Assignment 1

Due: Friday, September 15, 2023, 11:59 PM

Individual Assignment (100 points)

Assignment Title: Creating Polygons with Mouse Input in OpenGL GLUT

Objective: The objective of this assignment is to implement a simple interactive OpenGL GLUT application that allows users to create polygons by clicking the left mouse button to add new points and the right mouse button to finalize the polygon creation.

Description: In this assignment, you will be creating a basic OpenGL GLUT application that enables users to draw polygons by capturing mouse input. You will implement functionality for adding points on the screen with each left mouse click and finalizing the polygon with a right mouse click.

Code Requirements:

- Your program should create an OpenGL window using GLUT. (Already created)
- Initialize the window with an appropriate title and dimensions. (Already created)
- Implement a mouse callback function to handle mouse events: (40 points)
    - Left mouse button click: This should add a new vertex point to the current polygon being drawn.
    - Right mouse button click: This should finalize the current polygon, connecting the last point to the first point to complete the polygon.
    - Left mouse dragging: This should show the line from the last point.
- Implement a keyboard callback function to provide additional functionality (40 points)
    - Pressing 'R' to fill the last polygon with RED color,
    - Pressing 'G' to fill the last polygon with GREEN color,
    - Pressing 'T' to fill the last polygon with NO color,
    - Pressing 'C' should clear the screen and reset the drawing.
    - Pressing 'Q' should quit the application.
- Use appropriate OpenGL functions to draw the polygons on the screen based on the user's input. You can use GL_LINES or GL_POLYGON to draw the edges of the polygons.
- Ensure that the program can handle the creation of multiple polygons sequentially.
- Include comments and documentation in your code to explain the logic and any relevant OpenGL functions used.
- (Bonus) Pressing 'D' to drop the polygon from its location towards down (Extra 10 points)

Submission Guidelines:

- (80 points) Submit your source code (C++) file.
- (20 points) Include a 1-page report (PDF) describing your
    - Math needed for the implementation,
    - Challenges faced, and
    - Additional features you implemented beyond the basic requirements.

Grading Criteria:

Your assignment will be evaluated based on the following criteria:

- Proper implementation of mouse and keyboard callbacks.
- Correct handling of mouse input for polygon creation.
- Clear and organized code with comments.
- Ability to draw and finalize multiple polygons.
- Additional features and creativity (if any).
- Code and 1-page report.

Note: Make sure to follow best practices for OpenGL programming and code organization. Feel free to seek assistance from Dr. Sayed Reza during office hours. Office hours are available in Syllabus.