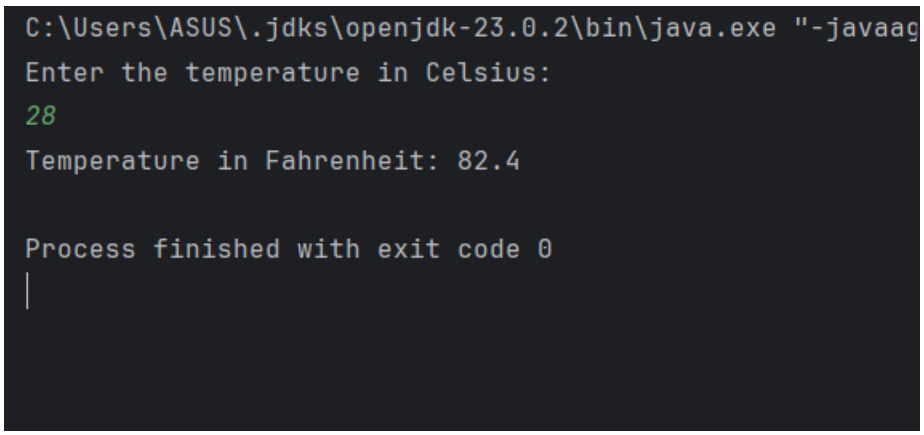
Q1.

Code:

```
package Q1;

public class Temperature {
    private double celsius; // Stores temperature in Celsius

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

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

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

    // Getter Method: Return temperature in Celsius
    public double toCelsius() {
        return celsius;
    }

    // Setter Method: Set temperature in Celsius
    public void setCelsius(double celsius) {
        this.celsius = celsius;
    }

    // Setter Method: Set temperature using Fahrenheit (converts to Celsius)
    public void setFahrenheit(double fahrenheit) {
        this.celsius = (fahrenheit - 32) * 5 / 9;
    }
}
```

```
package Q1;

import java.util.Scanner;

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

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

        //create temperature object with user input
        Temperature temp= new Temperature(inputCelsius);

        System.out.println("Temperature in Fahrenheit: "+temp.toFahrenheit());
        }
    }
```

Output:

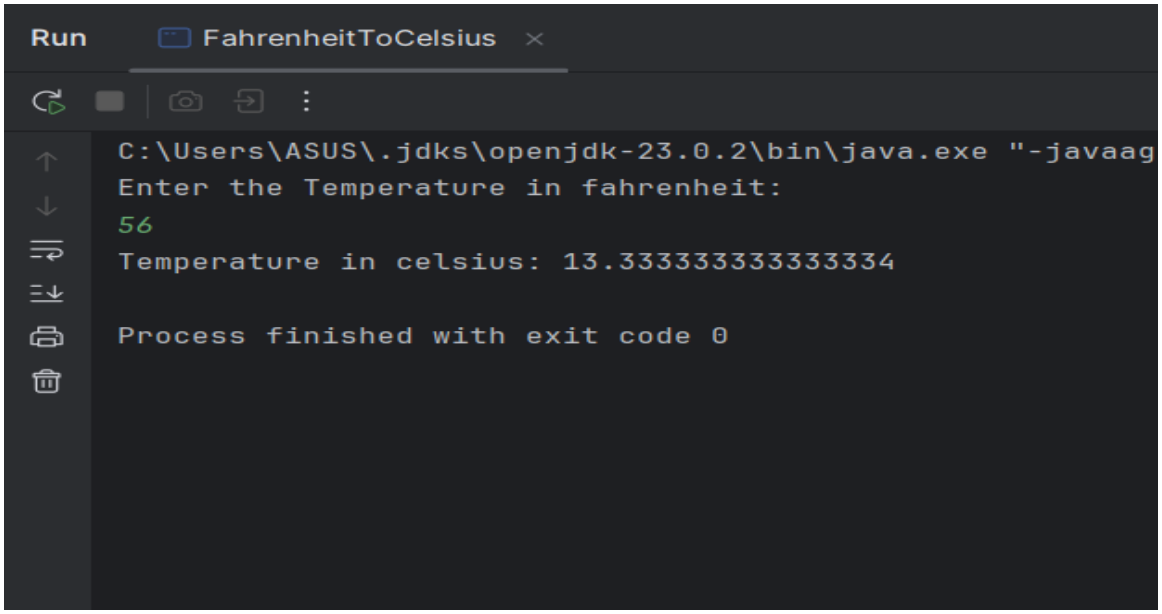


Q2.

Code:

```
package Q2;

import Q1.Temperature;

import java.util.Scanner;

public class FahrenheitToCelsius {
    public static void main(String[] args) {
        Scanner scanner=new Scanner(System.in);
        System.out.println("Enter the Temperature in fahrenheit: ");

        double fahrenheit=scanner.nextDouble();

        Temperature temp= new Temperature();

        temp.setFahrenheit(fahrenheit);

        System.out.println("Temperature in celsius: "+temp.toCelsius());

    }
}
```

Output:



Q3.

Code:

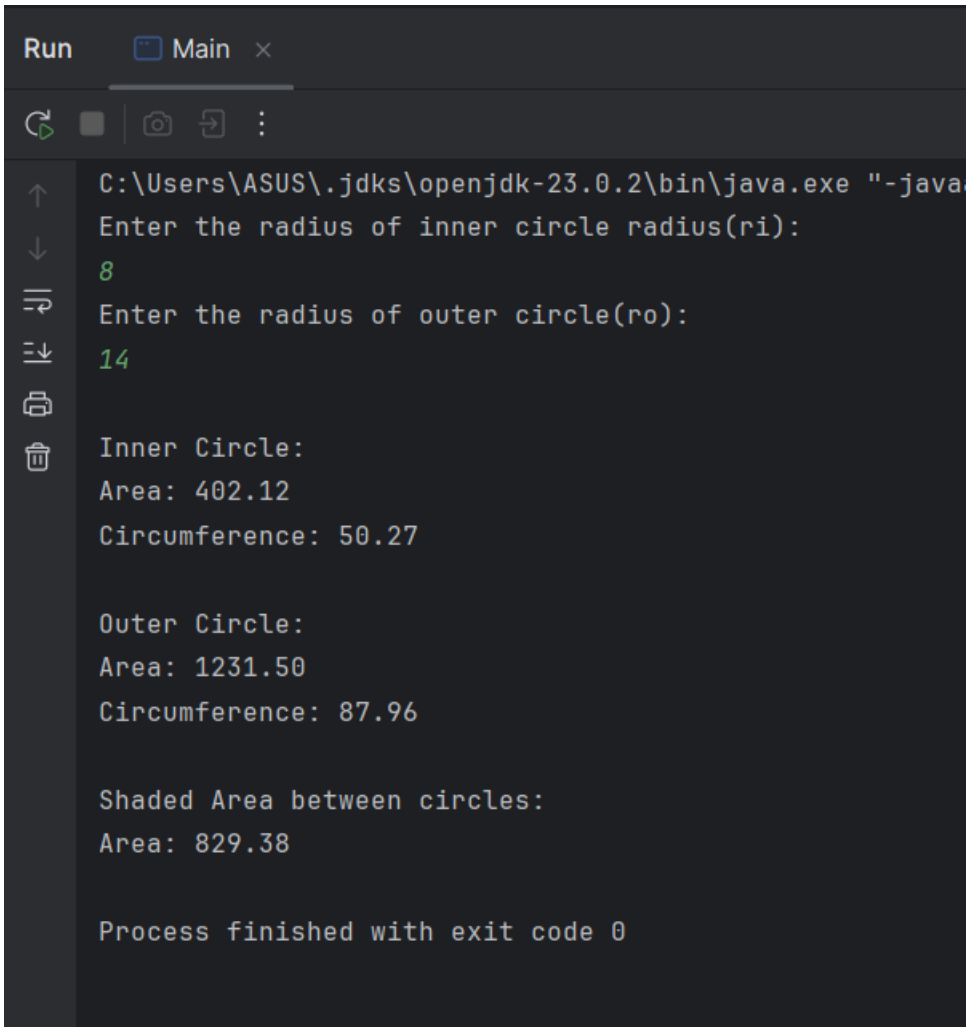
```
package Q3;

class Circle {
    private double radius;

    public Circle(){
        radius=0.0;
    }
    public Circle(double radius){
        this.radius= radius;
    }

    public void setRadius(double radius) {
        this.radius = radius;
    }

    public double computeArea(){
        return(2*Math.PI*Math.pow(radius,2));
    }

    public double computeCircumference(){
        return(2*Math.PI*radius);
    }

}
```

Code:

```
package Q3;

import java.util.Scanner;

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

        System.out.println("Enter the radius of inner circle radius(ri):");
        double ri=scanner.nextDouble();

        System.out.println("Enter the radius of outer circle(ro): ");
        double ro=scanner.nextDouble();

        //Create Circle objects
        Circle innerCircle=new Circle();
        Circle outerCircle=new Circle();

        //set method
        innerCircle.setRadius(ri);
        outerCircle.setRadius(ro);

        //compute area
        double innerArea=innerCircle.computeArea();
        double outerArea=outerCircle.computeArea();

        //compute circumference
        double innerCircumference=innerCircle.computeCircumference();
        double outerCircumference=outerCircle.computeCircumference();

        //calculate the area of shaded region
        double shadedArea=outerArea-innerArea;

        System.out.println("\nInner Circle:");
        System.out.printf("Area: %.2f%n", innerArea);
        System.out.printf("Circumference: %.2f%n",innerCircumference );

        System.out.println("\nOuter Circle:");
        System.out.printf("Area: %.2f%n", outerArea);
        System.out.printf("Circumference: %.2f%n",outerCircumference );

        System.out.println("\nShaded Area between circles:");
```

```
        System.out.printf("Area: %.2f%n", shadedArea);
    }
}
```

Output:



Q4.

Code:

```
package Q4;

class Bicycle {
    private Owner owner;

    //constructor
    public Bicycle(){
        owner=new Owner();
    }

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

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

    //Returns the name of this bicycle's owner
    public String getOwnerName() {
        return owner.getOwnerName();
    }

    // Assigns the name of this bicycle's owner
    public void setOwnerName(String name){
         owner.setOwnerName(name);
    }

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

    // Assigns the phone number of this bicycle's owner
    public void setPhoneNo(String num){
        this.owner.setPhoneNo(num);
    }

    // New methods to work with Owner object directly
    public Owner getOwner(){
        return owner;
```

```
    }

    public void setOwner(){
        this.owner=owner;
    }
}
```

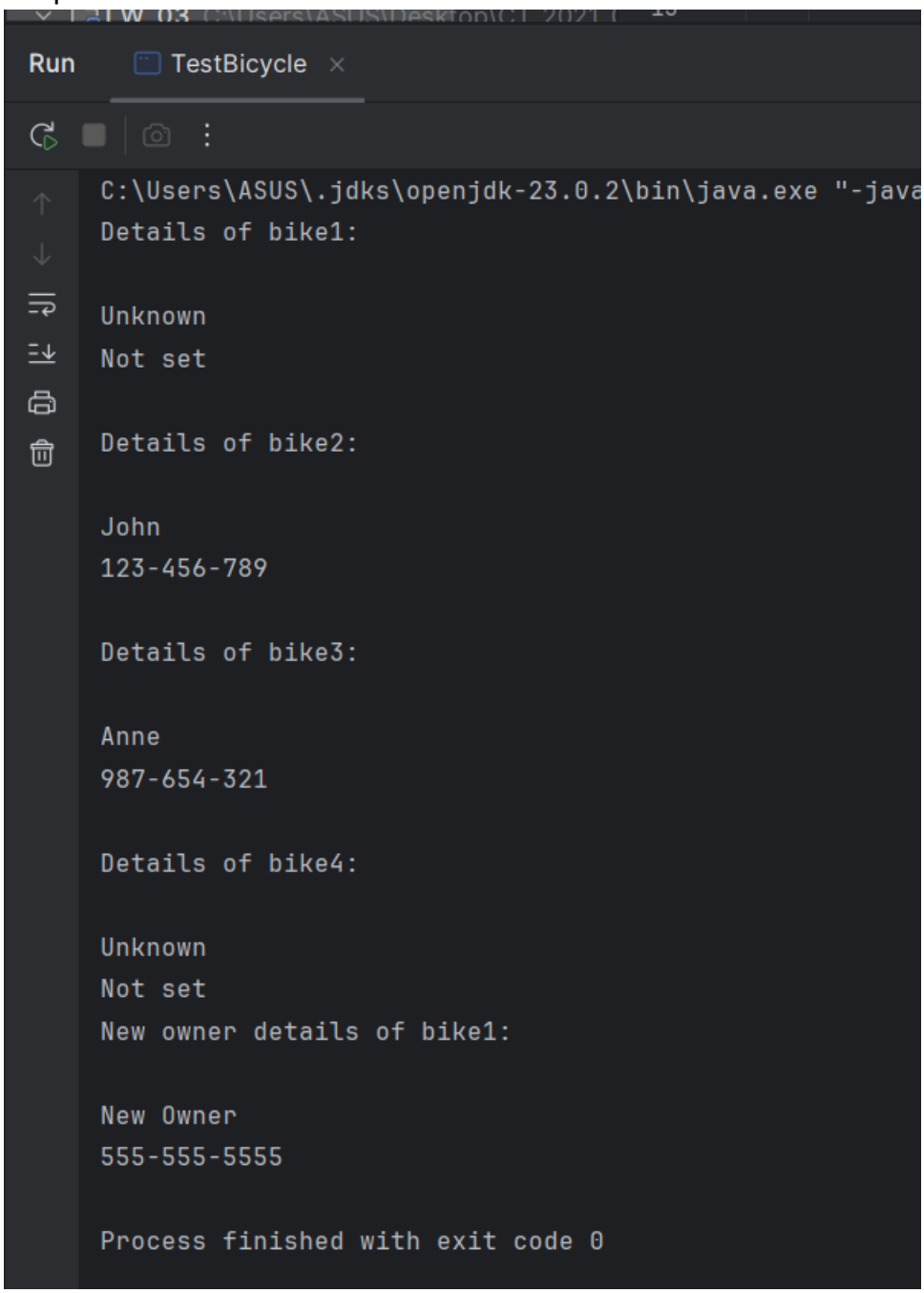
Code:

```
package Q4;

class Owner {
    private String ownerName;
    private String phoneNo;

    public Owner(){
        ownerName="Unknown";
        phoneNo="Not set";
    }

    public Owner(String name,String num){
        ownerName=name;
        phoneNo=num;
    }

    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;
    }
}
```

Code:

```
package Q4;

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

        Bicycle bike1=new Bicycle();//unknown owner
        Bicycle bike2=new Bicycle("John","123-456-789");

        //Using Owner object directly
        Owner owner1=new Owner("Anne","987-654-321");
        Bicycle bike3=new Bicycle(owner1);

        Owner owner2=new Owner();
        Bicycle bike4=new Bicycle(owner2);

        System.out.println("Details of bike1:\n");
        System.out.println(bike1.getOwnerName());
        System.out.println(bike1.getPhoneNo());

        System.out.println("\nDetails of bike2:\n");
        System.out.println(bike2.getOwnerName());
        System.out.println(bike2.getPhoneNo());

        System.out.println("\nDetails of bike3:\n");
        System.out.println(bike3.getOwnerName());
        System.out.println(bike3.getPhoneNo());

        System.out.println("\nDetails of bike4:\n");
        System.out.println(bike4.getOwnerName());
        System.out.println(bike4.getPhoneNo());

        // Modifying information
        bike1.setOwnerName("New Owner");
        bike1.setPhoneNo("555-555-5555");
        System.out.println("New owner details of bike1:\n");
        System.out.println(bike1.getOwnerName());
        System.out.println(bike1.getPhoneNo());// "New Owner"
    }
}
```

Output:


Run
TestBicycle
C:\Users\ASUS\.jdks\openjdk-23.0.2\bin\java.exe "-java
Details of bike1:
Unknown
Not set
Details of bike2:
John
123-456-789
Details of bike3:
Anne
987-654-321
Details of bike4:
Unknown
Not set
New owner details of bike1:
New Owner
555-555-5555
Process finished with exit code 0

Q5.

Code:

```
package Q5;

class Course {
    private String courseName;
    private String courseCode;
    private Lecturer lecturer;

    // Constructor
    public Course(String Name, String Code, Lecturer lecturer) {
        this.courseName = Name;
        this.courseCode = Code;
        this.lecturer = lecturer;
    }

    // Getters and setters
    public String getCourseName() {
        return courseName;
    }

    public void setCourseName(String Name) {
        this.courseName = Name;
    }

    public String getCourseCode() {
        return courseCode;
    }

    public void setCourseCode(String Code) {
        this.courseCode = Code;
    }

    public Lecturer getLecturer() {
        return lecturer;
    }

    public void setLecturer(Lecturer lecturer) {
        this.lecturer = lecturer;
    }
}
```

Code:

```
package Q5;
class Lecturer {
    private String lecturerName;
    private String courseTeaching;

    // Constructor
    public Lecturer(String Name, String course) {
        this.lecturerName = Name;
        this.courseTeaching = course;
    }

    // Getters and setters
    public String getLecturerName() {
        return lecturerName;
    }

    public void setLecturerName(String Name) {
        this.lecturerName = Name;
    }

    public String getCourseTeaching() {
        return courseTeaching;
    }

    public void setCourseTeaching(String course) {
        this.courseTeaching = course;
    }
}
```

Code:

```
package Q5;
class Student {
    private String studentName;
    private String degreeName;
    private String courseFollowing;

    // Constructor
    public Student(String Name, String degree, String course) {
        this.studentName = Name;
        this.degreeName = degree;
        this.courseFollowing = course;
    }

    // Getters and setters
    public String getStudentName() {
        return studentName;
    }

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

    public String getDegreeName() {
        return degreeName;
    }

    public void setDegreeName(String degree) {
        this.degreeName = degree;
    }

    public String getCourseFollowing() {
        return courseFollowing;
    }

    public void setCourseFollowing(String course) {
        this.courseFollowing = course;
    }
}
```

Code:

```
package Q5;
class Main {
    public static void main(String[] args) {
        // Create lecturer objects
        Lecturer lecturer1 = new Lecturer("Dr. Smith", "Introduction to Computer
Science");
        Lecturer lecturer2 = new Lecturer("Prof. Johnson", "Data Structures and
Algorithms");

        // Create course objects
        Course course1 = new Course("Introduction to Computer Science", "CT101",
lecturer1);
        Course course2 = new Course("Data Structures and Algorithms", "CT201",
lecturer2);

        // Create student objects
        Student student1 = new Student("Alice Brown", "Computer Science",
"CT101");
        Student student2 = new Student("Bob Wilson", "Computer Science",
"CT201");
        Student student3 = new Student("Charlie Davis", "Information Technology",
"CT101");

        // Display registration information
        System.out.println("=== University Course Registration System ===");
        System.out.println("\nAvailable Courses:");
        displayCourseInfo(course1);
        displayCourseInfo(course2);

        System.out.println("\nStudent Registrations:");
        displayStudentInfo(student1, course1);
        displayStudentInfo(student2, course2);
        displayStudentInfo(student3, course1);
    }

    private static void displayCourseInfo(Course course) {
        System.out.println("\nCourse Code: " + course.getCourseCode());
        System.out.println("Course Name: " + course.getCourseName());
        System.out.println("Lecturer: " + course.getLecturer().getLecturerName());
    }

    private static void displayStudentInfo(Student student, Course course) {
```

```
        System.out.println("\nStudent Name: " + student.getStudentName());
        System.out.println("Degree Program: " + student.getDegreeName());
        System.out.println("Registered Course: " + course.getCourseName() + " (" +
course.getCourseCode() + ")");
        System.out.println("Taught by: " + course.getLecturer().getLecturerName());
    }
}
```

Output: