CS445/545 – Project 1: Interactive 2D Graphics

1. Due Date

Project 1 is due on **09/06 11:59pm.**

2. Introduction

You are required to develop a 2D drawing program using OpenGL and GLUT. The program must 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 run the example I provided to see what features you should implement.

Note: I know there are many libraries or toolkits such as SFML, GLFW, SDL, etc., but you are required to use GLUT for this project since it is basic and provides lower-level functionality. We focus on low-level knowledge in CS445/545.

3. Requirements

- **3.1. (30pts) Setting GLUT:** *Display*, *reshape*, *mouse, motion* and *keyboard* callbacks must be used appropriately in your program.
- **3.2. (5pts) Points:** Your program should use `GL_POINTS` to draw points.
- **3.3. (5pts) Triangles:** You program should use `GL_TRIANGLES`, `GL_TRIANGLE_STRIP` or `GL_TRIANGLE_FAN` to draw triangles.
- **3.4. (5pts) Quads:** Your program should use `GL_QUADS` or `GL_QUAD_STRIP` to draw quads.
- **3.5. (5pts) Polygons:** Your program should use `GL_LINE_LOOP` or `GL_POLYGON` to draw polygons.
- **3.6. (5pts) Lines:** Your program should use `GL_LINES` to draw lines.
- **3.7. (7pts) 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 passed into `glColor*()` to specify the color for the object.
- **3.8. (7pts) 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 passed into `glPointSize()` to specify the rasterized diameter of the point.
- **3.9. (7pts) 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 passed into `glLineWidth()` to specify the width of rasterized lines.
- **3.10. (14pts) Mouse and Motion Callbacks:** Your program must use GLUT mouse callback to specify the position and shape of each object. Consider using `glutMouseFunc()` and `glutMotionFunc()`.
- **3.11. (10pts) Keyboard Callback:** Your program must use GLUT keyboard callback such as `glutKeyboardFunc()`. 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 2012.)
Submit the following items to Canvas:

- 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).