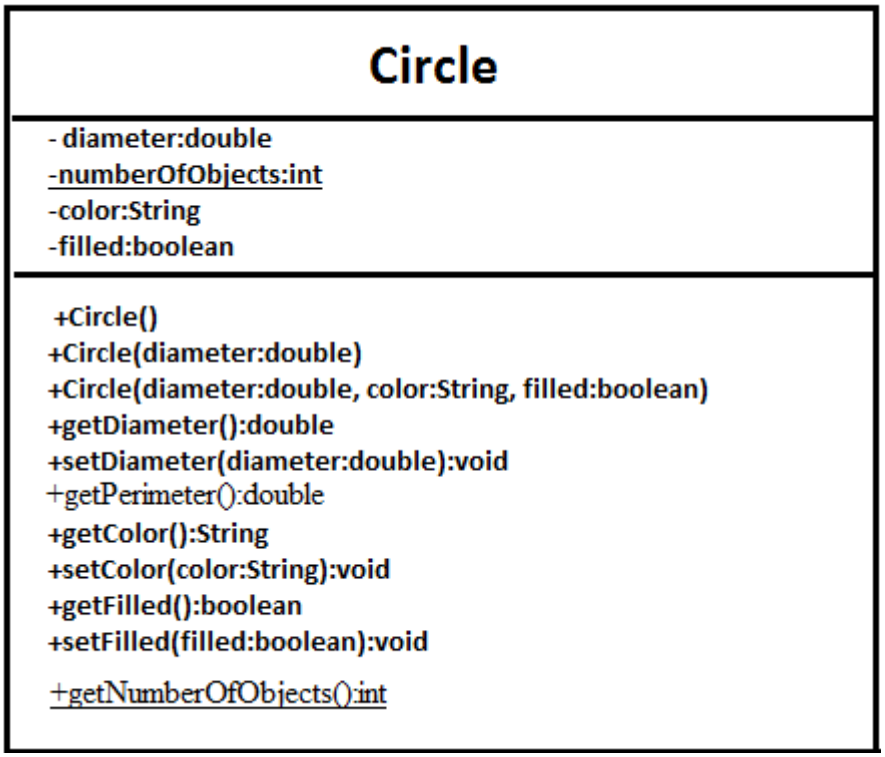
COMP2396B Tutorial 3 Exercises

1. Consider the following UML diagram:



Write a program in Java to implement the above Circle class. Here are the requirements on the data field/constructors/methods for the Circle class:

Note: + means public while - means private. The variable/method that is underlined imply it is static variable/method.

- ***diameter*** (i.e. the diameter of the circle) should have a default value of 1.

- ***numberOfObjects*** (i.e. the number of circle objects created) should be a static variable and have a default value of 0.

- ***color*** (i.e. the color of circle) should have a default value of "red".

- ***filled*** (i.e. to indicate whether the circle is filled with color) should have a default value of true.

-The no-argument constructor should construct a circle object with the default values of diameter, color and filled.

-The constructor that is with the argument ***diameter*** should construct a circle object with the specified diameter.

-The constructor that is with the argument ***diameter, color and filled*** should create a circle object with the specified diameter, color and filled values.

-Note that the static variable ***numberOfObjects*** should be incremented by 1 whenever the constructor of Circle is invoked.

-The method ***getDiameter*** should return the diameter of this circle.

-The method ***setDiameter*** should set a new diameter of this circle.

-The method ***getPerimeter*** should return the perimeter of this circle. Note that you should create a constant called pi, which has the value of 3.14 instead of using the pi value declared in java.lang.Math when calculating the perimeter of the circle.

-The method ***getColor*** should return the color of this circle.

-The method ***setColor*** should set a new color of this circle.

-The method ***getFilled*** should return the filled value (either true or false) of this circle.

-The method ***setFilled*** should set a new filled value (either true or false) of this circle.

-The method ***getNumberOfObjects*** should return the number of circles created in the Circle class.

Sample main()	public class Test {
	
	public static void main(String[] args) {
	System.out.println("Creating circles...");
	Circle c1=new Circle();
	Circle c2=new Circle(5);
	Circle c3=new Circle(12,"green",true);
	System.out.println("Getting the diameter of the circles...");
	System.out.println("C1: "+c1.getDiameter());
	System.out.println("C2: "+c2.getDiameter());
	System.out.println("C3: "+c3.getDiameter());
	System.out.println("Setting a new diameter of C2...");
	c2.setDiameter(16);
	System.out.println("The new perimeter of C2...");
	System.out.println("C2: "+c2.getPerimeter());
	System.out.println("Setting new color and filled of c2...");
	c2.setColor("blue");
	c2.setFilled(true);
	System.out.println("Getting the information of c2...");
	System.out.println("C2 Color: "+c2.getColor()+ " Filled: "+c2.getFilled());
	System.out.println("Total number of circles created...");
	System.out.println(Circle.getNumberOfObjects());
	
	}
	
	}

Sample output	Creating circles... Getting the diameter of the circles...

	C1: 1.0 C2: 5.0 C3: 12.0 Setting a new diameter of C2... The new perimeter of C2... C2: 50.24 Setting new color and filled of c2... Getting the information of c2... C2 Color: blue Filled: true Total number of circles created... 3

The above exercise is modified from the following references:

-"Introduction to Java Programming: Comprehensive Version" (8th edition) by Y. Daniel Liang

-EIE3320 "Object-Oriented Design and Programming" by Lawrence Cheung