Final Reflection

Joshua Pardue

CS330: Comp Graphic and Visualization

Professor Philip Enkema

October 14, 2022

***Justify development choices for 3D scene.*** For my selected 3D scene, I chose a coffee table with various complex objects resting on it. While some of the objects I initially selected were beyond my scope of knowledge for this course, I was able to successfully complete a few of the others resulting in a finished assignment. Beginning with the coffee table itself, I chose a cylinder to best convey the image. I did, however, have challenges with the texture and colors as I eventually settled on the “underwater.jpg” that gives the clear glass appearance. This formed the base of the scene which is positioned accordingly using translate and rotate functions giving the perspective of looking down onto the table as if sitting in a nearby chair. Including the lamp object, the objects are stored in 31 VAO/VBO’s which allowed me to render the individual objects and attach the varying textures to them accordingly. The game box which stores the scene’s game pieces is the initial VAO/VBO which is the only one not to have its own class. In retrospect it would have been more constructive to render the box using its own cube class allowing it to be more modular and reusable. The coffee table frame uses a cylinder as well that is textured in a contrasting “sun.jpg” color giving it the appearance of a metal or hard material structure. The four individual legs are wrapped in the same texture as well. The legs were a challenge to get the proper placement correct as I had to play with the x, y, and z axis in the translate function, so the structure appears to be legitimate. The game pieces themselves are displayed using 5 spheres wrapped in the container texturing which gives them the wooden appearance. The scale and translate functions of the spheres also had to be fashioned to give the aspect of resting inside the box, which sits on the coffee table. The complexity of the candle stands was the most challenging as they include a flattened cylinder to form a flat plane, a sphere, an elongated cylinder, and a few shortened cylinders. These were all coated in the same texture and positioned one on top of the other giving the image of one complete object. The candle objects were then placed on top of the candle holders using the correct x, y, and z coordinates.

***Explain how a user can navigate 3D scene.*** The visual and camera aspects of the 3D scene were also setup to move around using the mouse and/or keyboard keys. The camera class was utilized which allows for the camera to change views and look around the scene as desired. When pressed, the relevant keys allow movement through the entire scene up, down, left, right, zoom in, zoom out, and when moving the mouse left or right the scene itself moves left and right. The process input function is utilized in this scenario to update the camera position accordingly. The deltatime variable is used as well which allows more consistency of speed when navigating around the scene. A series of mouse functions is used to calculate and render the proper pitch, yaw, and sensitivity. This was very demanding and complicated due to the necessary specifications for scene visualization. The sensitivity had to be dialed back to 0.005f which seemed to change based on the computer I was utilizing at the time.

***Explain the custom functions in your program that you are using to make your code more modular and organized.*** My code was written and organized with modularity in mind which, if desired, could be applied to additional shapes and/or scene renderings. Separating the code into independent and individual classes allows interchangeability should I want to apply different textures or change an object in its entirety without having to remodel the scene itself. I was able to demonstrate specific modularity in my code by using varying classes such as cylinder, sphere, texture, and shaders. The cube used to render the coffee table game box was not put into its own class and, in turn, I found more difficult to work with. The sphere and cylinders were able to be easily manipulated with respect to their sizes by easily changing the x, y, and z axis. This was especially desirable when creating complex objects requiring varying sizes. While I was not able to completely render the scene I initially set out to accomplish due to its complexity, I still learned a lot that I can take with me into a career or to further my hobbies.