**CS 330 Project Reflection**

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The objects I chose for my scene I wanted to be simple and not too difficult to recreate. I chose items that I pretty much see on my desk everyday at work so I could analyze them better for when I went to make my 3D scene. When it came to programming the scene, the cylinders were by far the hardest to make since it requires me to think about the equations and logic involved when it came to rendering a cylinder. It was especially difficult because I had to remember OpenGL works in triangles too. I also had to think about the individual shapes that could be within each object like for the lotion bottle, I needed to use a torus for the cap and a pyramid for the shape of the tube. So that require separate functions. When I was choosing the shape for the lotion bottle, I was torn between using a pyramid or a cone. The cone was more rounded at the bottom but the tube itself was also triangular at the top and the cone was rounded so ultimately, the pyramid seemed like a better choice.

When I was also making the code for the torus, it was difficult to come up with since I did have to go back and look at various equations. I wanted to even make the lid transparent like it was in my photo but, it was very difficult to get it to work at my level of knowledge, so I had to scrap that for now but I think in the future I want to get it to work. Lighting was also an element of the scene that required some thought since my scene in real life was all light and there were not many shadows casted so it was hard to figure out where to put the lights. Increasing the brightness helped a lot with making the scene look as bright as it did in my photo. Textures were also hard to think about since they had to make sense with what the object was supposed to look like and be within a certain size or it looked awkward. The Dunkin cup was especially hard since I had to find a texture where it had sparkles and would show up and the cup also had 3 different textures I had to find and make sure they looked good for the actual cup.

For navigating the scene, I set up the camera to be able to move around the scene. The W key on the keyboard is to move forward, S is to move backwards, A is to go left, and D is to go right. The Q button is so that the user can go down and the E button is for moving upwards. The O button is used to make the scene go into orthogonal mode while the P button puts it back into perspective mode. The mouse is used to look up, down, left, right, and the scroll button on the mouse is so the user can increase or decrease the movement speed of the user moving around the scene. If the user scrolls backwards, the movement speed increases. But if the user scrolls forwards, the movement speed decreases. I also took out some functionalities like the ability to change how the texture clips to the objects. I thought it was just unnecessary for the scope of my project, but it was very helpful for seeing what methods of clamping textures worked well for each object and what I ultimately wanted to stick with in the end. I also took out the keys for changing the lighting position since it was a lot for the user to remember to use. So, I decided to keep the controls simpler in the end.

When it came to making the code more modular and organized, I tried my best to place shapes that had to do with each other together. I also placed things in their own functions like the lip balm tube and the lip balm bottom had their own functions for example. I think though it would’ve helped further if I placed cylinder in its own header and cpp files, but I figured it could have complicated things for me but would have definitely helped with making the program code smaller and neater. I took out the second light in my final design since without it, I found that my scene still had the same amount of light, which made the code also easier to follow and helped with rendering time.