Assignment #1 (2%)

Posted on January 12, 2023
Due Date: Thursday January 19, 2023, 11:59 PM
Late submission: 10% penalty per day until Sunday January 22, 11:59 PM
Submit to Slate Drop box for Assignment#1 using the submission template file

Design a class named **Rectangle** to represent a rectangle using object-oriented concepts of abstraction, encapsulation, and exception handling. Follow the example of the **Circle** class with exception as posted in Module 1 (Circle with Exception), which is designed using object-oriented concepts and exception handling.

Class **Rectangle** contains:

- Two **double** data fields named **width** and **height** that specify the width and height of the rectangle. The default values are **1** for both **width** and **height**.
- A data field **numberOfRectangles** to count the number of Rectangles
- A no-arg constructor that creates a default rectangle.
- A constructor that creates a rectangle with the specified **width** and **height** and invokes setter methods to instantiate objects.
- Setter and getter methods to set and get width and height
- A method named **getArea()**that returns the area of this rectangle,
  Area = width * height.
- A method named **getPerimeter()**that returns the perimeter,
  Perimeter = 2 * (width + height).
- Apply Exception handling in setter methods if height or width are set to 0 or negative values.
- Use this keyword both to invoke constructor and refer to data field.
- Display UML diagram.

Program Output and Deliverable:
Draw the UML diagram for the class then implement the class.
Write a **TestRectangle** driver class that creates three **Rectangle** objects—one with width **4** and height **40**, and a second one with width **3.5** and height **35.9**. and a third one with width -2 and height 20. Display the width, height, area, and perimeter of each rectangle and number of rectangles - in this order.

Submission Standard on Slate:
Submit only one single MSWord file (the Template file must be used) containing text of the program code in a single space format. Coding must include startup comment and file name should be Assigment1(Lastname-Firstname). Other requirements in the following order:

1. UML diagram
2. Text of your code, i.e., not image of the code (Note: Apply class abstraction and encapsulation. Create a test/driver class **TestRectangle** and a **Rectangle** class.
3. Include screen shot of your execution screen pasted below the text of your program code.
4. Attached template file (Assign_1(LastName-FirstName) may be used for submission of code and program output.

Evaluation: 2 Marks

1. UML:0.5 marks
2. Coding standard and quality (indentation, spacing, comments, conventions, etc.):1 mark
3. Program output screen shot: 0.5 marks
4. Penalty mark for Late submission 10% per day up to 3 days then mark of 0
5. Penalty mark for failing to follow submission standard 50%