Project 8: Simple Demo Scene

CST-310

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**Background**

The purpose of this project is to explore OpenGL’s capabilities with three-dimensional modeling. This deeper understanding of OpenGL is important because it can be utilized in many circumstances. The implementation example is a website that has a complex rendering of a three-dimensional virtual environment. This is just one example of how three-dimensional renderings can be used to enhance the design of any program or website. I’ve decided to implement this three-dimensional demonstration using C++, OpenGL, and GLUT. The simple rendering is a multicolored cube that rotates on three axes: the x-axis, y-axis, and z-axis. The cube rotates on these axes, and when the user clicks on the cube, the axis of rotation changes to the next axis. This small, interactive rendering is designed to show the possibilities of OpenGL.

**Mathematical Concepts Explained**

With this specific implementation, the largest mathematical implementation would be that of degree measurements in rotations. By using degree measurements, the cube is able to be directed to rotate 360 degrees. This 360-degree rotation is important because the rotation must continue. When the rotation is complete, it repeats itself for each axis.

A picture containing text

Description automatically generated

**Programming Implementations**

There are multiple programming implementations in this code. To begin, the verticies, normal, and color of the cube is defined in the code using multiple points on the cube:

Table

Description automatically generated

Next, the polygon colors are defined:

Calendar

Description automatically generated

After this, the normal display function is created to ensure that every part of the rendering makes it to the screen as clearly and accurately as possible:

Calendar

Description automatically generated

Next, an important of this project is created. The user functionality is designed through mouse clicks. When the mouse is clicked, or, “down,” the axis of rotation switches to the next defined switch.

Graphical user interface, text, application, email

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**Interest Explained**

This project, in my opinion, is interesting to watch because it’s multicolored and can rotate in any way the user chooses. The program was tricky to design because it involves the moving vertices, and it was difficult to create a cube in this model. I began with creating a static object that would rotate, but the cube would not render through this method, so I created a cube that was more dynamic. I also had to do a lot of research about how to implement a looped design, which is when the theta and degree measurements are used. This design is sensitive to moral, ethical, and legally questionable content such as sex, violence, or misrepresentations of truth.

**Logic Flow Chart**

Diagram

Description automatically generated

**Additional Screenshots**

Graphical user interface

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