**Project Reflection**

Design Decisions:

A computer and cell phone on a table

Description automatically generated

For this project, I have chosen to recreate the scene above in a 3D space. The requirements were that I have certain shapes and this scene satisfied them. For the laptop, I created 2 cubes and lined them up. This not only gave me better control over the angle of the device but also gave me the option of adding a different texture to each for better realism. For the phone, it was a simple cube with a texture on it and was placed in the right area. The same worked for the notebook as well. The real challenge was the coffee cup. For this, I made a cylinder with the top colored and the rest white. It was simple to add the dish at the bottom as well. Lastly, I added a basic plane with a wooden texture at the bottom of the scene to represent the table everything is on.

The features of the program include the ability to navigate in the 3D space using both your keyboard and mouse. Using the WASD keys you can move along the X and Y axes. Using the Q and E keys you can navigate along the Z-axis. Pressing the P and O keys will toggle the perspective of the scene from 2D to 3D. For the mouse controls, moving the mouse controls the camera, and the mouse scroll controls zooming in and out. I also added a light source at the top to match the light in the picture.

At first, the entire concept of OpenGL was a lot to take in. The heavy influx of information can be overwhelming and that coupled with doubt gave me trouble in the beginning. After doing some of my research and watching many videos, I realized that I was feeling overwhelmed because of having my entire program in a single source.cpp file. I decided to break up the components of the program into 4 essential parts:

* Source.cpp: Holds the basic activation of libraries and controls the back end and layout of most functionality.
* SceneManager.cpp: In charge of controlling the items in your scene and all the properties on each item.
* Models.cpp: Controls the functionality of creating each object in the scene and holds the rendering functionality.
* Mesh.h: The custom object structure of each object in the scene.

After organizing it differently, my brain began to understand how everything worked together to create my 3D scene. This also gave me the ability to simply add and customize each object and its properties. Lastly, it gives more modularity to my code and allows anyone to simply come in and modify, add, or remove objects with ease.

Issues:

Most of the issues encountered took up some time but ended up being simple mistakes. For example, I spent about 2 hours trying to figure out why my images wouldn’t render in my scene. I came to find out that my images were not in the correct folder(duh). I’ll list the other issues below.

**Laptop:**

The development was a simple task in terms of creating the objects. The thing I had the most trouble with was lining up the texture of the keyboard. In the scene, you can see that the image is not quite matched up where the triangles meet.

**Cup:**

This was the most challenging. Getting the color and texture to show with the lighting properties is a challenge. For some reason, in my cylinder and dish, the white would not render correctly. For this workaround, I applied a texture that represented a liquid on top of the cup, so it gave the idea of coffee. I also applied a texture to the dish to make it stand out a little more as well.