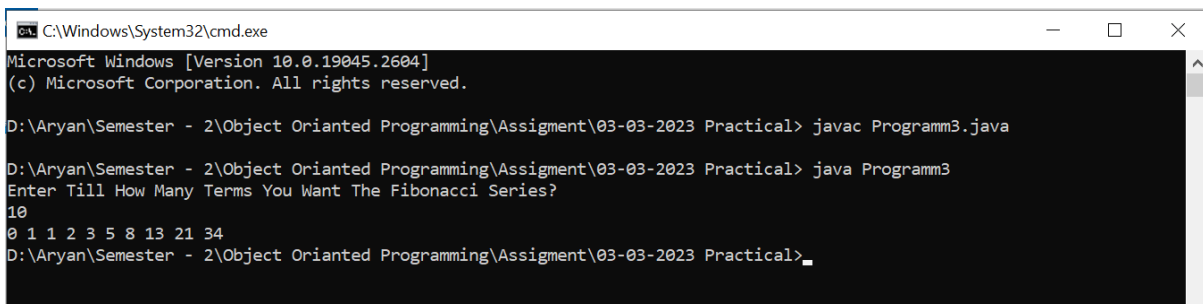|  | **Marwadi University** |
| | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP (01CT0105)** | **Aim:-** Write a java program to find the Fibonacci series using recursive Functions. |
| **Experiment No:-** 3 | **Date:-** 03-03-2023 | **Enrolment No:-** 92200133030 |

# Experiment – 3

**Objective :-** Write a java program to find the Fibonacci series using recursive Functions.

**Code:-**

```
import java.util.* ;
public class Programm3
{public static void main(String args[]){
    Scanner sc =new Scanner (System.in);
    int num,a=0,b=1;
    System.out.println("Enter Till How Many Terms You Want The Fibonacci Series?");
    num = sc.nextInt();
    System.out.print(0 + " " + 1 + " ");
    int c = Fibonacci(a,b,num);
    System.out.print(c + " "); }
  public static int  Fibonacci(int x,int y,int num){
    num--;
    int z=x+y;
    if(num<=2) { return x + y ; }
    else {
       System.out.print(z + " ");
       return  Fibonacci(y,z,num) ; }}}
```

**Output:-**

| | **Marwadi University** |
|---|---|
|  | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |

| **Subject:- OOP (01CT0105)** | **Aim:-** Write a java program to display the employee details using Scanner class. | |
|---|---|---|
| **Experiment No:-** 4 | **Date:-** 10-03-2023 | **Enrolment No:- 92200133030** |

# Experiment – 4

**Objective :**- Write a java program to display the employee details using Scanner class.

**Code:-**

```
import java.util.*;
class Employee_Detail
{ String Name;
   String Post;
   String Location;
   int age;
   int salary ;
   public static void Details(int n)
   { for(int i=0;i<n;i++){
        System.out.print("Enter The Name Of Employee-" + i+1 +":-");
        Employye[i].Name = sc.nextLine();
        System.out.print("Enter The Post Of Employee-" + i+1 +":-");
        Employye[i].Post = sc.nextLine();
        System.out.print("Enter The Location Of Employee-" + i+1 +":-");
        Employye[i].Location = sc.nextLine();
        System.out.print("Enter The Age Of Employee-" + i+! +":-");
        Employye1[i].age = sc.nextInt();
        System.out.print("Enter The Salary Of Employee-" + i+1 +":-");
        Employye[i].salary = sc.nextInt(); }}
   public static void print(int n) { for(int j=0;j<n;j++) {
System.out.println("Employee Details:-\nName:- "+ Employye[i].Name + "\nPost:- " +
Employye[i].Post + "\nLOcation:- " + Employye[i].Location+ "\nAge:- "+ Employye[i].age
+" Years" + "\nSalary:- Rs " + Employye[i].salary + " /-"); }}}
public class Programm1
{ public static void main(String args[]) {
Scanner sc = new Scanner(System.in);
    System.out.print("How Many Employee's etail You Want To Save:-");
    int num = sc.nextInt();
    Employee_Detail  Employye[] = new  Employee_Detail [num];
    Employee_Detail.Details(num);
    Employee_Detail.print(num); }}
```

*Object Oriented Programming*                    *Student Roll No:- 922001333030*

# Output:-

```
C:\Windows\System32\cmd.exe                                          —    □    ×

Microsoft Windows [Version 10.0.19045.2604]
(c) Microsoft Corporation. All rights reserved.

D:\Aryan\Semester - 2\Object Orianted Programming\Assigment\10-03-2023 Pratical> javac Programm3.java

D:\Aryan\Semester - 2\Object Orianted Programming\Assigment\10-03-2023 Pratical> java Programm3
Enter The Name Of Employee:- Aryan Langhanoja
Enter The Post Of Employee:- Chaiman & MD
Enter The Location Of Employee:- Ahmedabad
Enter The Age Of Employee:- 19
Enter The Salary Of Employee:-200000000
Employee Details:-
Name:-  Aryan Langhanoja
Post:-  Chaiman & MD
LOcation:-  Ahmedabad
Age:- 19 Years
Salary:- Rs 200000000 /-

D:\Aryan\Semester - 2\Object Orianted Programming\Assigment\10-03-2023 Pratical>
```

|  | **Marwadi University** |
|---|---|
| | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP**<br>**(01CT0105)** | **Aim:-** Write a java program that checks whether a given string is palindrome or not. |
| **Experiment No:-** 5 | <u>**Date:-**</u><br>10-03-2023 | <u>**Enrolment No:- 92200133030**</u> |
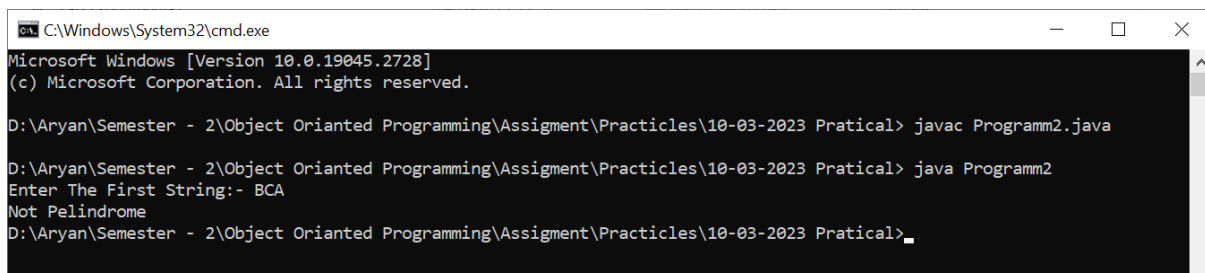
## Experiment – 5

**Objective :-** Write a java program that checks whether a given string is palindrome or not.

**Code:-**

```
import java.util.*;
public class Programm2
{public static void main(String args[]){
    Scanner sc = new Scanner (System.in);
    String A,B;
    System.out.print("Enter The First String:-");
    A = sc.nextLine();
    B=new StringBuilder(A).reverse().toString();
    if(A.equals(B))
    System.out.print("Palindrome");
    else
    System.out.print("Not Pelindrome"); }}
```

**Output:-**

| | **Marwadi University** |
|---|---|
| ![Marwadi University Logo] | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP (01CT0105)** | **Aim:-** Write a Java Program to implement all types of Inheritance. |
| **Experiment No:-** 6 | **Date:-** 07-04-2023 | **Enrolment No:-** 92200133030 |

## Experiment – 6

**Objective :-** Write a Java Program to implement all types of Inheritance.

 **Code:-**

```java
import java.util.*;
class Parent_Class {
   int num1;
   int num2;
   public void Add(int num1,int num2) {
      this.num1 = num1 ;
      this.num2 = num2 ;
      System.out.println("This Is A Method Of Patent Class");
      System.out.println("The Addition Of " + this.num1 + " and " + this.num2 + " Is " +
(this.num1 + this.num2)); }}
class Child_Class_1 extends  Parent_Class {
   int num3;
   public void Add(int num1,int num2,int num3) {
      this.num1 = num1;
      this.num2 = num2 ;
      this.num3 = num3 ;
      System.out.println("This Is A Method Of Child Class-1");
      System.out.println("The Addition Of " + this.num1 + " , " + this.num2 + "and " +
this.num3 + " Is " + (this.num1 + this.num2 + this.num3)); }}
class Child_Class_2 extends  Parent_Class {
   int num4;
   public void Add(int num1,int num2,int num4) {
      this.num1 = num1 ;
      this.num2 = num2 ;
      this.num4 = num4 ;
      System.out.println("This Is A Method Of Child Class-2");
      System.out.println("The Addition Of " + this.num1 + " , " + this.num2 + "and " +
this.num4 + " Is " + (this.num1 + this.num2 + this.num4)); }}
class Grand_Child extends Child_Class_1 {
   int num5;
   public void Add (int num1 , int num2 , int num3 , int num5) {
```

```java
      System.out.println("This Is A Method Of Grand Child Class:-");
      System.out.println("The Addition Of " + this.num1 + " , " + this.num2 + "and " +
this.num3 + " , "+ this.num5 + "" + " Is " + (this.num1 + this.num2 + this.num3 +
this.num5)); }}
public class Programm_1
{ public static void main(String[] args) {
  Scanner sc = new Scanner(System.in) ;
      Parent_Class P = new Parent_Class();
      Child_Class_1 C1 = new Child_Class_1();
      Child_Class_2 C2 = new Child_Class_2() ;
      Grand_Child G = new Grand_Child();
      System.out.print("Enter The Number-1:-");
      P.num1 = sc.nextInt();
      System.out.print("Enter The Number-2:-");
      P.num2 = sc.nextInt() ;
      System.out.print("Enter The Number-3:-");
      C1.num3 = sc.nextInt() ;
      C1.num1 =  P.num1 ;
      C1.num2 =  P.num2 ;
      System.out.print("Enter The Number-4:-");
      C2.num4 = sc.nextInt() ;
      C2.num1 =  P.num1 ;
      C2.num2 =  P.num2 ;
      System.out.print("Enter The Number-5:-");
      G.num5 = sc.nextInt() ;
      G.num3 = C1.num3 ;
      G.num1 = P.num1 ;
      G.num2 = P.num2 ;
      P.Add(P.num1, P.num2);
      C1.Add(C1.num1, C1.num2, C1.num3);
      C1.Add(C1.num1, C1.num2);
      C2.Add(C2.num1, C2.num2, C2.num4);
      C2.Add(C2.num1, C2.num2);
      G.Add(G.num1, G.num2);
      G.Add(G.num1, G.num2, G.num3);
      G.Add(G.num1, G.num2, G.num3, G.num5);
      sc.close(); }}
```

# Output:-

```
C:\Windows\System32\cmd.exe                                              —    □    ×

Microsoft Windows [Version 10.0.19045.2728]
(c) Microsoft Corporation. All rights reserved.

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\07-04-2023 Practicle> javac Programm_1.java

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\07-04-2023 Practicle> java Programm_1
Enter The Number-1:-1
Enter The Number-2:-2
Enter The Number-3:-3
Enter The Number-4:-4
Enter The Number-5:-5
This Is A Method Of Patent Class
The Addition Of 1 and 2 Is 3
This Is A Method Of Child Class-1
The Addition Of 1 , 2and 3 Is 6
This Is A Method Of Patent Class
The Addition Of 1 and 2 Is 3
This Is A Method Of Child Class-2
The Addition Of 1 , 2and 4 Is 7
This Is A Method Of Patent Class
The Addition Of 1 and 2 Is 3
This Is A Method Of Patent Class
The Addition Of 1 and 2 Is 3
This Is A Method Of Child Class-1
The Addition Of 1 , 2and 3 Is 6
This Is A Method Of Grand Child Class:-
The Addition Of 1 , 2and 3 , 5 Is 11

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\07-04-2023 Practicle>_
```

|  | **Marwadi University** |
| | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP (01CT0105)** | **Aim:-** Write a Java Program to Implement Static method. |
| **Experiment No:-** 7 | **Date:-** 07-04-2023 | **Enrolment No:-** 92200133030 |

# Experiment – 7

**Objective :-** Write a Java Program to Implement Static method.
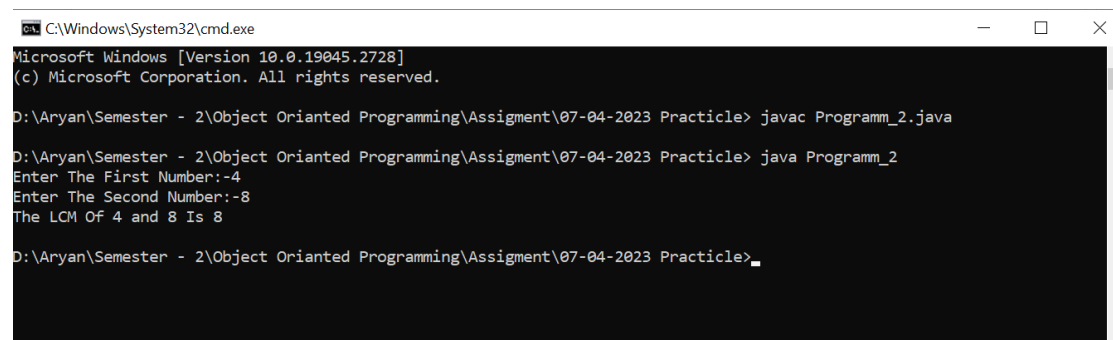
 **Code:-**

```
import java.util.*;

class LCM {
    public static int cal(int num1,int num2) {
        if(num2 == 0) { return num1 ; }
        else
        { return cal(num2,num1%num2) ; } }}
public class Programm_2
{    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in) ;
        int num1 ,num2 ;
        System.out.print("Enter The First Number:-");
        num1 = sc.nextInt();
        System.out.print("Enter The Second Number:-");
        num2 = sc.nextInt() ;
        int Add = (num1 * num2) / (LCM.cal(num1,num2) ) ;
        System.out.println("The LCM Of " + num1 + " and " + num2 + " Is " + Add);
        sc.close();
    }
}
```

## Output:-

| | **Marwadi University** |
|---|---|
| | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP (01CT0105)** | **Aim:-** Write a java program for Constructor overloading |
| **Experiment No:-** 8 | **Date:-** 24-03-2023 | **Enrolment No:-** 92200133030 |

# Experiment – 8

**Objective :-** Write a java program for Constructor overloading

**Code:-**

```java
import java.util.*;
class Class {
   String Name;
   long Roll_No ;
   int GR_No;
   Class() { }
   Class(String Name, long Roll_No,int GR_No) {
      this.Name = Name;
      this.Roll_No = Roll_No ;
      this.GR_No = GR_No ;
      System.out.println("Parameterized Constructor:-");
      System.out.println("Student Details:-\n" + "Name:- " + this.Name + "\nRoll- No:-
"+this.Roll_No + "\nSalary:- " + this.GR_No); }
   Class(Class c1) {
      System.out.println("Copy Constructor:-");
      System.out.println("Student Details:-\n" + "Name:- " + c1.Name + "\nRoll- No:-
"+c1.Roll_No + "\nSalary:- " + c1.GR_No); } }
public class Programm_5 {
   public static void main(String args[]) {
      Scanner sc  =  new Scanner (System.in) ;
      Class c1 = new Class() ;
      System.out.print("Enter Your Name:-");
      c1.Name = sc.nextLine() ;
      System.out.print("Enter Your Roll-No:-");
      c1.Roll_No = sc.nextLong();
      System.out.print("Enter Your GR No:-");
      c1.GR_No = sc.nextInt();
      Class c2 = new Class(c1.Name,c1.Roll_No,c1.GR_No) ;
      Class c3 = new Class(c2); } }
```

# Output:-

```
C:\Windows\System32\cmd.exe                                          —    □    ×

Microsoft Windows [Version 10.0.19045.2728]
(c) Microsoft Corporation. All rights reserved.

D:\Aryan\Semester - 2\Object Orianted Programming\Assigment\24-03-2023 Practical> javac Programm_5.java

D:\Aryan\Semester - 2\Object Orianted Programming\Assigment\24-03-2023 Practical> java Programm_5
Enter Your Name:- Aryan Langhanoja
Enter Your Roll-No:- 92200133030
Enter Your GR No:-119561
Parameterized Constructor:-
Student Details:-
Name:-  Aryan Langhanoja
Roll- No:- 92200133030
Salary:- 119561
Copy Constructor:-
Student Details:-
Name:-  Aryan Langhanoja
Roll- No:- 92200133030
Salary:- 119561

D:\Aryan\Semester - 2\Object Orianted Programming\Assigment\24-03-2023 Practical>
```

| | **Marwadi University** |
|---|---|
| ![Marwadi University Logo] Marwadi University | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP (01CT0105)** | **Aim:-** Write a java program to represent Abstract class with example |
| **Experiment No:-** 9 | **Date:-** 28-04-2023 | **Enrolment No:- 92200133030** |

# Experiment – 9

**Objective :-** Write a java program to represent Abstract class with example

**Code:-**
```java
import java.util.* ;
abstract class Shape{
  void getArea(){ }}
class Square extends Shape{
  public double length;
  public void getArea(){
    System.out.println("The Area Of Square Is " + (this.length * this.length));
  }}
class Rectangle extends Shape{
  public double length ;
  public double breadth ;
  public void getArea(){
    System.out.println("The Area Of Square Is " + (this.breadth * this.length));
  }}
class Circle extends Shape{
  public double Radius ;
  public void getArea(){
    System.out.println("The Area Of Circle Is " + (3.14159 * this.Radius * this.Radius));
  }}
public class Programm_1{
  public static void main(String[] args) {
    Scanner sc = new Scanner(System.in) ;
    int num ;
    System.out.println("Enter The Number According You Will Get Area:-\n1-Square\n2-Rectangle\n3-Circle");
    num = sc.nextInt() ;
    Square square = new Square();
    Rectangle rectangle = new Rectangle() ;
    Circle circle = new Circle() ;
    if(num == 1){
      System.out.println("Enter The Length Of  A Side  Of A Square:-");
      square.length = sc.nextInt();
```

```
        square.getArea();}
    else if(num == 2){
        System.out.println("Enter The Length Of A Rectangle");
        rectangle.length = sc.nextInt();
        System.out.println("Enter The Breadth Of A Rectangle");
        rectangle.breadth = sc.nextInt() ;
        rectangle.getArea();}
    else if(num == 3){
        System.out.println("Enter The Radius Of A Circle:-");
        circle.Radius = sc.nextInt();
        circle.getArea();}
    else{
            System.out.println("Enter The Valid Input");
    }
    sc.close();}}
```

## Output:-

```
Microsoft Windows [Version 10.0.19045.2965]
(c) Microsoft Corporation. All rights reserved.

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Practicles\28-04-2023 Practical> javac Programm_1.java

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Practicles\28-04-2023 Practical> java Programm_1
Enter The Number According You Will Get Area:-
1-Square
2-Rectangle
3-Circle
3
Enter The Radius Of A Circle:-
5
The Area Of Circle Is 78.53975
```

| | **Marwadi University** |
|---|---|
| ![Marwadi University logo] | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP (01CT0105)** | **Aim:-** Write a java program to implement Interface using extends keyword. |
| **Experiment No:-** 10 | **Date:-** 03-03-2023 | **Enrolment No:- 92200133030** |

# Experiment – 10

**Objective :-** Write a java program to implement Interface using extends keyword.

**Code:-**
```java
import java.util.*;
interface Shape{
   public void getArea() ;}
interface Circumference extends Shape{
 public void getCircumference() ;}
class Square implements Circumference
{  public double length;
   public void getArea(){
     System.out.println("The Area Of Square Is " + (this.length * this.length));}
   public void getCircumference(){
     System.out.println("The CIrcumference Is " + (4 *this.length));}}
class Rectangle implements Circumference{
   public double length ;
   public double breadth ;
   public void getArea(){
     System.out.println("The Area Of Square Is " + (this.breadth * this.length));
   }public void getCircumference(){
     System.out.println("The Circumference Of Rectangle Is " + (2*(this.length +
this.breadth))); }}
class Circle implements Circumference{
   public double Radius ;
   public void getArea(){
   System.out.println("The Area Of Circle Is " + (3.14159 * this.Radius * this.Radius));
   }public void getCircumference(){
     System.out.println("The Circumference OF A Circle Is " + (2 * 3.14159 * this.Radius));
   }}
public class Programm_2 {
   public static void main(String[] args) {
     Scanner sc = new Scanner(System.in) ;
```

```java
        int num ;
        System.out.println("Enter The Number According You Will Get Area:-\n1-Square\n2-
Rectangle\n3-Circle");
        num = sc.nextInt() ;
        Square square = new Square();
        Rectangle rectangle = new Rectangle() ;
        Circle circle = new Circle() ;
        if(num == 1){
            System.out.println("Enter The Length Of  A Side  Of A Square:-");
            square.length = sc.nextInt();
            square.getArea();
            square.getCircumference();}
        else if(num == 2){
            System.out.println("Enter The Length Of A Rectangle");
            rectangle.length = sc.nextInt();
          System.out.println("Enter The Breadth Of A Rectangle");
            rectangle.breadth = sc.nextInt() ;
            rectangle.getArea();
            rectangle.getCircumference();
        }else if(num == 3){
            System.out.println("Enter The Radius Of A Circle:-");
            circle.Radius = sc.nextInt();
            circle.getArea();
            circle.getCircumference();
        }
        else{
            System.out.println("Enter The Valid Input"); }
        sc.close();}}
```

## Output:-

```
Microsoft Windows [Version 10.0.19045.2965]
(c) Microsoft Corporation. All rights reserved.

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Practicles\28-04-2023 Practical> javac Programm_2.java

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Practicles\28-04-2023 Practical> java Programm_2
Enter The Number According You Will Get Area:-
1-Square
2-Rectangle
3-Circle
2
Enter The Length Of A Rectangle
3
Enter The Breadth Of A Rectangle
4
The Area Of Square Is 12.0
The Circumference Of Rectangle Is 14.0
```

|  | **Marwadi University** |
| | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |

| **Subject:- OOP (01CT0105)** | **Aim:-** Write a Java program to implement multiple inheritance using interface. | |
| **Experiment No:-** 11 | **Date:-** 03-03-2023 | **Enrolment No:- 92200133030** |

# Experiment – 11

**Objective :-** Write a Java program to implement multiple inheritance using interface.

**Code:-**
```
interface Parent_Class_1{ void sum(int a,int b);}
interface Parent_Class_2 { void sum(int a,int b); }
class Child_Class implements  Parent_Class_1 , Parent_Class_2{
    public void sum(int a,int b){
        System.out.println(a +" + " + b + " = " + (a+b));}}
public class Programm_3{
    public static void main(String[] args) {
        Child_Class c1 = new Child_Class() ;
        c1.sum(5,6) ;
        c1.sum(6, 7); }}
```
**Output:-**

| ![Marwadi University logo] Marwadi University | **Marwadi University** |
| | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP** **(01CT0105)** | **Aim:-** Write a Java program to show the difference between interface and abstract class. |
| **Experiment No:-** 12 | **Date:-** 03-03-2023 | **Enrolment No:- 92200133030** |

# Experiment – 12

**Objective :-** Write a Java program to show the difference between interface and abstract class.

 **Code:-**

```java
import java.util.*;
interface Interface{
    public void sum();
    public void sup();}
class Interface_Class implements Interface{
    int a;
    int b;
    public void sum(){
        System.out.println("Addition of " + this.a + " and " + this.b + " is " + (this.a + this.b));}
    public void sup(){
        System.out.println("Substraction of " + this.a + " and " + this.b + " is " + (this.a -
this.b)); }}
abstract class Abstract_Class {
    public void sum(){}
    public void sup(){} }
class Abstract_Child_Class extends Abstract_Class {
    int a;
    int b;
    public void sum(){
        System.out.println("Addition of " + this.a + " and " + this.b + " is " + (this.a + this.b));}
    public void sup(){
        System.out.println("Substraction of " + this.a + " and " + this.b + " is " + (this.a -
this.b));}}
public class Programm_4 {
    public static void main(String[] args) {
        Scanner sc= new Scanner(System.in) ;
        Abstract_Child_Class Abs = new Abstract_Child_Class();
```

```
Interface_Class Int = new Interface_Class() ;
System.out.println("Enter The Value Of A:-");
Abs.a = sc.nextInt() ;
System.out.println("Enter The Value Of B:-");
Abs.b = sc.nextInt() ;
Int.a = Abs.a ;
Int.b = Abs.b ;
Abs.sum();
Abs.sup();
Int.sum();
Int.sup();
sc.close(); }}
```

## Output:-

```
Microsoft Windows [Version 10.0.19045.2965]
(c) Microsoft Corporation. All rights reserved.

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Practicles\28-04-2023 Practical> javac Programm_4.java

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Practicles\28-04-2023 Practical> java Programm_4
Enter The Value Of A:-
3
Enter The Value Of B:-
4
Addition of 3 and 4 is 7
Substraction of 3 and 4 is -1
Addition of 3 and 4 is 7
Substraction of 3 and 4 is -1

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Practicles\28-04-2023 Practical>
```

| | **Marwadi University** |
| | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |

| **Subject:- OOP (01CT0105)** | **Aim:-** Write a Java program to implement 1D Array. | |
|---|---|---|
| **Experiment No:-** 13 | **Date:-** 03-03-2023 | **Enrolment No:-** 92200133030 |

# Experiment – 13

**Objective :-** Write a Java program to implement 1D Array.

**Code:-**
```java
public class Programm_1 {
    public static void main(String[] args) {
        int[] arr = new int[10] ;
        for(int i=0;i<10;i++){
            arr[i] = i ;}
        for(int i=0;i<10;i++){
            System.out.println("arr[" + i + "] = " + arr[i]);
        } } }
```

**Output:-**

```
D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Practicles\05-05-2023 Pratical> javac Programm_1.java

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Practicles\05-05-2023 Pratical> java Programm_1
arr[0] = 0
arr[1] = 1
arr[2] = 2
arr[3] = 3
arr[4] = 4
arr[5] = 5
arr[6] = 6
arr[7] = 7
arr[8] = 8
arr[9] = 9

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Practicles\05-05-2023 Pratical>
```

| | **Marwadi University** |
|---|---|
| ![Marwadi University Logo] | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |

| **Subject:- OOP (01CT0105)** | **Aim:-** Write a Java program to implement 2D Array. | |
|---|---|---|
| **Experiment No:-** 14 | **Date:-** 03-03-2023 | **Enrolment No:-** 92200133030 |

# Experiment – 14

**Objective :**-Write a Java program to implement 2D Array.

**Code:-**

```java
public class Programm_2 {
    public static void main(String[] args){
        int[][] arr = new int[2][5] ;
        int var = 0;
        for(int i=0;i<2;i++){
            for(int j=0;j<5;j++){
                arr[i][j] = var ;
                var++; }}
        for(int i=0;i<2;i++){
            for(int j=0;j<5;j++){
                System.out.println("arr[" + i + "][" + j + "] = " + arr[i][j]);
            }}}}
```

**Output:-**

```
D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Practicles\05-05-2023 Pratical> javac Programm_2.java

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Practicles\05-05-2023 Pratical> java Programm_2
arr[0][0] = 0
arr[0][1] = 1
arr[0][2] = 2
arr[0][3] = 3
arr[0][4] = 4
arr[1][0] = 5
arr[1][1] = 6
arr[1][2] = 7
arr[1][3] = 8
arr[1][4] = 9

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Practicles\05-05-2023 Pratical>
```

| | **Marwadi University** |
|---|---|
| ![Marwadi University logo] | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP (01CT0105)** | **Aim:-** Write a Java program to insert an element in 1D Array. |
| **Experiment No:-** 15 | **Date:-** 03-03-2023 | **Enrolment No:-** 92200133030 |

# Experiment – 15

**Objective :-** Write a Java program to insert an element in 1D Array.

**Code:-**
```java
import java.util.*;
public class Programm_3 {
    public static void main(String[] args) {
        Scanner sc= new Scanner(System.in);
        int arr[] = new int[10] ;
        for(int i=0;i<10;i++) {
            System.out.println("Enter The Number At arr[" + i + "] :-");
            arr[i] = sc.nextInt() ; }
        for(int i=0;i<10;i++) {
        System.out.println("arr[" + i + "] = " + arr[i]);
        }
        sc.close(); }}
```

**Output:-**

| | **Marwadi University** |
|---|---|
| ![Marwadi University Logo] | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |

| **Subject:- OOP (01CT0105)** | **Aim:-** Write a Java program to delete an element from 1D Array. | |
|---|---|---|
| **Experiment No:-** 16 | **Date:-** 03-03-2023 | **Enrolment No:- 92200133030** |

# Experiment – 16

**Objective :**-Write a Java program to delete an element from 1D Array.

**Code:-**
```
import java.util.*;
public class Programm_4 {
    public static void main(String[] args) {
        Scanner sc= new Scanner(System.in);
        int arr[] = new int[10] ;
        int del ;
        for(int i=0;i<10;i++){
            System.out.println("Enter The Number At arr[" + i + "] :-");
            arr[i] = sc.nextInt() ; }
        System.out.println("Enter the Index You Want To Delete:-");
        del = sc.nextInt();
        arr[del] = 0 ;
        for(int i=0;i<10;i++){
            System.out.println("arr[" + i + "] = " + arr[i]);}
        sc.close();}}
```

**Output:-**

| | **Marwadi University** |
| | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP (01CT0105)** | **Aim:-** Write a java program to create user defined package. Import Package and Use it functionality in another Java File. |
| **Experiment No:-** 17 | **Date:-** 03-03-2023 | **Enrolment No:-** 92200133030 |

# Experiment – 17

**Objective :-** Write a java program to create user defined package. Import Package and Use it functionality in another Java File.

**Code:-**
```java
package Packeges_My;
public class MyPackage {
    public static int sum(int a, int b) {
        return (a + b); }}


import Packeges_My.*;
public class Main {
    public static void main(String[] args) {
        int a = 5;
        int b = 5;
        System.out.println(MyPackage.sum(a,b)); }}
```

**Output:-**

```
Microsoft Windows [Version 10.0.19045.2965]
(c) Microsoft Corporation. All rights reserved.

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 7> javac Main.java

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 7> java Main
10

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 7>
```

| | **Marwadi University** |
|---|---|
| | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP (01CT0105)** | **Aim:-** Write a Java Program to demonstrate Exception Handling using try, catch and finally. |
| **Experiment No:-** 18 | **Date:-** 03-03-2023     **Enrolment No:- 92200133030** |

# Experiment – 18

**Objective :-** Write a Java Program to demonstrate Exception Handling using try, catch and finally.

**Code:-**
```java
import java.util.*;
public class My_Exception{
   public static void main(String[] args)
      Scanner sc = new Scanner(System.in);
      System.out.println("Enter The Number - 1 :-");
      int a = sc.nextInt();
      try{
         int b;
         System.out.println("Enter The Number - 2 :-");
         b = sc.nextInt();
         int c = a / b ;}
      catch (Exception e) {
         System.out.println("Can't Divide By Zero.");}
      Finally {
         System.out.println("Programm Ends");
      }}}
```

**Output:-**

```
Microsoft Windows [Version 10.0.19045.2965]
(c) Microsoft Corporation. All rights reserved.

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 7> javac My_Exception.java

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 7> java My_Exception
Enter The Number - 1 :-
7
Enter The Number - 2 :-
0
Can't Divide By Zero.
Programm Ends

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 7>
```

|  | **Marwadi University** |
| | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |

| **Subject:- OOP (01CT0105)** | **Aim:-** Write a Custom Exception and Use it. | |
| **Experiment No:-** 19 | **Date:-** 03-03-2023 | **Enrolment No:- 92200133030** |

# Experiment – 19

**Objective :-** Write a Custom Exception and Use it.

**Code:-**
```
import java.util.*;
class Custom_Ex extends Exception {
    Custom_Ex() {
        System.out.println("Custom Exception Occurs"); } }
public class Custom {
    public static void main(String[] args) {
        Scanner sc = new Scanner (System.in) ;
        int a , b ;
        System.out.println("Enter The Number:-");
        a = sc.nextInt();
        System.out.println("Enter The Second Number:-");
        b = sc.nextInt();
        if( b == 0) {
            try { throw new Custom_Ex(); }
            catch (Exception My_Exception)  {
                System.out.println("Can't Divide By Zero"); }}
        System.out.println("Answer :- " + (a/b)); } }
```

**Output:-**



*Object Oriented Programming*                              *Student Roll No:- 922001333030*

Department of Information and Communication Technology

| | **Marwadi University** |
|---|---|
| | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP** **(01CT0105)** | **Aim:-** Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number. |
| **Experiment No:-** 20 | **Date:-** 03-03-2023 | **Enrolment No:-** 92200133030 |

## Experiment – 20

**Objective :-** Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

**Code:-**

```
import java.util.Random;
class RandomNumberGenerator implements Runnable {
    public void run() {
        Random random = new Random();
        int num = 0;
        while (num<=10) {
            int number = random.nextInt(100);
            System.out.println("Generated number: " + number);
            if (number % 2 == 0) {
                Thread squareThread = new Thread(new SquareCalculator(number));
                squareThread.start(); }
            else {
                Thread cubeThread = new Thread(new CubeCalculator(number));
                cubeThread.start();}
            try {Thread.sleep(1000); }
            catch (InterruptedException e) {
                e.printStackTrace(); }
                    num ++;} } }
class SquareCalculator implements Runnable {
    private int number;
    public SquareCalculator(int number) {
        this.number = number; }
    public void run() {
        int square = number * number;
```

```
        System.out.println("Square of " + number + " is: " + square); } }

class CubeCalculator implements Runnable {
 private int number;
    public CubeCalculator(int number) {
        this.number = number; }
    public void run() {
        int cube = number * number * number;
        System.out.println("Cube of " + number + " is: " + cube); } }
public class Table {
    public static void main(String[] args) {
        Thread generatorThread = new Thread(new RandomNumberGenerator());
        generatorThread.start(); } }
```

**Output:-**

```
Microsoft Windows [Version 10.0.19045.2965]
(c) Microsoft Corporation. All rights reserved.

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 8> javac Table.java

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 8> java Table
Generated number: 71
Cube of 71 is: 357911
Generated number: 77
Cube of 77 is: 456533
Generated number: 52
Square of 52 is: 2704
Generated number: 79
Cube of 79 is: 493039
Generated number: 82
Square of 82 is: 6724
Generated number: 97
Cube of 97 is: 912673
Generated number: 14
Square of 14 is: 196
Generated number: 46
Square of 46 is: 2116
Generated number: 16
Square of 16 is: 256
Generated number: 9
Cube of 9 is: 729

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 8>
```

| | **Marwadi University** |
|---|---|
| ![Marwadi University logo] | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |

| **Subject:- OOP (01CT0105)** | **Aim:-** Write a Java program to implement Collection Framework | |
|---|---|---|
| **Experiment No:-** 21 | **Date:-** 03-03-2023 | **Enrolment No:-** 92200133030 |

# Experiment – 21

**Objective :-** Write a Java program to implement Collection Framework

**Code:-**
```java
import java.util.ArrayList;
import java.util.LinkedList;
public class CF {
    public static void main(String[] args) {
        ArrayList<String> arrayList = new ArrayList<>();
        arrayList.add("Apple");
        arrayList.add("Banana");
        arrayList.add("Orange");
        System.out.println("ArrayList elements: " + arrayList);
        LinkedList<Character> linkedList = new LinkedList<>();
        linkedList.add('A');
        linkedList.add('B');
        linkedList.add('C');
        System.out.println("LinkedList elements: " + linkedList); } }
```

**Output:-**

```
Microsoft Windows [Version 10.0.19045.2965]
(c) Microsoft Corporation. All rights reserved.

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 8> javac CF.java

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 8> java CF
ArrayList elements: [Apple, Banana, Orange]
LinkedList elements: [A, B, C]

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 8>
```

| | Marwadi University |
| --- | --- |
| | **Marwadi University**<br><br>**Faculty of Technology**<br><br>**Department of Information and Communication Technology** |
| **Subject:- OOP (01CT0105)** | **Aim:-** Write a Java program that reads a file and displays the file on the screen, with a line number before each line. |
| **Experiment No:-** 22 | **Date:-**<br>03-03-2023 | **Enrolment No:-** 92200133030 |

# Experiment – 22

**Objective :-** Write a Java program that reads a file and displays the file on the screen, with a line number before each line.

**Code:-**

```java
import java.io.BufferedReader;
import java.io.FileReader;
import java.io.IOException;
public class File_Read {
    public static void main(String[] args) {
        try (BufferedReader reader = new BufferedReader(new FileReader("ABC.txt"))) {
            String line;
            int lineNumber = 1;
            while ((line = reader.readLine()) != null) {
                System.out.printf("%d: %s%n", lineNumber, line);
                lineNumber++;  } }
catch (IOException e) {
        System.out.println("An error occurred while reading the file: " + e.getMessage());
    }}}
```

**Output:-**

```
Microsoft Windows [Version 10.0.19045.2965]
(c) Microsoft Corporation. All rights reserved.

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 8> javac File_Read.java

D:\Aryan\Semester - 2\Object Oriented Programming\Assigment\Lab Assigments\Lab Assigment - 8> java File_Read
1: Lorem Ipsum is simply dummy text of the printing and typesetting industry.
2: Lorem Ipsum has been the industry's standard dummy text ever since the 1500s,
3: when an unknown printer took a galley of type and scrambled it to make a type specimen book.
4: It has survived not only five centuries, but also the leap into electronic typesetting,
5: remaining essentially unchanged. It was popularised in the 1960s with the release of Letraset sheets containing Lorem
 Ipsum passages,
6: and more recently with desktop publishing software like Aldus PageMaker including versions of Lorem Ipsum.
7:
8: It is a long established fact that a reader will be distracted by the readable
9: content of a page when looking at its layout. The point of using Lorem Ipsum is
10: that it has a more-or-less normal distribution of letters, as opposed to using 'Content here, content here',
11: making it look like readable English. Many desktop publishing packages and
12: web page editors now use Lorem Ipsum as their default model text, and a search for 'lorem ipsum' will
13: uncover many web sites still in their infancy. Various versions have evolved over the years,
14: sometimes by accident, sometimes on purpose (injected humour and the like).
```

|  | **Marwadi University** |
| | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |

| **Subject:- OOP** **(01CT0105)** | **Aim:-** Develop an AWT/SWING program that receives an integer in one text field & compute its factorial value & returns it in another text filed when the button "Computer" is clicked | |
|---|---|---|
| **Experiment No:-** 23 | **Date:-** 03-03-2023 | **Enrolment No:-** 92200133030 |

## Experiment – 23

**Objective :-** Develop an AWT/SWING program that receives an integer in one text field & compute its factorial value & returns it in another text filed when the button "Computer" is clicked

**Code:-**

```
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
public class FactorialCalculator extends JFrame implements ActionListener {
    private JTextField inputField;
    private JTextField outputField;
    private JButton computeButton;
    public FactorialCalculator() {
        setTitle("Factorial Calculator");
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setSize(300, 150);
        setLocationRelativeTo(null);
        inputField = new JTextField(10);
        outputField = new JTextField(10);
        outputField.setEditable(false);
        computeButton = new JButton("Compute");
        computeButton.addActionListener(this);
        JPanel panel = new JPanel();
        panel.add(new JLabel("Enter an integer:"));
        panel.add(inputField);
        panel.add(computeButton);
        panel.add(new JLabel("Factorial value:"));
        panel.add(outputField);
        setContentPane(panel); }
    public void actionPerformed(ActionEvent e) {
        if (e.getSource() == computeButton) {
            String input = inputField.getText();
```
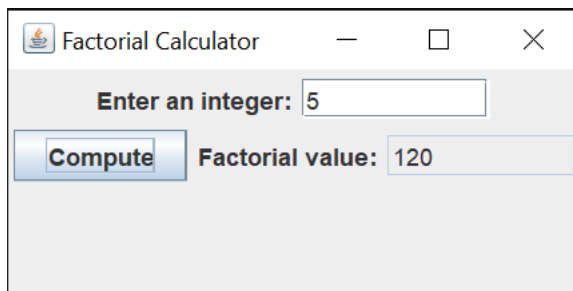
```java
        try {
            int number = Integer.parseInt(input);
            long factorial = computeFactorial(number);
            outputField.setText(String.valueOf(factorial)); }
        catch (NumberFormatException ex) {
            outputField.setText("Invalid input"); } } }
    private long computeFactorial(int number)  {
        long factorial = 1;
        for (int i = 2; i <= number; i++) {factorial *= i; }
        return factorial;}
    public static void main(String[] args) {
        SwingUtilities.invokeLater(() -> {
            FactorialCalculator calculator = new FactorialCalculator();
            calculator.setVisible(true);
        }); }}
```

## Output:-

| | **Marwadi University** |
|---|---|
|  | **Faculty of Technology** |
| | **Department of Information and Communication Technology** |
| **Subject:- OOP (01CT0105)** | **Aim:-** Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "stop" or "ready" or "go" should appear above the buttons in a selected color. Initially there is no message shown. |
| **Experiment No:-** 24 | **Date:-** 03-03-2023     **Enrolment No:- 92200133030** |

## **Experiment – 24**

**Objective :-** Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "stop" or "ready" or "go" should appear above the buttons in a selected color. Initially there is no message shown.

### **Code:-**
```
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
public class TrafficLightSimulation extends JFrame implements ActionListener {
    private JLabel label;
    public TrafficLightSimulation() {
        setTitle("Traffic Light Simulation");
        setSize(300, 400);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setLayout(new FlowLayout());
        JRadioButton redButton = new JRadioButton("Red");
        redButton.setActionCommand("stop");
        redButton.addActionListener(this);
        JRadioButton yellowButton = new JRadioButton("Yellow");
        yellowButton.setActionCommand("ready");
        yellowButton.addActionListener(this);
        JRadioButton greenButton = new JRadioButton("Green");
        greenButton.setActionCommand("go");
        greenButton.addActionListener(this);
        ButtonGroup buttonGroup = new ButtonGroup();
        buttonGroup.add(redButton);
        buttonGroup.add(yellowButton);
        buttonGroup.add(greenButton);
```

```java
        label = new JLabel();
        label.setPreferredSize(new Dimension(200, 100));
        add(redButton);
        add(yellowButton);
        add(greenButton);
        add(label);
        setVisible(true); }
    public void actionPerformed(ActionEvent e) {
        String command = e.getActionCommand();
        String message = "";
        if (command.equals("stop")) {
            label.setForeground(Color.RED);
            message = "Stop";
        } else if (command.equals("ready")) {
            label.setForeground(Color.YELLOW);
            message = "Ready";
        } else if (command.equals("go")) {
            label.setForeground(Color.GREEN);
            message = "Go";
        }
        label.setText(message);
    }
    public static void main(String[] args)
    {
        SwingUtilities.invokeLater(new Runnable() {
            public void run() {
                new TrafficLightSimulation();
            }
        });
    }
}
```

## Output:-