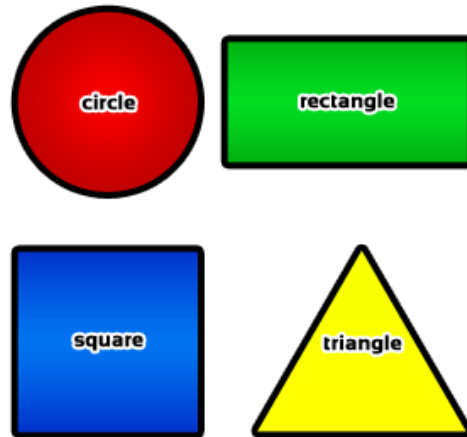


CST 180 Programming Assignment #3 (20 points)

Purpose: The purpose of this assignment is to use an IDE (Integrated development environment) to create a well-documented C++ program that utilizes a menu to enable user interactions and expressions to provide formatted output.

Specifics: Alice, a local elementary school teacher, has a need for a program that will help her students calculate the area circles, rectangles, and triangles. She would like the program to output a menu such as:



Chessnut Hill Geometry Calculator

1. *Calculate the Area of a Circle*
2. *Calculate the Area of a Rectangle*
3. *Calculate the Area of a Triangle*
4. *Calculate the Area of a Square*
5. *Quit*

Enter your choice (1 – 5):

Once the student has made a selection, your program will check for correct input and calculate the area based on the selected option. Processing involves the following:

If the student enters a 1, the program should ask for the radius of the circle and then display its area. Use the following formula: **$area = \pi r^2$** Use 3.14159 for pi and radius of the circle for r.

If the student enters a 2, the program should ask for the length and width of the rectangle and then display the rectangle's area. Use the following formula: **$area = length * width$**

If the student enters a 3 the program should ask for the length of the triangle's base and its height, and then display its area. Use the following formula: **$area = \frac{1}{2}(base * height)$**

If the student enters a 4 the program should ask for the length of a square's side and then display the square's area. Use the following formula: **$area = sideLength * sideLength$**

If the student enters a 5 the program should output an exit message and quit.

If the student enters anything other than the allowed inputs, output an error message and terminate the program.

Note: Assume input is in inches. Area calculations should be issued in square inches. Output should also provide tutorial value by showing the student how to calculate the area. An example statement of calculating the area of a triangle follows:

*“For a triangle with a base of 12 inches and a height of 10 inches, you multiply 12 * 10 and then divide by 2. The area is 60.0 square inches. The formula is $area = \frac{1}{2}(base * height)$ ”*

Items in red are provided as input by the user or calculated by the program.

You need to come up with a similarly constructed string for each of the shapes.

Step 1: Develop and document your program by writing pseudocode. Examine your pseudocode for logic errors and correct as needed. (Do this before you write the program!)

Step 2: Type your code into the IDE (e.g. Dev c++, visual studio, etc)

Step 3: Compile your code and execute. You may need to fix errors. Look at your output and make it meaningful for the students using your program. Do a test run that utilizes all menu options. Your output screenshot should include all options.

Deliverables: Submit the C++ source code to the **Program 3 Dropbox** within the Delta eLearning System.

Create a hardcopy for turn-in and grading containing the following:

- a) Title Page
- b) Pseudocode for program (you should know what this is now!)
- c) Source Code (copy and paste from your IDE)
- d) Screenshot of output

Upload the document AND the .cpp source code file for grading into the appropriate dropbox.