Final Project

Southern New Hampshire | CS-330 Comp Graphic and Visualization

3D Scene

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* **Justify development choices for your 3D scene**. As you write, think about why you chose your selected objects. Also, consider how you were able to program for the required functionality.

The original scene I chose was a kitchen table with four items on it. From left to right, a box of noodles, a koozie, a 2-liter soda bottle, and a Bluetooth speaker with a battery base. There is an outside door to the right of the scene that is giving off a bright light. I chose the box of noodles for its simplicity. One of the first lessons we were taught was a cube; therefore, the box was just a modification of the vectors. To move the object to the correct location in the scene, I used the translate and rotate function of GL. I had to create the back of the box separately to add a different texture to it. The koozie, tabletop, base of the speaker, and clock face are all cylinders of different sizes. I took a close-up picture of the actual koozie to make the texture. The table and base of the speaker textures were provided in the assignments. The speaker texture was taken from a picture of a speaker cover. I chose the wooden table texture because it was too difficult to get the actual table cover to convert correctly. Unfortunately, I had to remove the soda bottle from the project because the difficulty level of the top of the bottle. My original intentions were to make it from a cone but could not work out the math or find pre-existing code that would work. I replaced it with a clock I have on my desk. The hardest part of the clock was the clock face orientation. To turn the cylinder on its side I used the rotate function combined with translate.

The lighting is done in four parts. There are two point lights, one directional light, and a spotlight. I used the directional light to brighten up the whole scene to make it look like daytime. I added a red spotlight to give some control to the user. One point light to the right of the scene is used to represent the light from the door leading outside. The other is to compensate for the first light’s shadows.

* **Explain how a user can navigate your 3D scene**. As you compose your thoughts, discuss how you set up to control the virtual camera for your 3D scene using different input devices.

The camera uses multiple inputs for control. WASD is used for navigation on the X and Z axis to move the camera left, right, forward, and backward from the scene. Q and E are to move the camera on the Y axis up and down. The mouse controls the direction of the camera by modifying the YAW and PITCH. From my understanding, the camera is at a fixed point, and the scene moves around the camera. The mouse roller changes the camera speed multiplier. By pressing P, you can change the projection from perspective to ortho. I also added a camera reset with the letter C and a wire frame option with F = on and X = off. This helped while setting up the dimensions of the scene and creating the boxes.

* **Explain the custom functions in your program that you are using to make your code more modular and organized**. Ask yourself, what does the function you developed do, and how is it reusable?

There are multiple functions I am using in this code. Much of the code used was provided from different sources in the modules. This is proof that the code is modular because it was stitched together from different examples. For example, all the header files and various .cpp files were borrowed from multiple assignments and examples to be used in this project. I modified the camera header file for additional functionality. Within the main program, the callbacks could be used in any code that requires a mouse input. The process input function and load texture’s function could also be used in different coding projects.