**7-1 Final Project Submission**

**Reflection**

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CS 330 – Computer Graphics and Visualization

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1. **Justify development choices for your 3D scene**. The development choices I made focused on using a subject I could control and look at multiple times. I didn’t want to choose anything too fantastic or far away for this project because I knew I would need to reference it from different angles as well as get a feel for the material that the objects were made of. For this reason, I chose my desk and several objects on it because it was a model that fulfilled both of those requirements. There were several objects on the desk I did not choose some because of time, and some because of complexity. For example, I have several statues on my shelf and capturing those would be difficult using code to generate basic shapes, for that reason I chose to just create the clear square frame of my cat picture. I also opted not to add holes to the computer monitor stand. While I could capture the essence of those in a picture, they would not actually be transparent and would instead not be reflective of what is below the computer monitor, potentially causing issues later. Initially I was also interested in making more fine changes to some of the shapes, like removing the top and bottom of the cylinder but after seeing how much went into making a single object in the shape meshes file I decided to leave it as it was and not tinker with it for something I could work around with just using planes.
2. **Explain how a user can navigate your 3D scene**. Navigating the scene was set up to be much like an FPS game. The initial method of this was a little frustrating and took the x and y coordinates of the mouse as a general “where to look” variable so you could only really look forward. To change this, I used my previous code with it. First the mouse is locked to the center of the screen and hidden. Then as the mouse is moved it takes the new place it moved to, considers the height and width of the window, then multiples that by an adjustable look speed to get the x and y offset. After the calculation the mouse is again recentered and the process happens again. I had to throw out the first mouse movement though because the initial mouse position before it locked into position was causing it to jerk the view as soon as the program loaded which isn’t what I was looking for. Thankfully, a lot of this functionality was already built into the program through glfwSetCursorPos, glfwGetWindowSize, and even the ability to use the scroll wheel was already mostly completed. I really enjoyed the challenge though of making it work properly and was happy with the result.
3. **Explain the custom functions in your program that you are using to make your code more modular and organized**. I did a few things in my code to make it more organized and modular. First the thing I did to make it much more organized was create a function for each object I was modeling. This meant whichever object I was working on I could minimize the others in my IDE and have less trouble locating sections I was looking for. Organizing like this also allowed me to easily turn on and off parts, for example when I worked on the computer stand and second monitor, I commented out the rendering of the laptop and was able to see them properly. The other modular step I took (after the completion of the laptop) was to have a single set of X Y Z coordinates be the base of each object I was modeling. For example, as I was starting the shelf, I had the thought that if I needed to move this shelf a little, I would have to move *everything* in order to do that. I realized by creating an initial XYZ variable I could add that to the pieces I made for that object and have an element that would control everything. By making the location of the base of the shelf “XYZ” and the first shelf up as x – 1.6, y+3.2, and z - .75 I could just alter the initial X Y and Z and everything in that function would move along with it. Now If I need to move something slightly, I don’t have to rework everything. The last bit of modularity I did was by having the materials shared across some objects. For instance, the metal on the computer monitor stand and the Mini shelf isn’t all that different, so I just had a standard “metal” material. Same with the glass desk and the lamp. With everything I learned this was a very challenging yet rewarded project.