

Final Project

REflection

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# Development Choices

There were several decisions that I needed to make to complete my 3D scene. One of the first decisions I needed to make was which objects I was going to work on first. I figured the best place to start was the most complex one, so I created the eraser first. I was able to create the eraser by making a rectangular Cuboid and then attaching two identical tetrahedrons on each end. I had to flip one of them upside down to make it look proper like an eraser. The next shape I completed was the box of crackers, which I made with another cuboid shape. I was able to find libraries online for both spheres and cylinders which were both useful. One issue that arose was that trying to use both spheres and cylinders in the same scene were interfering with each other. The Cylinder was constantly rendering improperly as a sphere, so in the end I had to use triangles to make the coffee cup. I was able to make the coffee cup sit close to the bouncy ball and eraser just like in the photo. I was also able to get a sphere rendered for the bouncy ball. One issue that arose was that there isn’t a way to attach textures to the spheres with the libraries we’re using, so it remains black for now. It wasn’t required to have every object textured, so I left that the way it was. I was able to get some bright lights overhead illuminating the objects like the way they are in the photo. I also found several realistic looking textures that made the eraser, crackers, plane, and coffee cup stand out. The objects are all the correct size in relation to each other, and have the correct faces illuminated. The Lighting does not have any color as that seems to match the closest to the original photo.

## Navigation

I was able to add in several camera controls that allow you to view the scene from different angles and perspectives. You can use the WASD keys to move around the scene, while using the mouse to look around from where you’re currently located. You can also press the P key to switch from a 3D perspective to an orthographic perspective. Another feature was added that allows you to scroll the mouse wheel, which changes the speed at which the camera moves. This way, you can move quickly when zoomed out and slow down when zoomed in. There are also additional controls for vertical movement. Pressing the Q and E keys will move you directly up and down respectively.

## Code Functions and Modularity

There are several useful sections of my code that can be re-used for other things. I was able to utilize the sphere.cpp resource in the render function. The render function can be changed easily to add more textures and change what textures are applied to which objects. We can also easily transform, scale, and rotate objects from within this function. The process input function is also a nice modular piece of code that allows us to customize how the program responds to user input. This is how we can change the perspectives and choose what the controls are. The create mesh function is another place where we can easily add more triangles thus creating more new shapes. This can be used to draw other scenes if needed by changing the location of the triangles. One could easily take the sections of my program that offer controls, textures, and shapes if they wanted to re-use them for their own scene. It would be easy to alter certain sections to make it match a photo of a few different objects.