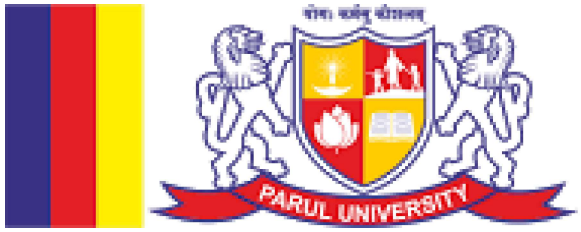

Parul University

FACULTY OF ENGINEERING AND TECHNOLOGY

BACHELOR OF TECHNOLOGY

OBJECT ORIENTED PROGRAMMING WITH JAVA (203105334)

5TH SEMESTER

COMPUTER SCIENCE AND ENGINEERING DEPARTMENT

Laboratory Manual

PREFACE

CERTIFICATE

This is to certify that

Mr. **Ashishranjan Prasad** *with enrolment no.* **190303105021** *and semester/division* **5B1** *has successfully completed his laboratory experiments in the Object-Oriented Programming with Java (203105334) from the department of Computer Science And Engineering during the academic year 2021-2022.*

Date of Submission: ……

Staff In Charge: ……

Head of Department: ……

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PRACTICAL – 1

Aim: - Write a program to count the number of words that start with a capital letter.

Code: -

```
import java.util.Scanner;
public class practical_1 {
    public static void main(String[] args) {
        String str1;
        Scanner obj = new Scanner(System.in);
        System.out.println("Enter any String: ");
        str1 = obj.nextLine();
        int len = str1.length();
        char c;
        int count = 0;
        for (int i = 0; i < len; i++) {
            c = str1.charAt(i);
            if (c>=65 && c<=90) {
                count++;
            }
        }
        System.out.println(str1);
        System.out.println("No. of capital letter in given str
ing is " + count);
    }
}
```

Output: -

```
Enter any String:
Ankit Singh
Ankit Singh
No. of captital letter in given string is 2
```

PRACTICAL – 1.1

Aim: - Write a java program to take an array of strings as an input, and arrange strings in ascending order.

Code: -

```
import java.util.Arrays;
import java.util.Scanner;
public class StringSort {
    public static void main(String[] args) {
        String name[];
        Scanner obj = new Scanner(System.in);
        System.out.println("Enter Six Strings: ");
        name = new String[6];
        for (int i = 0; i < 6; i++) {
            name[i] = obj.nextLine();
        }
        Arrays.sort(name);
        System.out.print("Sorted Array: ");
        System.out.println(Arrays.toString(name));

    }
}
```

Output: -

```
Enter Six Strings:
Age
Dash
Line
Text
Game
Play
Sorted Array: [Age, Dash, Game, Line, Play, Text]
```

PRACTICAL – 2

Aim: - Write a program to find the largest number in an array of numbers using command line arguments.

Code: -

```
public class max {
    public static void main(String[] args) {
        int num, maximum;
        num = Integer.parseInt(args[0]);
        int arr[] = new int[num];
        for (int i = 0; i < num; i++) {
            arr[i] = Integer.parseInt(args[i+1]);
        }
        maximum = arr[0];
        for (int i = 0; i < num; i++) {
            if (maximum<arr[i]) {
                maximum = arr[i];
            }
        }
        System.out.println("Maximum value from given array is:
 " + maximum);
    }
}
```

Output: -

```
PS D:\5th Semester\OOPJ\Lab> javac max.java
PS D:\5th Semester\OOPJ\Lab> java max 4 2 3 4 23
Maximum value from given array is: 23
```

PRACTICAL – 2.1

Aim: - Write a program to find factorial of number. Here, take number as command line argument.

Code: -

```
public class fact {
    public static void main(String[] a) {
        int number;
        number = Integer.parseInt(a[0]);
        int n = 1;
        for (int i = 1; i <= number; i++) {
            n = n * i;
        }
        System.out.println("The factorial of " + number + " is
 " + n);
    }
}
```

Output: -

```
PS D:\5th Semester\OOPJ\Lab> javac fact.java
PS D:\5th Semester\OOPJ\Lab> java fact 5
The factorial of 5 is 120
```

PRACTICAL – 3

Aim: - Write a program to demonstrate class and objects using the concept of an array object.

Code: -

```
import java.util.Scanner;
public class example {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter Number of Students: ");
        int number = sc.nextInt();
        student data[] = new student[number];
        for (int i = 0; i < number; i++) {
            data[i] = new student();
            data[i].dataInsert();
        }
        for (int i = 0; i < number; i++) {
            data[i].display();
        }
    }
}
class student {
    int rollno;
    String name;
    public void dataInsert() {
        Scanner sc1 = new Scanner(System.in);
        System.out.println("Enter Roll No: ");
        rollno = sc1.nextInt();
        System.out.println("Enter Name: ");
```

```
        name = sc1.next();
    }
    public void display() {
        System.out.println("Roll no is : " + rollno + "\tName
is : " + name);
    }
}
```

Output: -

```
Enter Number of Students: 3
Enter Roll No:
1
Enter Name:
Ankit
Enter Roll No:
2
Enter Name:
Rahul
Enter Roll No:
3
Enter Name:
Ashish
Roll no is : 1  Name is : Ankit
Roll no is : 2  Name is : Rahul
Roll no is : 3  Name is : Ashish
```

PRACTICAL – 3.1

Aim: - Declare a class Box. Overload Box constructors with zero argument, one argument and three argument to initialize the members of the class. Declare a method to find volume of the box.

Code: -

```
public class box_volume {
    public static void main(String[] args) {
        box b = new box();
        box b1 = new box(10);
        box b2 = new box(10,4,6);
        b.volume();
        b1.volume();
        b2.volume();
    }
}
class box{
    double l, b, h, a;
    box() {
        System.out.println("Zero Args");
    }
    box(double l){
        this.l = l;
    }
    box(double b, double h, double a){
        this.a = a;
        this.b = b;
        this.h = h;
    }
    void volume() {
```

```
        double v = a*b*h;
        System.out.println("Volume of a box is: " + v);
    }
}
```

Output: -

```
Zero Args
Volume of a box is: 0.0
Volume of a box is: 0.0
Volume of a box is: 240.0
```

PRACTICAL – 4

Aim: - Write a program to demonstrate garbage collection using System.gc() or Runtime.gc().

Code: -

```
public class TestGarbage1{
    public void finalize(){
        System.out.println("object is garbage collected");
    }
    public static void main(String args[]){
     TestGarbage1 s1=new TestGarbage1();
     TestGarbage1 s2=new TestGarbage1();
     s1=null;
     s2=null;
     System.gc();
    }
}
```

Output: -

```
object is garbage collected
object is garbage collected
```

PRACTICAL – 4.1

Aim: - Write a program to show the use of finalize method for garbage collection.

Code: -

```
public class TestGarbage1{
    public void finalize(){
        System.out.println("object is garbage collected");
    }
    public static void main(String args[]){
     TestGarbage1 s1=new TestGarbage1();
     TestGarbage1 s2=new TestGarbage1();
     s1=null;
     s2=null;
     System.gc();
    }
}
```

Output: -

```
object is garbage collected
object is garbage collected
```

PRACTICAL – 5

Aim: - Write a program to demonstrate static constants and final constants.

Code: -

```
public class practical_5 {
    static int subjectCode = 203105334 ;
    final static String subject = "OOPJ";
    public static void main(String[] args)
    {
        System.out.println(subject + "(" + subjectCode + ")");
    }
}
```

Output: -

```
OOPJ(203105334)
```

PRACTICAL – 5.1

Aim: - Write a program to create a class named as Bike which consist one final method called as run(),Declare a subclass Bike & demonstrate the use of final method.

Code: -

```
class Bike {
    final void run(){
        System.out.println("Bike is Running.");
    }
}
public class Bikes extends Bike{
    public static void main(String[] args) {
        Bikes b = new Bikes();
        b.run();
    }
}
```

Output: -

```
Bike is Running.
```

PRACTICAL – 6

Aim: - Write a program to explain static polymorphism in java.

Code: -

```
class Addition{
    void Add(int a, int b){
        int c = a+b;
        System.out.println(c);
    }
    void Add(int a, int b, int c){
        int d = a+b+c;
        System.out.println(d);
    }
}
public class static_poly {
    public static void main(String[] args) {
        Addition add = new Addition();
        add.Add(5, 6);
        add.Add(5, 6, 7);
    }
}
```

Output: -

```
11
18
```

PRACTICAL – 6.1

Aim: - Write a program to find volume of Box using concept of method overloading.

Code: -

```
class Volume{
    void volume(int l, int b, int h){
        int v = l*b*h;
        System.out.println("Volume of a box is: " + v);
    }
    void volume(int l, double b, int h){
        double v = l*b*h;
        System.out.println("Volume of a box is: " + v);
    }
    void volume(double l, int b, double h){
        double v = l*b*h;
        System.out.println("Volume of a box is: " + v);
    }
}
public class Box {
    public static void main(String[] args) {
        Volume vol = new Volume();
        vol.volume(5, 6, 7);
        vol.volume(5, 6.5, 7);
        vol.volume(6.5, 5, 7.5);
    }
}
```

Output: -

```
Volume of a box is: 210
Volume of a box is: 227.5
Volume of a box is: 243.75
```

PRACTICAL – 7

Aim: - Write a program to find the factorial of a number using interface.

Code: -

```
interface factorial1{
    void fact(int a);
}
class factorial2 implements factorial1{
    public void fact(int a) {
        int n = 1;
        for (int i = 1; i <= a; i++) {
            n = n * i;
        }
        System.out.println("The factorial of " + a + " is " +
n);
    }
}
public class fact_interface {
    public static void main(String[] args) {
        factorial2 f = new factorial2();
        f.fact(5);
    }
}
```

Output: -

```
The factorial of 5 is 120
```

PRACTICAL – 7.1

Aim: - Write a program to implement multiple inheritance in java using interface.

Code: -

```
interface Print1{
    void print();
}
interface Print2{
    void print();
}
class Show implements Print1,Print2{
    public void print() {
        System.out.println("Multiple Inheritance");
    }
}
public class inter_mul_inher {
    public static void main(String[] args) {
        Show s = new Show();
        s.print();
    }
}
```

Output: -

```
Multiple Inheritance
```

PRACTICAL – 7.2

Aim: - Create a package called Mathsoperation1, which must contain classes to perform addition, subtraction, create another package called Mathsoperation2, which must contain classes to perform multiplication and division operation. Create a main class and import the Mathsoperation1, Mathsoperation1 package in it to perform all the operations on the input numbers provided by the user. Finally, display the result of each operation on the console.

Code: -

MathsOperation1.java

```
package MathsOperation;
public class MathsOperation1 {
    public void add(int a, int b) {
        int c = a+b;
        System.out.println("Addition of " + a + " and " + b +
" is: " + c);
    }
    public void sub(int a, int b) {
        int c = a-b;
        System.out.println("Subtraction of " + a + " and " +
b + " is: " + c);
    }
}
```

MathsOperation2.java

```
package MathsOperation;
public class MathsOperation2 {
    public void mul(int a, int b) {
        int c = a*b;
        System.out.println("Multiplication of " + a + " and "
+ b + " is: " + c);
    }
```

```
    public void div(int a, int b) {
        int c = a/b;
        System.out.println("Division of " + a + " and " + b +
" is: " + c);
    }
}
```

Main.java

```
package MathsOperation;
import java.util.*;
public class Main {
    public static void main(String[] args) {
        MathsOperation1 add_sub = new MathsOperation1();
        MathsOperation2 mul_div = new MathsOperation2();
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter two number to perform
Addition, Subtraction, Multiplication and Division");
        int a = sc.nextInt();
        int b = sc.nextInt();
        add_sub.add(a, b);
        add_sub.sub(a, b);
        mul_div.mul(a, b);
        mul_div.div(a, b);
    }
}
```

Output: -

```
Enter two number to perform Addition, Subtraction, Multiplication and Division
10
5
Addition of 10 and 5 is: 15
Subtraction of 10 and 5 is: 5
Multiplication of 10 and 5 is: 50
Division of 10 and 5 is: 2
```