Project 1: Interactive 2D Graphics

1. Due Date

Project 1 is due on **09/15 11:59pm.**

2. Introduction

You are required to develop a 2D drawing program. You are free to use either OpenGL or Direct3D for this project. Game engines like Unity and Unreal are not allowed. An executable of this project (*.exe*) created by the instructor has been uploaded on *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 select 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. Please help you start this project, an OpenGL program named *interactiveTriangle.cpp* is provided. Please downloaded it from *mycourses*, and take a look at the use of callback functions, primitive drawing, and the use of GLUT menu.

3. Requirements

- **3.1. (15pts) Setting 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 type of objects.
- **3.3. (6pts) Points:** Your program should be able to draw points.
- **3.4. (6pts) Triangles:** You program should be able to draw triangles.
- **3.5. (6pts) Quads:** Your program should be able to draw quads.
- **3.6. (6pts) Polygons:** Your program should able to draw polygons.
- **3.7. (6pts) Lines:** Your program should be able to draw lines.
- **3.8. (3pts) Color:** The right-click menu must contain at least **three** predefined colors for users to choose from at the time of creating an object. A chosen color should be used to specify the color of object.
- **3.9. (3pts) Point Size:** The right-click menu must contain at least **three** predefined sizes for users to choose from at the time of creating a point. A chosen size should be used to specify the rasterized diameter of the point.
- **3.10. (3pts) Line Width:** The menu must contain at least **three** predefined line widths for users to choose from at the time of creating a line. A chosen width should be used to specify the width of rasterized lines.
- **3.11. (13pts) Mouse:** Your program must use an appropriate mouse callback to specify the position and shape of each object. Consider using `glutMouseFunc()` and `glutMotionFunc()` if you use OpenGL.
- **3.12. (13pts) Keyboard:** Your program must use an appropriate keyboard callback such as `glutKeyboardFunc()` in OpenGL. For example, hitting a key on the keyboard completes the creation of a polygon.

4. What to Turn In

(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.
- A screen shot of your drawing with your program.
- A zip file containing all source files (*.h* and *.cpp* files).
- A description explaining how to set up your code in Visual Studio, if not done with OpenGL.