Question 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()]

Solution

```
import java.util.*;

class NumberClass {
   private int value ;
   private boolean[] isprime;

   NumberClass(int val)
   {
      this.value = val;
      this.isprime = new boolean[val + 1];
      for(int i = 0;i<=val;i++) isprime[i] = true;
   }

   boolean isPrimeNumber()
   {

      isprime[0] = isprime[1] = false;
      for(int i = 2;i<=value ; i++)
      {
         if(isprime[i])
         {
            for(int j = 2*i ; j<=value;j += i)
            {
```

```
                isprime[j] = false;
            }
        }
    }

    return isprime[value];
  }
}

class lab3_pg1 {

  public static void main(String[] args) {
    // TODO Auto-generated method stub
    Scanner obj = new Scanner(System.in);
    System.out.print("Enter number :- ");
    int n = obj.nextInt();
    NumberClass c1 = new NumberClass(n);

    if(c1.isPrimeNumber())  System.out.print("Number is
prime");
    else System.out.print("number is not prime ");

  }

}
```

Screenshot

```
"C:\Program Files\Eclipse Adoptium\jdk-17.0.8.101-hotspot
 .jar=61880:C:\Users\LENOVO\AppData\Local\Programs\Intell
 4\java\labs\java_labs\lab3\out\production\lab3" lab3_pg1
Enter number :- 51
number is not prime
Process finished with exit code 0
```

Question 2

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.

Person class

```
public class Person {

    private String name;
    private int age;

    public Person() {

    }

    ;

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

    public String getName() {
        return name;
    }

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

    public int getAge() {
        return age;
    }

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

```
    @Override
    public String toString() {
        return "Person [name=" + name + ", age=" + age + "]";
    }
}
```

Student Class

```
import java.util.Arrays;

class Student extends Person{
    private int rollno ;
    private double[] marks ;
    public static int count ;
    static {
        count = 0;
    }
    public Student() {
        super();
        count++;
    }
    public Student(int rollno, double[] marks) {
        super();
        this.rollno = rollno;
        this.marks = marks;
        count++;
    }
    @Override
    public String toString() {
```

```
        return "Student [rollno=" + rollno + ", marks=" +
Arrays.toString(marks) + "]";
    }
    public int getRollno() {
        return rollno;
    }
    public void setRollno(int rollno) {
        this.rollno = rollno;
    }
    public double[] getMarks() {
        return marks;
    }
    public void setMarks(double[] marks) {
        this.marks = marks;
    }
    public Student(String name, int age, int rollno, double[] marks)
{
        super(name, age);
        this.rollno = rollno;
        this.marks = marks;
        count++;
    }

    void displayDetails()
    {
        System.out.println("RollNo = " + this.rollno + "\nName = "+
super.getName() + "\nAge = " + super.getAge() + "\nMarks = " +
Arrays.toString(this.marks));

    }
    static int  getCount()
    {
```

```
        return count;

    }
}
```

TestClass

```
import java.util.Scanner;

public class lab3_pg2 {

    public static void main(String[] args) {
        Scanner obj = new Scanner(System.in);
        System.out.print("Enter the number :- ");
        int n = obj.nextInt();
        Student[] s = new Student[n];
        int index  = 0;
        double highest = 0;

        for(int i = 0;i<n;i++)
        {
            obj.nextLine();
            System.out.print("Enter name :- ");
            String name = obj.nextLine();
            System.out.print("Enter age :- ");
            int age = obj.nextInt();
            System.out.print("Enter roll :- ");
            int roll = obj.nextInt();
            double[] marks = new double[5];
            double sum = 0;
            for(int j = 0;j<5;j++)
            {
```

```
            System.out.print("Enter element marks of " + (j+1) + "
Subject :- " );
            marks[j] = obj.nextDouble();
            sum += marks[j];
        }
        s[i] = new Student(name,age,roll,marks);
        if(sum > highest)
        {
            highest = sum;
            index = i;
        }
    }

    s[index].displayDetails();
    System.out.println(Student.getCount());


  }
}
```

Screenshot

```
Enter the number :- 3
Enter name :- nisarg
Enter age :- 19
Enter roll :- 1
Enter element marks of 1 Subject :- 78
Enter element marks of 2 Subject :- 89
Enter element marks of 3 Subject :- 47
Enter element marks of 4 Subject :- 58
Enter element marks of 5 Subject :- 89
Enter name :- janmang
Enter age :- 19
Enter roll :- 5
Enter element marks of 1 Subject :- 56
Enter element marks of 2 Subject :- 78
Enter element marks of 3 Subject :- 98
Enter element marks of 4 Subject :- 78
Enter element marks of 5 Subject :- 85
Enter name :- neha
Enter age :- 19
Enter roll :- 36
Enter element marks of 1 Subject :- 89
Enter element marks of 2 Subject :- 87
Enter element marks of 3 Subject :- 45
Enter element marks of 4 Subject :- 58
Enter element marks of 5 Subject :- 47
RollNo = 5
Name = janmang
Age = 19
Marks = [56.0, 78.0, 98.0, 78.0, 85.0]
3
```