

CIRCLE OBJECTS

Objectives: Objects, Methods, Member Variables

Task: Calculate a circle's diameter, circumference and area.

What will the application do?

- The application prompts the user to enter a radius; the user may enter a number with decimals (double).
- The application displays an error if the user enters invalid data and asks the user again for a radius.
- When the user enters valid data, the application creates an instance of a Circle and then uses its methods to display the Diameter, Circumference and Area.
- The application asks the user if the circle should grow.
 - If the user says yes, call the grow method and then loop back to the method calls for the formulas.
 - The grow method will adjust radius to double its value.
 - If the user says no, the application displays a "goodbye" message that also displays the radius of the circle.

Build Specifications:

1. Create a class named **Circle** to store the data about this circle. This class should contain these constructors and methods:
 - a. **Properties**
 - i. `private double radius`
 - b. **Constructor**
 - i. `public Circle(double radius)`
 - c. **Methods**
 - i. `public double CalculateDiameter()`
 - ii. `public double CalculateCircumference()`
 - iii. `public double CalculateArea()`
 - iv. `public void Grow()`
 - v. `public double GetRadius()`
2. For the value of pi, use the PI constant of the System.Math class.
3. Get the user input, create a Circle object, and display the diameter, circumference and area.

Hints:

- Don't mess up the formulas for diameter, circumference or area of a circle!

Extra Challenges:

- Create a class named Validator and use its static methods to validate the data in this application.

Console Preview:

```
Welcome to the Circle Tester
Enter radius: 3
Diameter: 6
Circumference: 18.849...
Area: 28.2743...

Should the circle grow? (y/n): y
The circle is magically growing.

Diameter: 12
Circumference: 37.699...
Area: 113.097...
Should the circle grow? (y/n): n
Goodbye. The circle's final radius is 6
```

