Lab worksheet 3: Defining Classes

Q1.

Code:

Temperature class

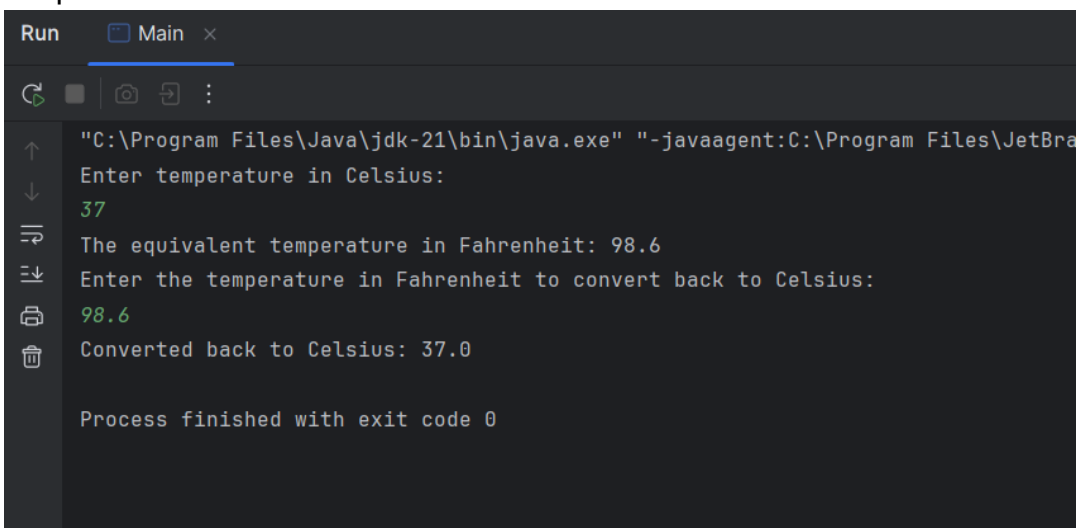
```
package Q_01;

public class Temperature {
    private double celsius;

    // No-Arg Constructor
    public Temperature()
    {
        this.celsius=0.0;
    }

    // Parameterized Constructor
    public Temperature(double celsius) {
        this.celsius = celsius;
    }

    //Getter method Temperature in Celsius
    public double toCelsius() {
        return celsius;
    }

    // Getter method to convert Celsius to Fahrenheit
    public double toFahrenheit ()
    {
        return(celsius * 9 / 5 + 32 );
    }

    // Setter method to set temperature in Celsius
    public void setCelsius(double celsius) {
        this.celsius = celsius;
    }

    // Setter method to set temperature in Fahrenheit
    public void setFahrenheit (double fahrenheit ) {
        this.celsius = (fahrenheit - 32) * 5 / 9;
    }
```

```
}
```

Main class

```
package Q_01;
import java.util.Scanner;

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

        System.out.println("Enter temperature in Celsius:");
        double inputCelsius = input.nextDouble();

        Temperature temperature = new
Temperature(inputCelsius);
        System.out.println("The equivalent temperature in
Fahrenheit: " + temperature.toFahrenheit());

        // Question Number2
        System.out.println("Enter the temperature in
Fahrenheit to convert back to Celsius:");
        double inputFahrenheit = input.nextDouble();

        // Setting the temperature in Fahrenheit and
converting back to Celsius
        temperature.setFahrenheit(inputFahrenheit);
        System.out.println("Converted back to Celsius: " +
temperature.toCelsius());
    }
}
```

Output:



Q3.

Code:

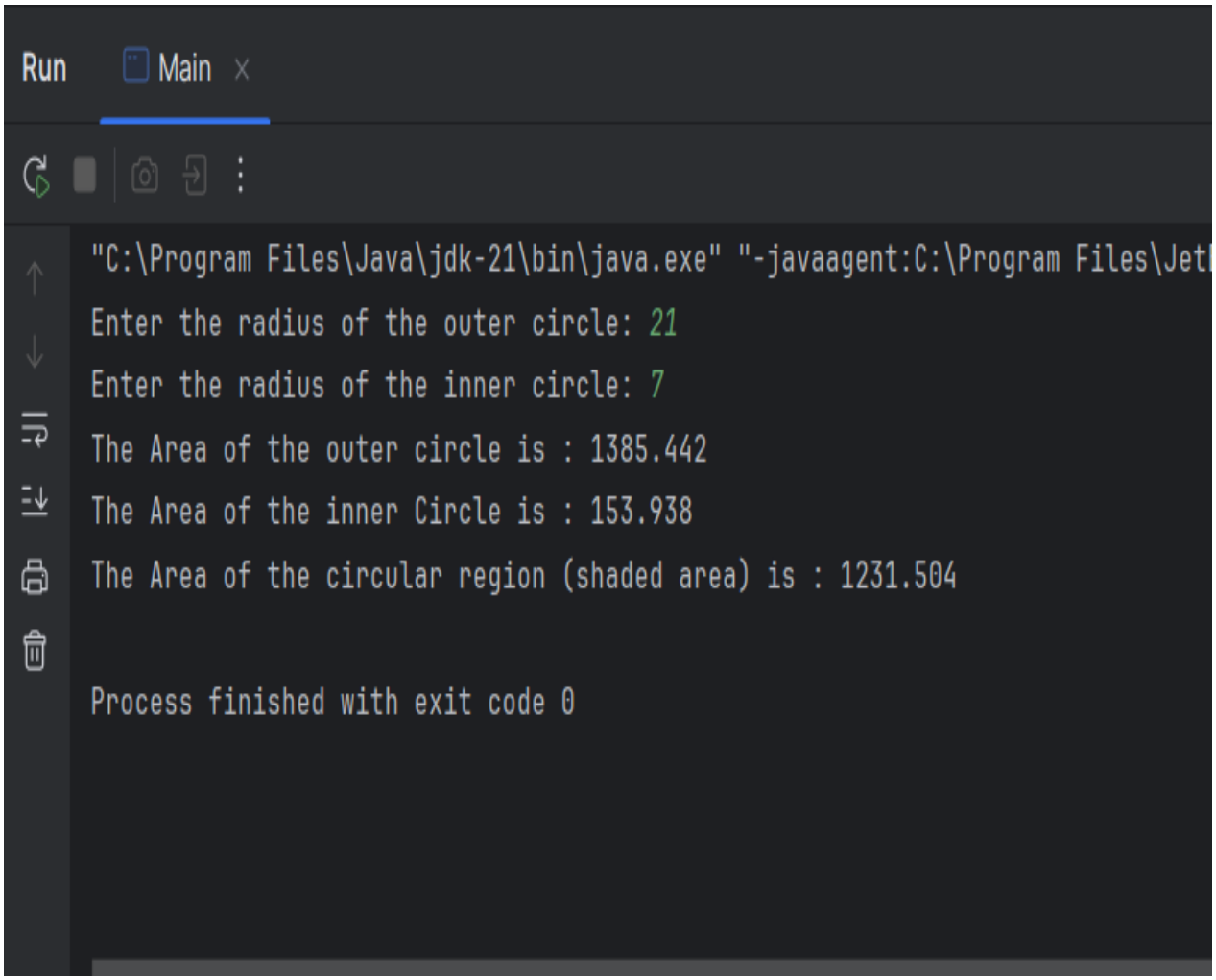
Circle class

```
package Q_03;

public class Circle {
    private double radius;

    // Constructor
    public Circle(double radius) {
        this.radius = radius;
    }
    // getter method for radius
    public double getRadius() {
        return radius;
    }

    // Setter method for radius
    public void setRadius(double radius) {
        this.radius = radius;
    }

    // Method to compute area
    public double computeArea() {
        return (Math.PI * radius * radius);
    }

    // Method to compute circumference
    public double computeCircumference() {
        return (2 * Math.PI * radius);
    }
}
```

Main class

```
package Q_03;

import java.text.DecimalFormat;
import java.util.Scanner;

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

        // Get input for outer and inner circle radius
        // ro - outer circle radius
        // ri - inner circle radius
        System.out.print("Enter the radius of the outer
circle: ");
        double ro = scanner.nextDouble();
        System.out.print("Enter the radius of the inner
circle: ");
        double ri = scanner.nextDouble();

        Circle outerCircle = new Circle(ro);
        Circle innerCircle = new Circle(ri);
        double shadedArea = outerCircle.computeArea() -
innerCircle.computeArea();
        DecimalFormat df = new DecimalFormat("0.000");

        System.out.println("The Area of the outer circle is :
"+df.format(outerCircle.computeArea()));
        System.out.println("The Area of the inner Circle is :
"+df.format(innerCircle.computeArea()));
        System.out.println("The Area of the circular region
(shaded area) is : "+df.format(shadedArea));

    }
}
```

Output :


Run
Main
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\Jet
Enter the radius of the outer circle: 21
Enter the radius of the inner circle: 7
The Area of the outer circle is : 1385.442
The Area of the inner Circle is : 153.938
The Area of the circular region (shaded area) is : 1231.504
Process finished with exit code 0

Q4.

Code:

Owner class

```
package Q_04;

import javax.xml.crypto.Data;

public class Owner {
    // Data Member
    private String ownerName;
    private String phoneNo;

    public Owner() {
        ownerName = "Unknown"; }

    public Owner(String ownerName, String phoneNo) {
        this.ownerName = ownerName; this.phoneNo =
phoneNo; }


    public String getOwnerName() {
        return ownerName; }

    public void setOwnerName(String ownerName) {
        this.ownerName = ownerName;
    }

    public String getPhoneNo() {
        return phoneNo;
    }

    public void setPhoneNo(String phoneNo) {
        this.phoneNo = phoneNo;
    }
}
```

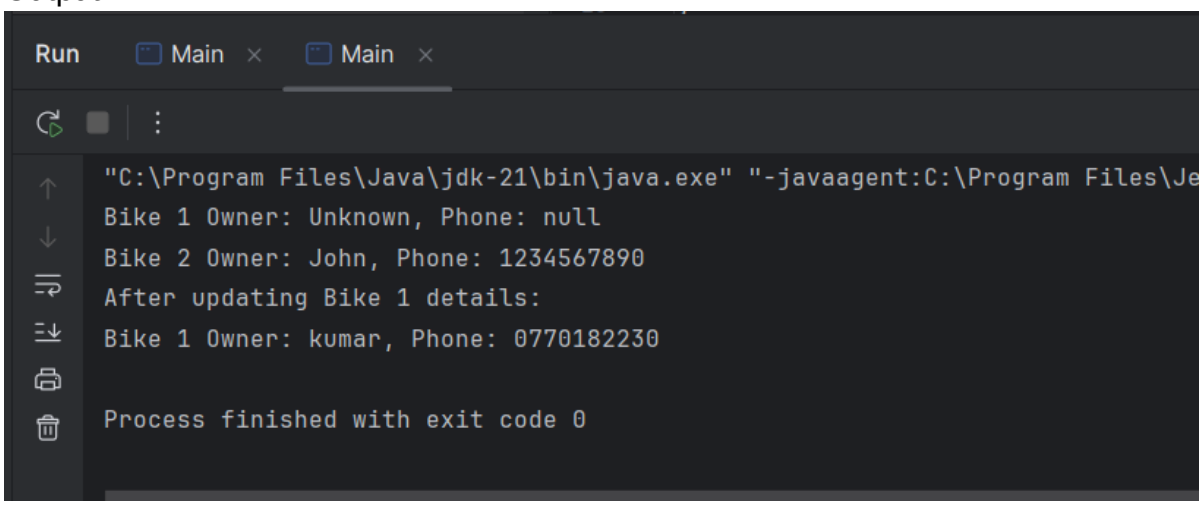
Bicycle class

```
package Q_04;

public class Bicycle {
   // Data Member
    private Owner owner;

    public Bicycle() {
        this.owner = new Owner(); }

    public Bicycle(String name, String num) {
        this.owner = new Owner(name, num); }

    public String getOwnerName() {
        return owner.getOwnerName(); }

    public void setOwnerName(String name) {
        owner.setOwnerName(name); }

    public String getPhoneNo() {
        return owner.getPhoneNo(); }

    public void setPhoneNo(String num) {
        owner.setPhoneNo(num);
    }
}
```

Main class

```
package Q_04;

public class Main {
    public static void main(String[] args) {
        // Creating a Bicycle with default owner
        Bicycle bike1 = new Bicycle();
        System.out.println("Bike 1 Owner: " +
bike1.getOwnerName() + ", Phone: " + bike1.getPhoneNo());

        // Creating a Bicycle with a specific owner
        Bicycle bike2 = new Bicycle("John", "1234567890");
        System.out.println("Bike 2 Owner: " +
bike2.getOwnerName() + ", Phone: " + bike2.getPhoneNo());

        // Updating owner details for bike1
        bike1.setOwnerName("kumar");
        bike1.setPhoneNo("0770182230");

        System.out.println("After updating Bike 1 details:");
        System.out.println("Bike 1 Owner: " +
bike1.getOwnerName() + ", Phone: " + bike1.getPhoneNo());
    }
}
```

Output:



Q5.

Code:

Course class

```
package Q_05;

public class Course {
    //data members
    private String courseName;
    private String courseCode;
    private Lecturer lecturerInCharge;

    //getter method courseName
    public String getCourseName() {
        return courseName;
    }

    //setter method courseName
    public void setCourseName(String courseName) {
        this.courseName = courseName;
    }

    //getter method courseCode
    public String getCourseCode() {
        return courseCode;
    }

    //setter method courseCode
    public void setCourseCode(String courseCode) {
        this.courseCode = courseCode;
    }

    //getter method lecturerInCharge
    public Lecturer getLecturerInCharge() {
        return lecturerInCharge;
    }

    //setter method lecturerInCharge
    public void setLecturerInCharge(Lecturer lecturerInCharge)
{
        this.lecturerInCharge = lecturerInCharge;
    }
}
```

Lecturer class

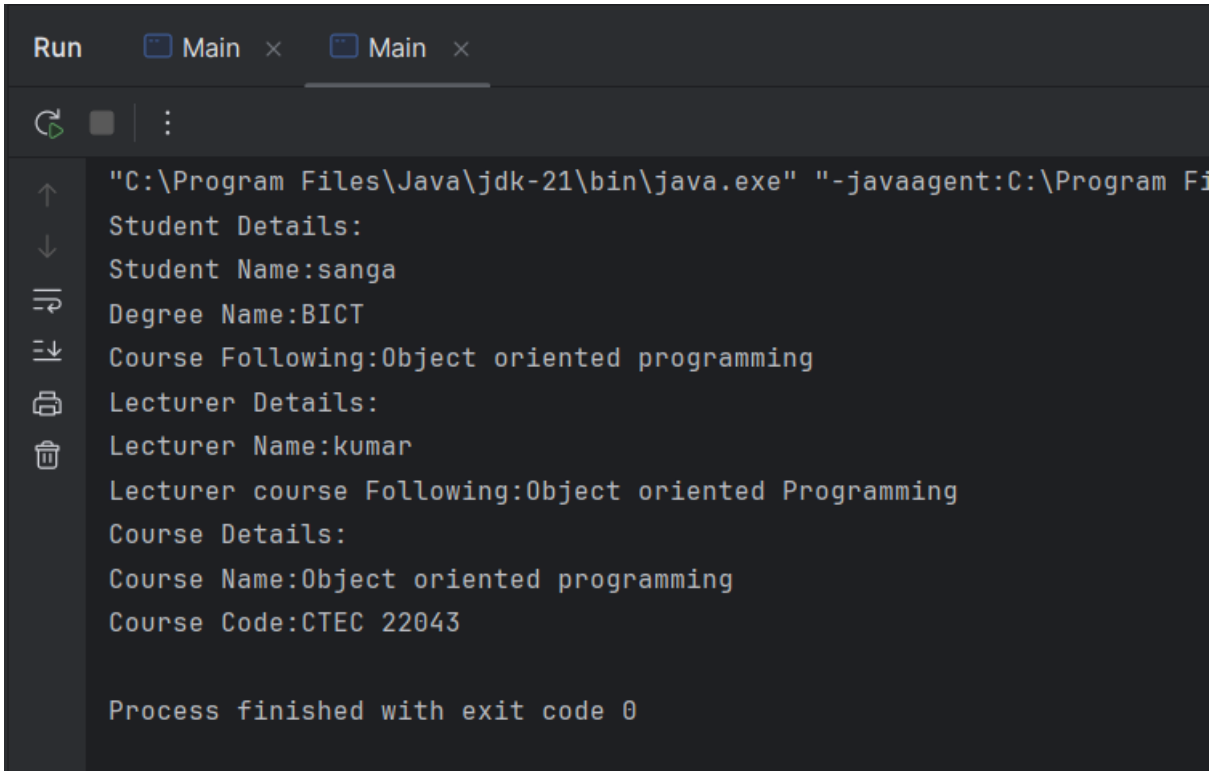
```
package Q_05;

public class Lecturer {
    private String lecturerName;
    private String courseTeaching;

    // getter method lecturerName
    public String getLecturerName() {
        return lecturerName;
    }
    //setter method LecturerName
    public void setLecturerName(String lecturerName)
{
        this.lecturerName = lecturerName;
    }
    // getter method courseTeaching
    public String getCourseTeaching() {
        return courseTeaching;
    }

    // setter method courseTeaching
    public void setCourseTeaching(String
courseTeaching) {
        this.courseTeaching = courseTeaching;
    }
}
```

Student class

```
package Q_05;

public class Student {
    private String studentName;
    private String degreeName;
    private String courseFollowing;

    //getter method studentName
    public String getStudentName() {
        return studentName;
    }
    //setter method studentName
    public void setStudentName(String studentName) {
        this.studentName = studentName;
    }
    //getter method degreeName
    public String getDegreeName() {
        return degreeName;
    }
    //setter method degreeName
    public void setDegreeName(String degreeName) {
        this.degreeName = degreeName;
    }
    //getter method courseFollowing
    public String getCourseFollowing() {
        return courseFollowing;
    }
    //setter method courseFollowing
    public void setCourseFollowing(String
courseFollowing) {
        this.courseFollowing = courseFollowing;
    }
}
```

Main Class

```
package Q_05;

public class Main {
    public static void main(String[] args) {

        Lecturer kumar = new Lecturer();
        kumar.setCourseTeaching("Object oriented
Programming");
        kumar.setLecturerName("kumar");

        Course oop = new Course();
        oop.setCourseName("Object oriented programming");
        oop.setCourseCode("CTEC 22043");
        oop.setLecturerInCharge(kumar);

        Student sanga = new Student();
        sanga.setCourseFollowing("Object oriented
programming");
        sanga.setDegreeName("BICT");
        sanga.setStudentName("sanga");

        oop.setLecturerInCharge(kumar);
        System.out.println("Student Details:");
        System.out.println("Student Name:"
+sanga.getStudentName());
        System.out.println("Degree Name:"
+sanga.getDegreeName());
        System.out.println("Course Following:"
+sanga.getCourseFollowing());

        System.out.println("Lecturer Details:");
        System.out.println("Lecturer Name:"
+kumar.getLecturerName());
        System.out.println("Lecturer course Following:"
+kumar.getCourseTeaching());

        System.out.println("Course Details:");
        System.out.println("Course Name:"
+oop.getCourseName());
        System.out.println("Course Code:"
+oop.getCourseCode());

    }

}
```


Run
Main
Main
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Fi
Student Details:
Student Name:sanga
Degree Name:BICT
Course Following:Object oriented programming
Lecturer Details:
Lecturer Name:kumar
Lecturer course Following:Object oriented Programming
Course Details:
Course Name:Object oriented programming
Course Code:CTEC 22043
Process finished with exit code 0