**Programming Project Report**

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**Problem Statement:**

The Goal of this project is to develop a simple OpenGL application that allows a user to draw on the screen, and a cube will follow the drawn line. There are no outputs to this code other than the cube moving along the line.

**Design:**

To design this I chose to use a vector to store all the points of the drawn line, then redraw a cube at each of those new coordinates stored in the vector by iterating through it. This is not the most efficient strategy to this problem, but it will work for this project.

**Implementation:**

First I initialized a few Global variables, these being lineStart, lineEnd which are arrays to store the line’s start and ending coordinates. Then I declared a cubePos which is an array that stores the current position of the cube. Then the currentPointIndex keeps track of the current target point for the cube. Then a Vector called linePoints is initialized to store the points of the drawn line, and finally a Boolean variable called isDrawing is set to False, it is to keep track of whether or not the user is drawing. The mouse() function detects when the left mouse button is pressed, it clears the previous line points and begins a new line, when the left mouse button is released it stops drawing the line and resets the current point index. The mouseMotion() function handles while the mouse is drawing across the screen by converting mouse coordnates to world coordinates OpenGl can use. Then calls glutPostRedisplay() to redraw the window. The drawLine iterates through the linePoints vector and uses OpenGl’s “GL\_LINE\_STRIP” to draw the line. The drawCube() simply draws the cube to the screen using GL\_QUADS. The display() function draws the line and cube. The reshape function sizes the cube and line to fit the new window size. The timer() function updates the cubes position to the next point in line, incraments the currentPointIndex to move to the next point, calls glutPostRedisplay() to update the window to the new position, and continues the animation. Finally the main function combines all these functions into prebuilt OpenGL functions.

**Testing:**

To test this program I would see if the cube followed the line. The major error that was present in the code was with the mouse motion as the conversion of coordinates from mouse to OpenGL recognizable was being scaled down so the cube would not follow the line presented on the screen, but mirror it in the center of the window. To fix this a adjustment to the mouseMotion() function was made to handle conversion better.

**Conclusions:**

The project was a overall success as when a line is drawn on the screen the cube walks across the line. Next time I would redesign the program to be more memory efficient as right now it is not optimized. This project took about 5hrs to complete with 30min dedicated to the report.