Dominic Drury

CS-330

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**7-1 Final Project**

**Justify development choices for your 3D scene:**

I had a lot of trouble figuring out what scene I wanted to capture. I needed to keep the objects relatively simple so I could actually code them, but they still needed to span the spectrum of shapes. In the end I decided to design a scene that would be similar to the one I have set up when doing tabletop games. I chose a pint glass because it would involve a cylinder for the cup and a torus for the handle. Those shapes had files already provided by examples that were given at the start of the building journey. I chose a dice tray because it fit the theme and was another cylinder. I chose a d4 dice because it too fit the them and it was a pyramid which we already were coding for, all I had to do was switch the square base into a triangle base. Finally, I chose a notebook. This shape could be basic if I needed it to be, like a simple cube, or it could be complex with torus’ acting as the spiral. In the end I went with complex, and even added white panes to act as the paper along the 4 sides. The hardest parts were taking the provided code and making it work for me. I had made a bed I had to sleep in by using provided code for the cylinders and tori, but the code for provided has bad texturing that forced me to use specific textures, the cube file was incompatible with the cylinder file (they had conflicting overrides), and there was no pyramid. In order to fix the cube and pyramid issue I copied the base code of the plane and altered the vector points in order to build my shapes. As for the lighting I chose a cylinder as the object of my light since it mimics the overhead light I have (it is located behind the camera to mimic my own light as well) and I used the spotlight as my second light and made it yellow. This both satisfied the requirement that one of them be colored, and made it feel like more of a flashlight.

**Explain how a user can navigate your 3D scene:**

The controls for my scene are W, A, S, D for forward, left, backward, and right. E will take the camera up, and Q will take the camera down. Scrolling the mouse wheel forward will slow down the movement speed, and scrolling the mouse wheel down will speed up the movement. The last two controls I added were P to switch to perspective view and O to switch to an orthographic projection matrix.

**Explain the custom functions in your program that you are using to make your code more modular and organized:**

My program is modularized to separate out the shape functionality and input controls. It takes a lot of code to make a cylinder or torus so those are kept in different files to improve readability of the code. It also made it easier to copy the torus file and make it into a half torus maker and use the plane file as a base for making a pyramid and cube. Keeping the shapes separate also would allow me to add more shapes with very little additions needed to the source file. The same can be said about keeping the camera functions in a separate file, I can have all the controls in a few small functions in the source file that's called during the while loop and keep the complicated math behind making it work separate. This again improves the readability of the code and allows me to add more controls in the future if I wanted with little additional code needed. If I had more time, I would have liked to mimic the functions of the tutorials provided in Github in order to make the main file smaller and easier to read/navigate, but after trying several times over the past few weeks I believe it would take too much time to alter my scene code in order to force it into the set-up of the tutorial code.