Project 1: Interactive 2D Graphics

1. Due Date

Project 1 is due on **Sunday, 02/14 11:59pm.**

2. Introduction

You are required to write a 2D drawing program using C++ and OpenGL. An executable of this project (*.exe*) created by the instructor has been uploaded to Mycourses. Please run it and get a feel of the work you should deliver. The program should have a right-click menu, from which users can choose specifications they want to draw with. The program should allow users to draw 2D objects including points, lines, triangles, quads and polygons, and they must be interactively created using GLUT mouse, motion and keyboard callbacks. To help you start this assignment, an example code named *interactiveTriangle.cpp* is provided in Mycourses. Please take a look at it and familiarize yourself the use of callback functions, primitive drawing, and GLUT menu.

3. Requirements

3.1. **(15pts) Callbacks:** The programming mechanism with callback events such as display, mouse and keyboard events must be used appropriately in your program.

3.2. **(20pts) Data Structure:** You should implement appropriate data structure(s) in order for your program to store and display multiple objects. For example, you can define an *Object* class, and at the runtime you create instances of the *Object* class and add each of them into a C++ *vector* dynamic sequence container.

3.3. **(6pts for each shape type) Points:** Your program should be able to draw points, triangles, quads, polygons, and lines.

3.4. **(3pts) Color:** The right-click menu must contain at least **three** predefined colors for users to choose during the time of creating an object. A chosen color is to specify the color of object.

3.5. **(3pts) Point Size:** The right-click menu must contain at least **three** predefined sizes. A chosen size is to specify the rasterized diameter of the point.

3.6. **(3pts) Line Width:** The menu must contain at least **three** predefined line widths. A chosen width is to specify the width of rasterized lines.

3.7. **(13pts) Mouse:** Your program must use an appropriate mouse callback to specify the position and shape of each object. Consider to use `glutMouseFunc()` and `glutMotionFunc()`.

3.8. **(13pts) Keyboard:** Your program must use an appropriate keyboard callback. Consider to `glutKeyboardFunc()`. For example, hitting a key on the keyboard completes the creation of a polygon.

4. What to Submit

(Make sure your codes can be compiled and run in Visual Studio.)

Submit the following items to *mycoures*:

- A document explaining how to use your program.
- Draw a picture with the tool you created, and submit a screen shot of your drawing.
- A zip file containing all source files (*.h* and *.cpp* files).