Final Project: Reflection

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CS 330

Looking back on this final project, I can honestly say that this was one of the most challenging but rewarding assignments I have done in this course. My goal was to recreate a real-world scene based on a photo of two shakers and a ketchup bottle sitting on a countertop. At first glance, it looked simple, but as I started building everything in OpenGL, I quickly realized how much detail and problem-solving went into getting everything to look right. From constructing each object and setting up textures to getting the lighting to show naturally across the models, every step tested my patience and understanding of 3D programming.

Throughout the earlier modules, I built a solid foundation in how to use transformations, object creation, and materials, but I didn’t realize how much all those parts would come together in this final project. When I started, I focused on creating the basic shapes, cylinders for the bottles, cubes for the caps, and a plane for the countertop. Positioning everything took some time because I wanted the layout to match the photo’s perspective as closely as possible. I had to experiment with different scaling and rotation values until the proportions felt right. By the end, the salt and pepper shakers sat side by side with the ketchup bottle centered behind them on the countertop, which gave my scene a balanced and realistic setup.

One of the hardest parts of this project was working with the lighting. I spent a lot of time trying to make the lighting look natural and highlight each object the way I wanted. I’ll admit that my lighting isn’t the best, but I did the best I could. I know that lighting can completely change how a scene looks, and even though mine still needs improvement I know that with more practice I can get better. It may not be perfect, but the effort I put into it helped me understand how complex lighting really is and how much small adjustments can affect the final outcome.

Another area I spent time on was texturing. In the milestone for texturing, I used the same texture as the example and I knew I needed to be better and use materials that match my desired outcome. I tried to make sure each object had its own color and surface look that matched the real photo as best as I could. The red bottle, white shaker, and gray shaker all looked close to how I pictured them, and I think they represented the photo well. I know I could improve by refining how the textures blend with the lighting, but overall, I was proud of how clean everything looked once I was done. The countertop also added a sense of depth and grounding to the scene, making the objects feel like they were actually resting on a surface instead of floating in space.

Navigating the 3D scene is an important part of the experience. To make this as intuitive as possible, I implemented controls for the virtual camera using common input devices like the keyboard and mouse. Users can move around the scene using the WASD keys to move the camera horizontally and the Q and E keys to scale upwards and downwards within the scene. The scroll wheel on the mouse can be used to speed up the camera’s movement across the environment, while mouse motion allows the user to freely rotate and change the viewing angle. This setup ensures that users can easily explore the scene from different angles and get a good look at all the details.

As for development choices, I learned a lot about planning before jumping straight into coding. Early in the course, I sometimes rushed into writing code without organizing my functions, which made debugging harder. For this final project, I tried to make my code simple and follow the sources while also staying organized and allowing for the code to be easy to read. I realized how important structure and clarity are when working on larger projects.

Reflecting on my progress from the start of this course to now, I can see real growth in both my understanding and confidence. In the early modules, I was mainly focused on just getting things to appear on screen, but by the end, I was thinking about how to make the scene feel realistic, how light interacts, how perspective matters, and how to optimize my workflow. Even though I ran into frustrations along the way, especially with lighting and fine-tuning materials, those challenges forced me to learn through experimentation.

If I could improve anything, it would be refining the materials even more and possibly adding more detail to the countertop to make it stand out. This project pushed me to bring everything together, shapes, transformations, textures, lighting, navigation, and organization, and see how they all connect in one complete 3D environment.

Overall, completing this project showed me how much I’ve learned about OpenGL, problem-solving, and persistence. The ups and downs were worth it because I can now look at the finished scene and know I built it from scratch. I hope to be better as I move forward beyond this class into different but rewarding challenges.