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CS-330

Design Decisions

8/12/21

This design document will explain my thought process behind creating this 3D scene for my project. My 3D scene is based on 3 objects sitting a nightstand. The three objects from left to right are a green coffee mug, a black amazon echo, and a black ball. The mug and ball are in the foreground and the echo is farther back in the middle. The complex object is the mug since it is a cylinder and a torus on the side that represents the handle. The 3 objects will be represented as sitting on a plane which is the night stand. When approaching this project, I first thought about was creating the individual shapes, so I started with creating the amazon echo in the middle of the view as a starting point because I knew how to create the cylinder. The next object that I created was the sphere was will be positioned to the right and in the foreground compared to the echo device. The object that I found most difficult to create was the coffee mug since it was a complex object. I found it difficult to figure out how to place the torus, which represents the mug handle, right onto the side of the mug.

User navigation was an important aspect to implement into my 3D scene. There were several different elements that I had to incorporate, such as key and mouse navigation for this scene. I also made sure to apply scaling on the projection to make sure I could fit all of the objects onto the screen. First, I implemented navigation for the WASD keys, and this was one with several conditional statements. The “W” key will make the projection move forwards. The “S” key will make the view move backwards. The “A” key will cause movement to the left and the “D” key will cause movement to the right. This will allow the user of this to look at different angles of the 3D scene. This program will also track of whether the mouse buttons were pressed. For example, if the left mouse button was pressed, the program will log that the left mouse button was pressed, and the user will be able to see this on the console window. There were three types of lighting used in this project to make the objects look more realistic. The three types of lighting used were ambient light, diffuse light, and specular light. Combining these three lighting types will create a more realistic view of the 3D scene.

Custom functions are used to make programs more modular and easier to read. This was the case for this project as it helped make the program more modular. The different functions to create the cylinder such as getRadius() and getSlices were used to create the cylinder object components of the amazon echo and the green coffee mug. Another function that was used was the glClearColor() function which was used to set the background color of the window to black. Another function that was used was the URender() which was used in this program to render the frame. The glfwGetKey() function was used several times in conditional statement to allow the program to read the WASD keys from being pressed by the user so it could change the position of the view. This function uses the functionality of the GLFW library to accomplish this. The UResizeWindow() function was used to resize the window if it is changed by the operating system or the user.