***13.9** (*Enable `Circle` comparable*) Rewrite the `Circle` class in Listing 13.2 to extend `GeometricObject` and implement the `Comparable` interface. Override the `equals` method in the `Object` class. Two `Circle` objects are equal if their radii are the same. Draw the UML diagram that involves `Circle`, `GeometricObject`, and `Comparable`.

***13.10** (*Enable `Rectangle` comparable*) Rewrite the `Rectangle` class in Listing 13.3 to extend `GeometricObject` and implement the `Comparable` interface. Override the `equals` method in the `Object` class. Two `Rectangle` objects are equal if their areas are the same. Draw the UML diagram that involves `Rectangle`, `GeometricObject`, and `Comparable`.

***13.11** (*The `Octagon` class*) Write a class named `Octagon` that extends `GeometricObject` and implements the `Comparable` and `Cloneable` interfaces. Assume that all eight sides of the octagon are of equal length. The area can be computed using the following formula:

$$area = (2 + 4/\sqrt{2}) * side * side$$

Draw the UML diagram that involves `Octagon`, `GeometricObject`, `Comparable`, and `Cloneable`. Write a test program that creates an `Octagon` object with side value `5` and displays its area and perimeter. Create a new object using the `clone` method and compare the two objects using the `compareTo` method.

***13.12** (*Sum the areas of geometric objects*) Write a method that sums the areas of all the geometric objects in an array. The method signature is:

```
public static double sumArea(GeometricObject[] a)
```

Write a test program that creates an array of four objects (two circles and two rectangles) and computes their total area using the `sumArea` method.

***13.13** (*Enable the `Course` class cloneable*) Rewrite the `Course` class in Listing 10.6 to add a `clone` method to perform a deep copy on the `students` field.