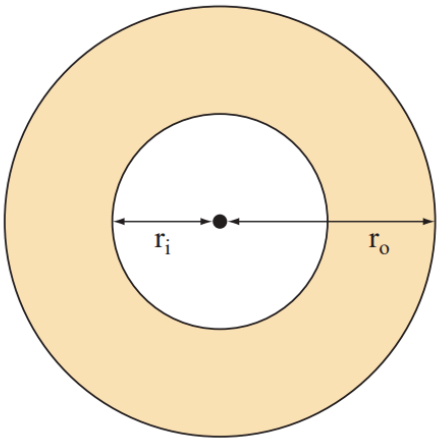
Lab worksheet 3: Defining Classes

1. Define a new class named **Temperature**. Save the temperature internally in Celsius using a private double variable **celsius**. The class has two Constructors one is a No-Arg Constructor, and another one is Parameterized Constructor which accepts a double type argument celsius. The class also has two getter/accessor methods, **toFahrenheit** and **toCelsius** that return the temperature in the specified unit, and two setter/mutator methods **setFahrenheit** and **setCelsius** that assign the temperature in the specified unit. Using this class, write a Java program that accepts temperature in Celsius as an input using the Scanner class and outputs the temperature in equivalent Fahrenheit.

   celsius = (fahrenheit - 32) * 5 / 9
   fahrenheit = celsius * 9 / 5 + 32

2. Using the **setFahrenheit** method of **Temperature** class from the above Exercise, write a Java program that accepts temperature in Fahrenheit as an input using the **Scanner** class and outputs the temperature in equivalent Celsius.

3. Write a Java program that computes the area of a circular region (the shaded area in the diagram), given the radii of the inner and the outer circles, ri and ro, respectively. We compute the area of the circular region by subtracting the area of the inner circle from the area of the outer circle. Define a **Circle** class that has methods **computeArea** and **computeCircumference** to compute the area and circumference. You set the circle's radius with the **setRadius** method or via a constructor.



Lab worksheet 3: Defining Classes

4. Modify the **Bicycle** class provided below, to assign an owner object instead of just the owner's name and telephone number. The new **Owner** class will have two date members **ownerName** and **phoneNo.**

File: Bicycle.java

```
class Bicycle {
   // Data Member
   private String ownerName;
   private String phoneNo;

   //Constructor: Initializes the data member
   public Bicycle() {
       ownerName = "Unknown";
   }

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

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

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

   public String getPhoneNo() {
       return phoneNo;
   }

   //Assigns the name of this bicycle's owner
   public void setPhoneNo(String num) {
       phoneNo = num;
   }

}
```

Lab worksheet 3: Defining Classes

5. Please write a Java program for a university course registration system. The program should consist of the following classes: **Course, Lecturer, Student,** and **Main**.

   In the **Course** class, include two String variables: **courseName** and **courseCode**. Additionally, include a **lecturer** object along with their corresponding getter and setter methods.

   The **Lecturer** class should have two String variables named **lecturerName**, **courseTeaching** along with their getter and setter methods.

   The **Student** class should include three String variables: **studentName, degreeName,** and **courseFollowing**. It should also have corresponding getter and setter methods.

   Lastly, implement a **Main** class to serve as the entry point of the program. Create **course, lecturer,** and **student** objects, and assign them all the necessary properties.