11.1 (*The `Triangle` class*) Design a class named `Triangle` that extends `GeometricObject`. The class contains:

- Three `double` data fields named `side1`, `side2`, and `side3` with default values `1.0` to denote three sides of the triangle.
- A no-arg constructor that creates a default triangle.
- A constructor that creates a triangle with the specified `side1`, `side2`, and `side3`.
- The accessor methods for all three data fields.
- A method named `getArea()` that returns the area of this triangle.
- A method named `getPerimeter()` that returns the perimeter of this triangle.
- A method named `toString()` that returns a string description for the triangle.

For the formula to compute the area of a triangle, see Programming Exercise 2.19. The `toString()` method is implemented as follows:

```
return "Triangle: side1 = " + side1 + " side2 = " + side2 +
  " side3 = " + side3;
```

Draw the UML diagrams for the classes `Triangle` and `GeometricObject` and implement the classes. Write a test program that prompts the user to enter three sides of the triangle, a color, and a Boolean value to indicate whether the triangle is filled. The program should create a `Triangle` object with these sides and set the `color` and `filled` properties using the input. The program should display the area, perimeter, color, and true or false to indicate whether it is filled or not.

11.2 (*The `Person`, `Student`, `Employee`, `Faculty`, and `Staff` classes*) Design a class named `Person` and its two subclasses named `Student` and `Employee`. Make `Faculty` and `Staff` subclasses of `Employee`. A person has a name, address, phone number, and email address. A student has a class status (freshman, sophomore, junior, or senior). Define the status as a constant. An employee has an office, salary, and date hired. Use the `MyDate` class defined in Programming Exercise 10.14 to create an object for date hired. A faculty member has office hours and a rank. A staff member has a title. Override the `toString` method in each class to display the class name and the person's name.

Draw the UML diagram for the classes and implement them. Write a test program that creates a `Person`, `Student`, `Employee`, `Faculty`, and `Staff`, and invokes their `toString()` methods.

11.4 (*Maximum element in `ArrayList`*) Write the following method that returns the maximum value in an `ArrayList` of integers. The method returns `null` if the list is `null` or the list size is `0`.

```
public static Integer max(ArrayList<Integer> list)
```

Write a test program that prompts the user to enter a sequence of numbers ending with `0`, and invokes this method to return the largest number in the input.

11.6 (*Use `ArrayList`*) Write a program that creates an `ArrayList` and adds a `Loan` object, a `Date` object, a string, and a `Circle` object to the list, and use a loop to display all the elements in the list by invoking the object's `toString()` method.

11.7 (*Shuffle `ArrayList`*) Write the following method that shuffles the elements in an `ArrayList` of integers.