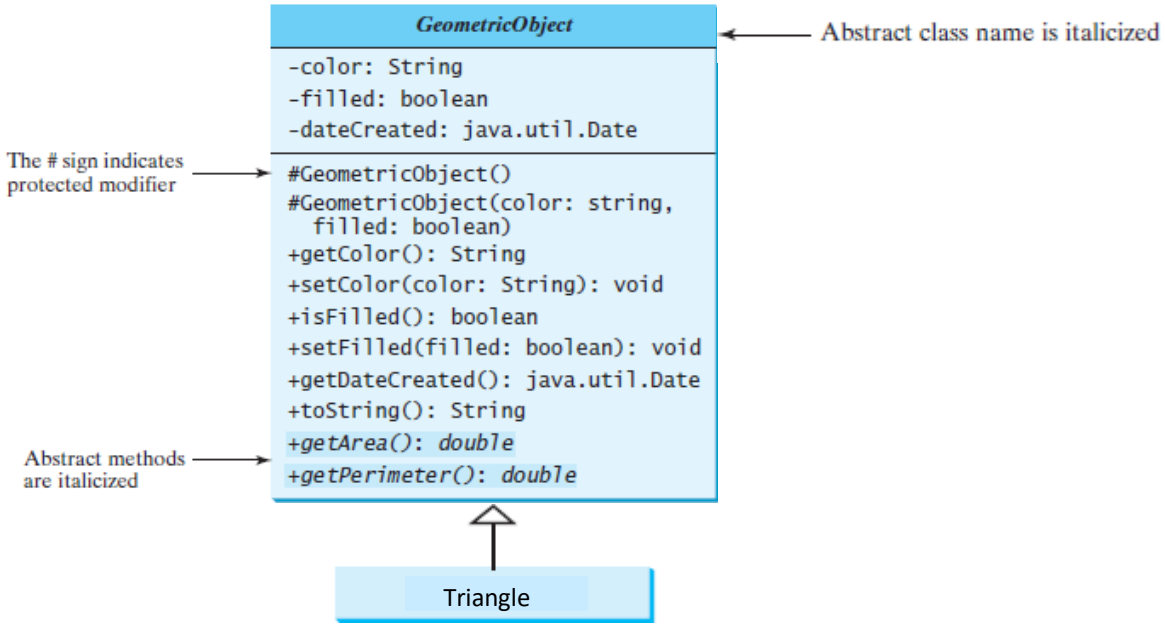
การทดลองที่ 8

Chapter 13 Abstract classes and Interfaces

Program # 1 (Exercise 13.1 p.529 Triangle class)

Design a new Triangle class that extends the abstract *GeometricObject* class. Draw the UML diagram for the classes Triangle and *GeometricObject* and then implement the Triangle class. 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.



Sample run:

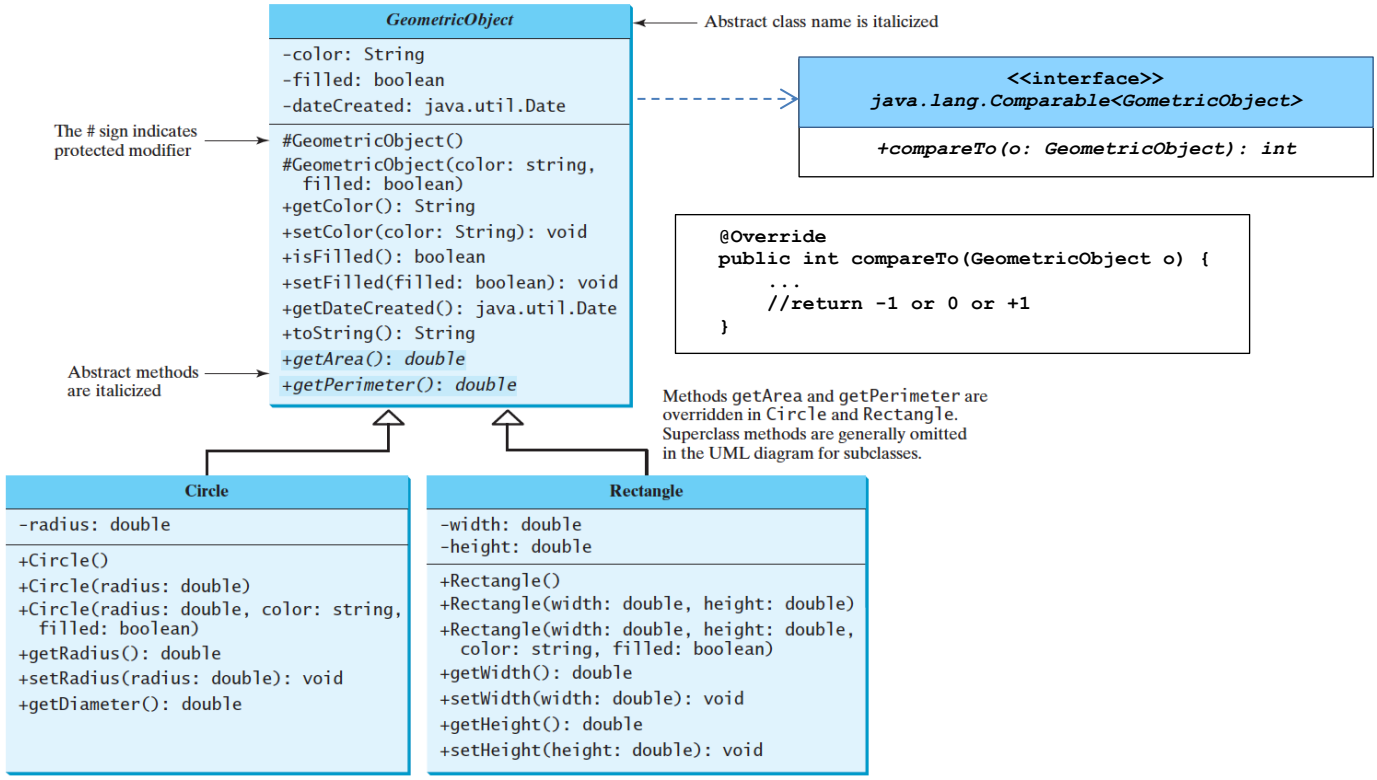
```
Input 3 sides of the triangle: 3 4 5 <enter>
The color is: RED <enter>
The triangle is filled (y/n): y <enter>
----------------------------
Triangle: side1 = 3.0 side2 = 4.0 side3 = 5.0
The area is 6.0
The perimeter is 12.0
The color is RED
Triangle is filled: true
```

Program # 2 (Exercise 13.5 (Enable GeometricObject comparable) Modify the GeometricObject class to implement the Comparable interface, and define a static max method in the GeometricObject class for finding the larger of two GeometricObject objects.
Draw the UML diagram and implement the new GeometricObject class.
Write a test program that uses the max method to find the larger of two circles and the larger of two rectangles.

```
public static GeometricObject max(GeometricObject o1, GeometricObject o2) {
      //compare o1 with o2...
}
```

Sample run:

```
Creating circle 1, input radius: 2.4 <enter>
Creating circle 2, input radius: 2.8 <enter>
------------------------
The max circle's radius is 2.8
========================
Creating rectangle 1, input width and height: 3 6 <enter>
Creating rectangle 2, input width and height: 2 4 <enter>
------------------------
The max rectangle's width and height are 3.0, 6.0
========================
```



Program # 3 (Exercise 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 + 4/22) * 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.
