Laboratory Work

Subject: Java Technologies
Branch: B.Tech. (CE)
Semester: IV
Batch: II

Student Roll No: CE030
Student Name: PARMAR LAKHMAN

Department of Computer Engineering,
Faculty of Technology,
Dharmsinh Desai University, Nadiad – 387001.
Gujarat, INDIA.

LAB 3

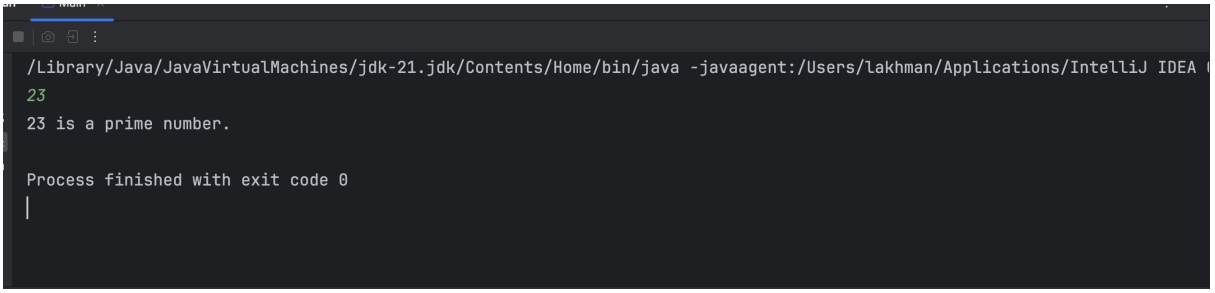
Q.1

Write a Java program that checks for prime number using the object oriented approach. [Hint: create a class NumberClass with a member value and method isPrimeNumber()]

Ans.

```
import java.util.*;
class NumberClass {
private int value;
public NumberClass(int value) {
this.value = value;
}
public boolean isPrimeNumber() {
if (value <= 1) {
return false;
} else {
for (int i = 2; i <= Math.sqrt(value); i++) {
if (value % i == 0) {
return false;
}
}
return true;
}
}
}
class Main {
public static void main(String[] args) {
Scanner scan=new Scanner(System.in);
int num1=scan.nextInt();
NumberClass numberObj = new NumberClass(num1);
```

```
if (numberObj.isPrimeNumber()) {
System.out.println(num1 + " is a prime number.");
} else {
System.out.println(num1 + " is not a prime number.");
}
}
}
```



Q.2

1. Create two classes:

class Person

Derive a class Student from class Person.

Person

- name : String
- age : int

+ Person()

+ Person(name : String, age : int)

+ getName() : String

+ getAge() : int

+ setName(name : String) : void

+ setAge(age : int) : void

+ toString() : String

Student

- rollno : int
- marks : double[]

+ Student()

+ Student(rollno : int)

+ Student(rollno : int, marks : double[])

+ Student(rollno : int, name : String, age : int, marks : double[])

+ getRollno() : int

+ getMarks() : double[]

+ setRollno(rollno: int) : void

+ setMarks(marks : double[]) : void

+ toString() : String

+ displayDetails() : void

Add the following to Student class:

- a static variable **count**(to count the number of objects)
- a static block to initialize count variable to zero
- a static method String **getCount()** that returns the number of student objects created
- Write a TestStudent class containing the main() method.
- Store the details of 3 students by creating an array of objects of Student class and display the student who has highest average amongst the three students as follows using **displayDetails()** method for that object:

e.g.

RollNo = 100

Name = ABC

Age = 20

Marks=78 86 88 67 92

- Create one more object of the Student class and then call the getCount() to display the number of Student objects created.

Ans.

```
import java.util.Scanner;

class Person {
    private String name;
    private int age;

    public Person() {
        this.name = "";
        this.age = 0;
    }

    public Person(String name, int age) {
        this.name = name;
        this.age = age;
    }

    public String getName() {
        return name;
    }

    public int getAge() {
        return age;
    }

    public void setName(String name) {
        this.name = name;
    }

    public void setAge(int age) {
        this.age = age;
    }

    public String toString() {
```

```
        return "Name: " + name + ", Age: " + age;
    }
}

class Student extends Person {
    private int rollno;
    private double[] marks;
    private static int count = 0;

    static {
        count = 0;
    }

    public Student() {
        super();
        this.rollno = 0;
        this.marks = new double[0];
        count++;
    }

    public Student(int rollno) {
        super();
        this.rollno = rollno;
        this.marks = new double[0];
        count++;
    }

    public Student(int rollno, double[] marks) {
        super();
        this.rollno = rollno;
        this.marks = marks;
        count++;
    }

    public Student(int rollno, String name, int age, double[] marks) {
        super(name, age);
        this.rollno = rollno;
        this.marks = marks;
```

```
        count++;
    }

    public int getRollno() {
        return rollno;
    }

    public double[] getMarks() {
        return marks;
    }

    public void setRollno(int rollno) {
        this.rollno = rollno;
    }

    public void setMarks(double[] marks) {
        this.marks = marks;
    }

    public static String getCount() {
        return "Number of Student objects created: " + count;
    }

    public void displayDetails() {
        System.out.println("RollNo = " + rollno);
        System.out.println("Name = " + getName());
        System.out.println("Age = " + getAge());
        System.out.print("Marks = ");
        for (double mark : marks) {
            System.out.print(mark + " ");
        }
        System.out.println("\n");
    }

    public String toString() {
        return super.toString() + ", RollNo: " + rollno;
    }
}
```

```
public class Main {
    public static void main(String[] args) {
        Scanner scan = new Scanner(System.in);
        Student[] students = new Student[3];
        students[0] = new Student(100, "lakhman", 20, new double[]{78, 86, 88, 67,
92});
        students[1] = new Student(101, "shivansh", 21, new double[]{80, 75, 90, 60,
85});
        students[2] = new Student(102, "dev", 22, new double[]{85, 92, 78, 70, 88});

        Student highestAverageStudent = students[0];
        double highestAverage = students[0].getMarks().length > 0 ?
                calculateAverage(students[0].getMarks()) : 0;

        for (int i = 1; i < students.length; i++) {
            double avg = calculateAverage(students[i].getMarks());
            if (avg > highestAverage) {
                highestAverage = avg;
                highestAverageStudent = students[i];
            }
        }

        System.out.println("Student with the highest average marks:");
        highestAverageStudent.displayDetails();

        Student extraStudent = new Student(103);
        System.out.println(Student.getCount());

        // Close the scanner
        scan.close();
    }

    private static double calculateAverage(double[] marks) {
        double sum = 0;
        for (double mark : marks) {
            sum += mark;
        }
```

```
        return marks.length > 0 ? sum / marks.length : 0;
    }
}
```