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CS 330 Comp Graphic and Visualization

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For our final project of the class, we were tasked with doing our best to recreate an image of our choosing into a 3D model using OpenGL. The image I chose was of some household objects on top of a mini refrigerator in my basement. Those objects were a desk lamp, an arcade fight/joystick, a leather journal, and a roll of medical tape. I chose these objects because they were interesting enough to model without being overly complicated. The lamp and joystick were the most interesting and fun to model, due to their unique shapes, requiring multiple 3D meshes to create the entire object. Each object was made of a different material, which had different visual and reflective properties.

The journal and roll of tape were the easiest to create, after the top of the refrigerator. I used a simple plane to represent the top of the refrigerator and gave it a bumpy and slightly reflective texture to mimic the texture of my own refrigerator. The journal was made of a shallow box mesh that I textured with a leather texture image I found online. I also created an offset and slightly smaller box within and colored it white to show the edges of the pages within. The roll of tape was a simple cylinder mesh with a matte finish. I also added a smaller cylinder within that one and gave it the same texture as the refrigerator to simulate the cylinder being hollow, like the actual roll is. The joystick body was a box mesh with a matte plastic texture. The buttons were all shallow cylinders with a shinier plastic texture, as well as the sphere for the top of the joystick. That sphere sat on top of a thin metal cylinder for the shaft of the joystick. The lamp was the most complicated, using a wide cylinder for the base, a thin cylinder for the shaft rising out of it. These connected to a half torus mesh to show the flexible metal neck that attached to the actual lamp portion, which was two tapered cylinders connected to each other. I added several light sources to the scene to add to the realism, including a specular light positioned within the lamp head to simulate the actual light source pointed down onto the scene that the other objects can reflect.

A user can navigate this scene using a familiar mouse and keyboard setup. This will feel especially familiar if the user is used to playing video games on their PC. Moving the mouse will move the camera’s view around. Using the familiar “WASD” control scheme on the keyboard will move the camera forward, left, back, and right, respectively. The Q and E keys are used to raise or lower the camera vertically. Pressing the P key will show a perspective view, while pressing O will show an orthographic view. Moving the scroll wheel on the mouse will change the speed at which the keys will move your camera around the scene.

I created several functions to make my code more modular and organized. I created a separate function for each of the objects I wanted to model. This means there was a function for the fridge top, the lamp, the joystick, the journal, and the roll of tape. These were simply named and should be easy to understand for anyone looking at the code. Modularizing these functions would allow myself (or someone looking at my code) to easily create multiple versions of the objects if they so choose. This adds to the reusability of my code. While this is probably of little concern for a project of this scope, it is easy to see how this practice and way of thinking can massively simplify modelling the hundreds or thousands of objects that may need to be created in a bigger project, such as modelling a 3D video game with many reusable assets.