Britian Holcomb

CS 330

Final Project Reflection

For this OpenGL project, I created a 3D scene that represents a realistic desk environment. The decision to include objects like a notebook, keyboard, screen, and desk surface was intentional to simulate a workspace. I selected these objects to work with familiar shapes such as cubes and planes, which could be textured and transformed to resemble real-world counterparts. This not only made modeling feasible within OpenGL’s capabilities, but also allowed me to focus on refining materials, lighting, and interaction.

To meet the project requirements for applying lighting and texture, I implemented support for multiple materials like wood, leather, paper, and metal by assigning appropriate textures (e.g., wood.jpg, leather.jpg) and configuring object-specific properties through the DefineObjectMaterials function. This function assigns ambient, diffuse, and specular values for each mesh object, allowing the scene to react realistically to light sources. I also used Phong shading in the shaders to enhance realism.

Navigation in the 3D scene is handled through a virtual camera controlled by the ViewManager class. Keyboard inputs allow users to pan and zoom the camera, enabling dynamic exploration of the space. This interactivity was set up to mimic basic FPS-style or CAD-style controls, improving usability without overwhelming the user with complexity.

Modular code design was a key part of this project. Custom functions like DefineObjectMaterials() and DrawObject() are used to streamline the rendering logic. DefineObjectMaterials() encapsulates the lighting setup for each object, making it easy to add or tweak materials independently without cluttering the main render loop. Meanwhile, DrawObject() abstracts the process of applying transforms and drawing meshes, making the code more readable and reusable. These functions keep the RenderScene() function clean and focused on scene layout.

Overall, this project gave me a deeper understanding of 3D graphics pipelines, from object modeling and texture mapping to lighting and camera control. My design choices centered around clarity, realism, and modularity, allowing me to meet both the technical requirements and the creative goals of the assignment. This was honestly one of my favorite classes I’ve taken at SNHU and I’m excited to dive deeper in my free time.