Assignment 3: Microcad 2.0

Prompt

This program is an extension of Assignment 2. Read the full requirements to get started.

MicroCad is the simple application that calculates area and perimeter/circumference of geometric figures. Students will develop class hierarchy that slows to create triangles, circles and rectangles and to calculate their area and perimeter/circumference.

Requirements

Prerequisites and Logistics

- ❏ Use your GitHub account and provide a link to your repository/project.
- ❏ Your source code must be committed into a git repository as a separate project. Add dvgenis@brandeis.edu as collaborator to this project (it will give me opportunity to provide feedback in GitHub).
- ❏ You must have access to any Unix-based system (Linux or Mac) or Windows 10 with C++ compiler that supports C++11/C++14 standards.
- ❏ After completion of this assignment you will commit your code, create pull request, and submit it to review
- ❏ Your program shall be successfully compiled using the following command `g++ -std=c++1y microcad.cpp` or `g++ - microcad.cpp` and to be started using the following command `./a.out` or I should be able to build/run it in Code:Block IDE on Windows
- ❏ If you use Windows environment, put all your files in one folder.

Requirements

- ❏ You should implement class hierarchy for: Figure (base class), triangle, rectangle and circle. You may or may not need other classes.
- ❏ You have to provide constructor, destructor, assignment operator, area and perimeter/circumference methods for derived classes.
- ❏ -Each class shall have dynamically allocated member (random string) which is C++ `char * id`
- ❏ While implementing a copy constructor/assignment operator, two “equal” objects must have the same `id`
- ❏ The program must support all corner cases and handle invalid input correctly.
- ❏ Your program must track the number of created/deleted geometric figures as counter in the base Figure class.

- ❏ Your program must track the number of created/deleted triangles, rectangles and circles as counter in the corresponding class.
- ❏ In this assignment, you should distinguish between perimeter and circumference (circle does not have perimeter).
- ❏ Your `main()` shall create two triangles, three rectangles, two circles, calculate their perimeters and areas (and to print these values to the console) and to print the number of created geometric figures. Delete one triangle, one rectangle and print the number of created geometric figures, rectangles and triangles.
- ❏ You have to implement base (and derived) class method `name()` that returns in runtime the name of the figure (hint: use virtual methods).
- ❏ You have two implement `type()` global function or base type method that uses `typeid` to identify object type and to print it for each created object.

Grading Rubric

Assignment Weight: 15%

	Excellent 100	**Good** 80	**Acceptable** 70	**Insufficient** 50	**Absent** 0
Correctness of results/output 50	The program is bugless (handles all inputs, no leaks etc.) and satisfies all requirements described in the assignment 50	The program has few non-critical bugs and mostly satisfies requirements described in the assignment 40	The program is still usable but has major issue and mostly satisfies requirements described in the assignment 35	The program has major issues/bugs that make it unusable 25	0
Design 50	The program always satisfies basic concepts of OO Design and “good coding practice” 50	The program mostly satisfies basic concepts of OO Design and “good coding practice” 40	The program generally satisfies basic concepts of OO Design and “good development practice” but has major flow in design 35	The program does not satisfy basic concepts of OO Design or “good coding practice”. 25	0

***I understand that the real software development process is not black and white. As result of this, minor problems will not cause immediate drop to next grade. You may lose 0.5 – 2 points for minor issues (not immediately 10-20 points)**