This sheet is to be returned at the conclusion of the lab session.

Student Name:_____

Student Number:_____

ENG 1D04, Lab 3, Marked Assignment 1, Expressions, Wednesday

This assignment has to be submitted via ELM before 1:45 pm. Assignments will not be accepted after this time. As for the practice lab, compress the contents of your project folder, rename it, and submit one zip file. Please remember to submit your work early and resubmit often. You should not wait until the end of the lab to start submitting. You must do the assignment on your own. Conversations between students will not be permitted. You cannot bring reference material into the lab or access information through the Internet. You may use the Visual C# help, Notepad, and the Calculator program.

Overview

Your program will calculate the surface area of a cone with a given radius and height. The surface area A of a cone with radius r and height h is given by the following formula:

 $A = \pi r^2 + \pi r \sqrt{r^2 + h^2}.$

Design, implement and test the application described in the requirements below. When done, compress the project and rename the zip file

MacID_StudentNumber_LabSection_Lab3.zip

where *MacID*, *StudentNumber*, and *LabSection* are your MacID, student number, and lab section (written as Lxy), respectively. Details of what you must submit are specified below.

Requirements

Your application form should be modelled on the form below. (Your form will have fewer inputs and outputs.)

🔜 Name of the Form		
Input1 =	Unit1	
Input2 =	Unit2	
Input3 =	Unit3	
etc.		
	Calculate Clear	
Output1		
Output2	Ν	
Output3	k⊈	

- One input label box with the label Radius = , followed by a text box to accept the radius input, followed by a units label box with the label meters. Another input label box with the label Height = , followed by a text box to accept the height input, followed by a units label box with the label meters.
- 2. Two output label boxes with the labels Output1 and Output2.
- 3. A Calculate button that is clicked to perform the necessary calculations and update the output label boxes.
- 4. When the Calculate button is clicked, the output label boxes should be updated as follows:
 - a. The label Output1 should be replaced by The surface area of the cone = X whereX is the calculated surface area for a cone whose radius and height are the first and second input values, respectively.
 - b. The label Output2 should be replaced by The Surface area of the cone with the radius and height doubled = Y where Y is the calculated surface area for a cone whose radius and height are twice the first and second input values, respectively.
- 5. A Clear button that when clicked causes the input text boxes to be cleared of their values. It will also restore the output label boxes back to the original values of Output1 and Output2. The face of the button is blue, and the text is white.
- 6. The text Name of the Form on the Graphical User Interface (GUI) displayed above should be replaced by Cone Surface Area Calculator.
- 7. When the applications starts, the input text boxes are empty.
- 8. You do not need to protect against "inadmissible inputs" such as a negative input value or an empty input text box.

Design

In your project folder include a separate text document (using Notepad) with the file name Name_LabNumber_Lab3.txt where Name is your name and LabNumber is your lab section. The report will answer two questions, one related to design and the other related to testing. The testing question is given below. The design question is:

What are the advantages of coding the formula for the surface area of a cone just once (using a separate method) instead of once for each output?

Implementation in Visual C#

Implement the requirements listed above. Use the constant Math.PI from the C# Math class to represent the value π .

Testing

In the *Name_LabNumber_Lab3.txt* file, answer the following testing question:

What set of inputs, along with expect outputs, would provide a good test of your application?