CS 185
Programming Assignment 8

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Before writing any code, you should design your full architecture. Draw a diagram containing the hierarchy of all the classes and their content.

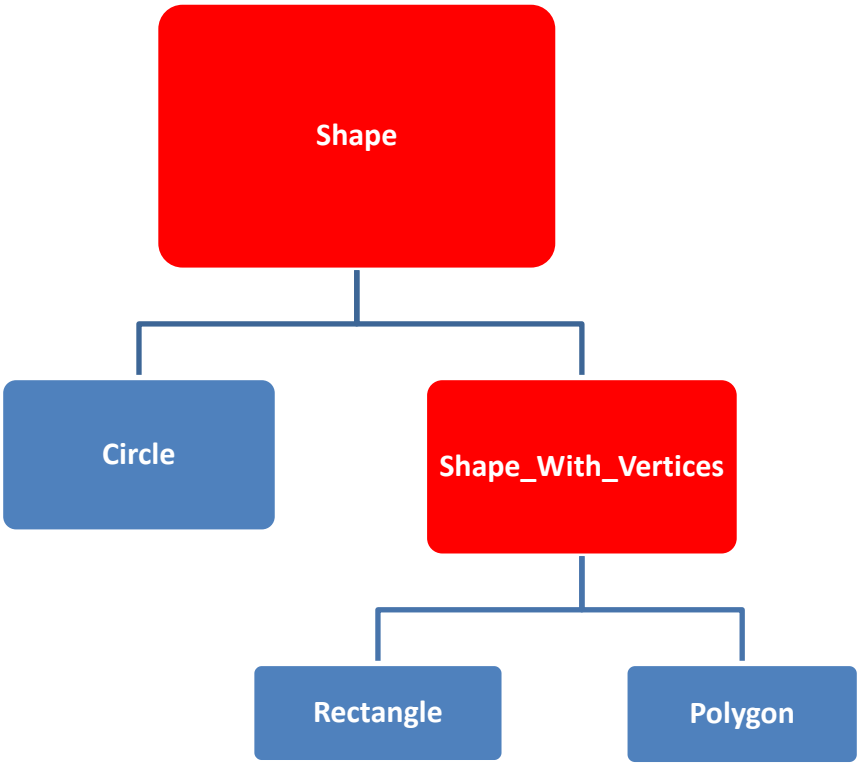
Details

This assignment will give you some practice with object-oriented programming (classes, objects, constructors, destructors, inheritance, polymorphism, etc.), as well as pointers and dynamic memory allocation.

You are given a driver ***(main.cpp)*** that is testing the following classes:

- Shape
- Shape_With_Vertices
- Circle
- Rectangle
- Polygon

Here is a diagram that shows you the hierarchy that you are required to follow:



Note: Red nodes represent abstract classes.

Your job is to implement the above classes in order to pass all the tests provided in main.

Note: Some of the tests should lead to a compiler error, so make sure you are getting one when you uncomment that line of code.

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Here are **SOME** of the methods that you will find in the above classes. I did not specify if the properties or methods are ***public***, ***protected*** or ***private***. Also, I did not specify if the methods are ***const***, ***virtual*** or ***pure virtual***. It is up to you to decide.

Shape Class	

Methods	`Shape(Point center_)`
	`~Shape()`
	`Point GetCenter()`
	`void SetCenter(float x_, float y_)`
	`void Draw()`

Properties	`Point center;`

Shape_With_Vertices Class	

Methods	`Shape_With_Vertices(Point center_, unsigned int number_of_vertices_)`
	`~Shape_With_Vertices()`
	`void SetCenter(float x_, float y_)`

Properties	`Point *vertices;` `unsigned int number_of_vertices;`

Circle Class	
Methods	`Circle(Point center_, unsigned int radius_)`
Properties	`unsigned int radius`

Rectangle Class	
Methods	`Rectangle(Point center_, unsigned int width_, unsigned int height_)`
Properties	`unsigned int width;` `unsigned int height;`

Polygon Class	

Methods	`Polygon(Point center_, unsigned int number_of_vertices_);`
	`Polygon(Point center_, const Point *points_, unsigned int number_of_vertices_);`
	`void SetVertex(unsigned int vertexIdx_, float x_, float y_);`

Once again:

- I did **NOT** provide all the methods that should be found in the above classes. It is up to you to add the remaining ones.
- You are responsible for the architecture ***(public, protected, private, const, virtual, pure virtual, etc…).***
- The tests in **main.cpp** should guide you with the architecture and with the additional methods***.***
- You can add helper functions but they all need to be ***private*** or ***protected***.

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An **output.txt** file is given to you so that you can compare your output with the expected output.

Note: ***I expect the exact output. So be careful and use a tool (such as: WinMerge) that will check the difference between two text files.***

Comments

In this and future assignments, you are required to include:

- **A file header comment in every piece of source file. The format is shown in the "Comments.cpp" file given to you in the beginning of the semester and should be present at the very top of all your code.**
- **Function header for each function you create. The format is shown in the "Comments.cpp" file given to you in the beginning of the semester and should be present at the top of every function.**
- **Inline commenting for your code.**

What to submit

You must submit the following CPP and Header files:

- Shape.cpp
- Shape.h
- Shape_With_Vertices.cpp
- Shape_With_Vertices.h
- Circle.cpp
- Circle.h
- Rectangle.cpp
- Rectangle.h
- Polygon.cpp
- Polygon.h

in a single .zip file (go to the class page on moodle and you will find the assignment submit link). ***Do not submit any other files than the ones listed.***

If you've forgotten how to submit files, the details are posted in the syllabus and in the assignment guidelines document. Failure to follow the instructions will result in a poor score on the assignment (and possibly a zero).

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Special note:

The due date/time posted is the positively latest you are allowed to submit your code. Since the assignments can easily be completed well before the deadline, you should strive to turn it in as early as possible. If you wait until the deadline, and you encounter unforeseen circumstances (like being sick, or your car breaking down, or something else), you may not have any way to submit the assignment on time. Moral: **Don't wait until the last day to do your homework.**

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