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CS330

Final Project: Design Reflection

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The purpose of this project was to recreate a 2D scene in 3D using the C++ programming language as well as the OpenGL graphics library. This project was a challenging one, where things such as textures, lighting, camera controls, and inputs needed to be considered and implemented. This project also reinforced many topics within the areas of linear algebra and C++ programming that are important to computer science.

A television on a table

Description automatically generated with low confidence The Following is the image that was chosen to (attempt) to recreate for this project:

There are four main objects that were to be recreated. This was the Xbox Console, the TV, the moon light, and the TV stand. For this project, it was a requirement that four primitive shapes appear in this scene. These would end up being cubes, a plane, a cylinder, and a sphere. The design would need to be simplified for the sake of ease of coding the scene, so some of the finer details would be left out, such as the true shape of the moon light’s stand. It was instead decided to proceed with a design where this was just a sphere on top of a cylinder. This scene was chosen due to it being one that could be easily inspected from all angles (this is in my living room in my apartment), so I could try and break this scene down further. The objects in this scene are also all quite simple to recreate using primitive shapes. The code was created using help from the module readings, videos, and tutorials, which were very helpful in the attempt to create this project.

Within this scene, navigation was required. This C++ program is capable of detecting input from a mouse and keyboard (Cursor and WASD controls) to move the scene around. I was unable to fully complete the workings of all the controls, but was however able to implement methods to be able to move the scene side to side and forward and backward using the WASD keys. If I were to do this project again, I would completely overhaul this portion of the code and make sure that it could be properly controlled, and the scene manipulated using the total range of mouse and keyboard controls.

Texture and light were also required for this project. For texture, I made the decision to try to find a wood grain texture to apply to my plane representing the TV stand. With light, we were required to have two different types of light. First, I attempted to make the Moon light a source of light in itself, simulating what it may look like when it is on. Also, a source of ambient light was needed such as in the photo. The lighting in my apartment is very warm, so I wanted to make a light source that would sit above the scene to simulate the lights in the ceiling, with a kind of yellow color to it to show off the warm lighting I have.

All functions developed for this project were created for the sole purpose of making code modular and reusable. This is key in a project such as this, where the same bits of code are used over and over again. It is best practice to create a separate function for any piece of code that will be reused multiple times, in order to make the code easier to follow and less likely to mess up. If I had to do this project again, I probably would have made a separate class for the functions that were created and a separate main file where the main class inherited the functions from the created class. The main function could then call these (as it already did) but I feel this would have made things easier to read and follow instead of having all the function definitions at the bottom of my Source.cpp file. The functionality would be the same, however this is just personal preference.

Whilst a lot was learned during this project, I was quite disappointed in the result. Graphics programming has been quite the struggle for me, so I was proud of the code and images I was able to create, however, I think there was a lot that could have been done better on my end. For example, I tend to make a lot of little mistakes that end up turning in to huge errors during the coding process. I could have been better with this to help avoid issues and delays that I experienced creating this project. I’m very thankful for the skills I have gained in taking this course, and I look forward to applying them in the future.