Introduction to Java Programming

Sheet # 4: Thinking in Objects

Textbook: Introduction to Java Programming and Data Structures, Comprehensive Version (12th Edition)

This sheet covers chapter 10 "Thinking in Objects"

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➢ Check Point Questions:

Review the questions at the following URL:
https://liveexample.pearsoncmg.com/checkpoint12/Chapter10.html

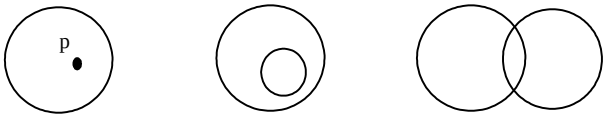
➢ Solve the following Programming Exercises from the textbook (pages 401-410)

10.2	10.3	10.4	10.10	10.11	10.13
10.14	10.17	10.19			

➢ Mini Project: The Circle2D Class

Define the `Circle2D` class that contains:

- Two `double` data fields named `x` and `y` that specify the center of the circle with `get` methods.
- A data field `radius` with a `get` method.
- A no-arg constructor that creates a default circle with (`0`, `0`) for (`x`, `y`) and `1` for `radius`.
- A constructor that creates a circle with the specified `x`, `y`, and `radius`.
- A method `getArea()` that returns the area of the circle.
- A method `getPerimeter()` that returns the perimeter of the circle.
- A method `contains(double x, double y)` that returns `true` if the specified point (`x`, `y`) is inside this circle. See Figure 10.14(a).
- A method `contains(Circle2D circle)` that returns `true` if the specified circle is inside this circle. See Figure 10.14(b).
- A method `overlaps(Circle2D circle)` that returns `true` if the specified circle overlaps with this circle. See the figure below.



Figure

(a) A point is inside the circle. (b) A circle is inside another circle. (c) A circle overlaps another circle.

Draw the UML diagram for the class. Implement the class. Write a test program that creates a Circle2D object c1 (new Circle2D(2, 2, 5.5)), displays its area and perimeter, and displays the result of c1.contains(3, 3), c1.contains(new Circle2D(4, 5, 10.5)), and c1.overlaps(new Circle2D(3, 5, 2.3)).

With our best wishes;