Milton Francisco  
CS – 330  
October 14, 2024

Final Project Reflection

This project was very intriguing, and I really enjoyed creating it. The objects I chose for this scene were everyday objects from around my house. Ultimately, I decided on creating a metal tumbler, a book, a Rubik’s cube, a reed diffuser, and a table. While the rubric only required four, I wanted to ensure I was able to use different types of objects, instead of just cylinders and boxes.

My scene included 3 complex objects and 4 basic objects. The basic objects were the book, the Rubik’s Cube and the planes for the wall and floor. The complex objects were the reed diffuser, the tumbler, and the table. The reed diffuser was most complicated and required 10 shapes to create the reference picture! Angling the cylindrical reeds was most time consuming. While the table was not as complex as the other two, it was a good starting point before going to those more complex objects. I chose these objects because they were everyday objects from around my house. I felt that recreating these would be the most practical, as computer graphics will undoubtedly be needed for everyday objects. Additionally, the code is created in a way that shows a uniform appearance throughout.

The user is able to navigate the 3-D scene through the use of a keyboard and mouse. The legend for the controls is displayed neatly in the console when the user starts the program. This ensures the user is not lost when attempting to navigate around and provides instructions in case they forget. The camera is able to move around with the mouse, while the keyboard keys are used to move the “person”, or camera in this case. This was accomplished using various functions, that incorporated GLFW, to capture specific keys and mouse inputs. Additionally, we can switch between 3-D and 2-D view by pressing the ‘o’ key, and then we are able to cycle through different orthographic views using that same key.

The custom functions in my program were plentiful, while being modular and organized as well. Most of the custom functions were created to render specific objects. This helped ensure the driving function is clean and uncluttered. Other functions included setting up lights, loading textures, defining materials, and various camera settings. Each of these grouped the applicable information in a smaller place, which helped when navigating the codebase. Furthermore, the most useful and reusable function, that I am most proud of, was created in the ‘ShapeMeshes.cpp’ file. In this file, I created a new function that drew the faces of a box independently. This allowed the box object to use the same values for the overall size and position, while using different textures for each face. This is greatly reusable as I used it for both the Rubik’s cube and the book. Both of these boxes required different textures for their faces. In the original ‘DrawBoxMesh()’ function, the texture was displayed evenly on each face, which did not work for my case. By drawing each face separately, I was able to set its texture independently and create a complete and more realistic object. This function will be very reusable if I were to need it in the future. Additionally, since the objects are grouped into custom functions, using them in a different scene would be quite simple and only require modifying the position of the basic shapes.

Finally, each of these objects created a different challenge when attempting to create them. While the Rubik’s cube was a simple box, the textures required were not. I spent quite a while in Paint to create the empty face, but once that was created coloring the squares individually was much faster. For the other objects, some of the textures were taken from my phone’s camera and modified to fit the specific objects, such as the book’s cover and sides, and the table. Overall, I have learned quite a bit about using OpenGL and computer graphics, and it was very fun!