Project Reflection

Development Choices

The 3D scene I recreated consisted of several items from my desk. I chose these items because of the variety of shapes needed to reproduce the scene. The shapes needed included a cube, sphere, cylinder, and plane. I was able to use these basic shapes to make more complex shapes such as a wedge and a sphere with a base. Using the different abilities of openGL, the shapes I created, and the textures I found, I was able to create a 3D scene that had all of the required functionality.

Scene Navigation

To be able to easily navigate through the 3D scene two input devices, a mouse and keyboard, were used to provide several types of input to the program. Several methods were used to process keyboard input as well as mouse position feedback and mouse events such as left or right click or using the scroll wheel. The input from these devices was also combined to enable further functionality with the mouse by holding down a key while performing and action with the mouse.

The WASD keys are used for movement forward (W) or backward (S), and to strafe left (A) or strafe right (D). The QE keys are used to move up (Q) or down (E). The mouse cursor is used to look up, down, left, and right, or any angle in between. The mouse scroll wheel is used to increase or decrease the speed the camera moved around the scene. Additionally, using the mouse scroll wheel while holding down either shift key allows you to zoom in or out with the camera. Clicking the left mouse button will reset the camera to the original view. Right clicking

the mouse will reset the camera movement speed back to its original speed. Holding the shift key while right clicking resets the camera zoom back to its original level.

Besides movement, some additional controls were added to the scene. The OP keys are used to switch the camera to an orthographic projection view (O) or a perspective projection view (P). The LK keys can be used to start (L) or stop (K) the light sources orbiting the scene. Lastly, the ESC key is used to exit the program.

Custom Functions

There were several methods created for this program that helped to simplify development and make the code more reusable. I created a method for creating a mesh each of the shapes I need for the 3D scene. This included shapes for a plane, sphere, cylinder, and cube. These methods allowed me to pass in a mesh for the shape I needed. I could then reuse that shape multiple times using transformations to create the different varieties of the shape I needed. I could then also bind different textures to the shapes to create the item I needed.

I further customized the plane and cube creation methods to create shapes with different heights or angles. In the case of the cube, you could pass in two different heights for the front and the back of the cube. This allowed me to create a wedge shape, which I needed for several of my objects. By doing the same thing with the plane mesh creation method, I was able to create a plane at the same angle of the wedge. This allowed me to easily apply the same transformations to the plane. Then, I could bind a texture to the plane to give a different texture to the top of the wedge. Given more time, the code could be further refactored, making it more reusable and thus easier to code and develop.