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CS 330 Project Reflection

The scene I chose to render provided a good opportunity to experiment with lighting and 3D models without being excessively complicated. I know from experience that I often struggle with learning complex programs in a short amount of time, so I didn’t want to bite off more than I could chew. On the other hand, I needed something that would allow me to experiment with multiple types of shapes and textures, and this scene provided me with that.

The biggest challenge to creating the scene was programming the lighting. My solution was not as elegant as some, but I am happy with the results. I was able to achieve multiple light sources by simply performing two sets of Phong calculations in the shader program, and then adding those results to simulate the desired effect. This effect, combined with careful placement of the normal vectors when creating the 3D models, was enough to create a realistic looking scene.

Navigating the scene is relatively simple. The user can move the mouse to look around, while the mouse wheel controls the speed at which the camera ‘flies’ within the 3D scene. Camera movement is directed using the WASD keys for two dimensional ‘walking,’ and the Q/E keys to move up and down. In addition to movement, the scene provides several additional functions designed to display the capabilities of OpenGL.

The first is the use of the O and P keys to swap between Orthographic and Perspective projections respectively. The primary difference between these two types of rendering is that an Orthographic projection is manually defined, while the Perspective projection uses OpenGL’s logic to determine what parts of the scene to render (thus simulating the camera’s point of view).

The second set of functions changes the scene’s lighting. The scene uses two light sources, which rotate by default around the origin. One of the lights is a soft white, to simulate natural lighting, while the other is tinted yellow to simulate indoor lighting. Tapping the X key swaps the lights to a combination of red and blue, while the C key will switch the primary light to green, and turn off the second light. Pressing K will freeze the rotating lights in place; the user can press L to restart the rotation.

The code uses multiple custom functions, mainly for creating mesh and rendering lighting models. These functions can be re-used to render similar objects, such as the two glasses which are rendered using the same mesh and lighting; only the textures are different. The plate also uses the same (glossy) lighting function.



