7-1 Final Project Submission

Fred Wahab

CS-330

This was an engaging project to work on throughout the term. We began by generating basic shapes to replicate the items in the reference image. For my project, several complex shapes were combined to create the objects. For example, the back wall features a plane and a box for the diploma frame. The tabletop was more detailed in the image, so instead of a simple plane, I used two boxes to replicate it, which also helped hide some clipping of the objects on the table. The gear box was represented by a single box, and the coaster by a cylinder. One of the more intricate objects was the tumbler, which consisted of a tapered cylinder and a regular cylinder for the body, a cylinder for the lid, flattened cylinders for the handle to give it a rounded edge, and two cylinders for the straw. The pen was made up of a cylinder for the body, another for the clicking mechanism, a cylinder for the clip, and a tapered cone for the tip. The skull, initially designed with a sphere and a cylinder, didn’t fit well with the scene. Its awkward shape felt out of place, pulling the user out of the scene rather than enhancing it. Since the other objects fulfilled the project’s requirements, I decided to omit the skull. The code remains but is commented out. If I had to model the skull accurately, I would likely use 3D modeling software like Blender and export it as an .obj file. Given my limited experience with such software, this would have been time-consuming and beyond the scope of this project.

Next, we applied textures to our 3D objects. Many of my textures were based on the actual objects. I took photos, transferred them to my PC, converted them to .jpg format, and added them to the project. Initially, only a couple of objects had these textures, while others used placeholders. By the final project, more original textures were applied, including those for the diploma, wall, tabletop, coaster, gearbox, and the omitted skull. However, the pen and tumbler were either too small or too oddly shaped to texture effectively with real photos, so I used free online resources to find pre-rendered textures that best represented the chrome on the pen and straw, the pen body, and the tumbler.

After texturing, I focused on lighting and materials. The lighting setup was like the sample project since I don’t have a strong design sense, but I adjusted the angles, intensity, and color to better simulate a room lit by a ceiling light rather than outdoor lighting. I spent considerable time refining the materials for the objects. For example, I created the chrome material by using glass as a base, then increasing its diffusion, specular highlights, and shininess to give it a more metallic appearance.

The camera controls were straightforward since the w, a, s, and d keys were already configured in the initial project file. I added functionality for the E and Q keys to raise and lower the camera, while O and P toggled between orthographic and perspective views. In the final project, I adjusted the camera positions to better showcase a flatter orthographic view.

Another improvement in the final project was grouping objects into meaningful functions. Each combination of shapes that formed an object in the scene was organized into its own function: table, backdrop (background and frame), tumbler, gearbox, pen, and the omitted skull. This restructuring made it easier to tweak and adjust individual elements without affecting others, and it streamlined navigation through the code, allowing me to quickly search for functions instead of scrolling through long code blocks.

I had no prior experience with OpenGL and lack an artistic eye, but considering these factors, I believe my scene does a reasonable job of representing the picture of my office dresser. There is still room for improvement, particularly with the lighting and modeling the skull, which would make the scene feel more complete. However, I feel confident that my code is clean, well-organized, and understandable to anyone familiar with OpenGL. I’m particularly proud of how I was able to combine basic 3D shapes to create more complex objects, and I think the use of original textures helps immerse the audience in the scene.