Final Project

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1. 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.
   * When I started out this project, I originally had multiple round objects such as the torus, multiple cylinders, and one sphere. As I started to work on those objects, I kept encountering errors with loading. This led me to choose more simplistic, straight-lined shapes such as the cube, pyramid, and plane. It wasn’t until the halfway through my project that I learned just how to fix the error by deleting one line of code in the “camera.h” file.

After this discovery, it was too late to go back to my original scene idea. I progressed through the project on my new scene. This was of a cheese grater on a wood table. The cheese grater gave me an opportunity to make a complex shape by making a pyramid and adding a cube to it. The tabletop became a plane to help me orientate my objects according to an x and y axis relation to one another. Their size, in reference to one another, was done by the z axis, with the cheese grater being the point of reference. Because of my disappointment that I didn’t solve the errors I encountered early in the project; I chose to do more spherical shapes to fulfill the last of the objects/ primitive shapes requirements needed to complete this project. To go off of the theme of the cheese grater, I chose to add eggs around the grater. Since egg’s are mostly round, I chose to represent them with spheres.

1. 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.
   * In accordance with the rubric, I used the “W”, “S”, “A”, and “D” keyboard keys to move around my scene. The “W” key is used to move in closer to the scene while the “S” key is used to move away. This project is also capable of utilizing the middle mouse wheel to do the same as the “W” and “S” keys. The “A” key is used to move the camera left while the “D” key moves the camera to the right. These commands are based on translating the camera on the x and y coordinates.

The last functionality that I have added to this scene is to rotate around the object. To achieve this all you need to do is simply move the mouse. You must be careful with this function, however. Depending on your computer, such as mine, you might lose your scene with no hopes of finding it again. Moving the mouse to the left rotates the scene to the left as you might expect, as well as moving the mouse to the right and the scene moving to the right. If you are having problems with losing the scene, I have annotated the section of code that you will need to change. This section of code must deal with the refresh rate of the frames. By increasing the time between refresh rates, you can slow the scene down to view it more properly.

1. 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?
   * In my code, I have all the straight edged shapes, along with their vertex coordinates and normal vertexes for each point of the shape. This allows me to recreate those shapes whenever I need. Along with the vertexes for the shapes, I have a format set for any additional images that you want to load for the scene. Lastly, I have a format set to load any shape, and put a texture to it when you are ready to render the scene.

If you wish to make the shapes smaller, larger, rotate, or move the shape once you have them added to the render list, I have provided a format to do so. To shrink or grow the shape, utilize the scale function in each section you wish to change the size of. To make the shape bigger, increase the number. To make the shape smaller, reduce it. To rotate the object, utilize the rotate function. To do this, change the angle of which you wish to rotate the object, then change the axis’s you wish to change. This is in the format of x, y, and z. If you don’t wish to rotate, leave the value of the section to 0.0f. If you wish to rotate on that axis, change the value to 1.0f. Lastly, if you wish to move the object, you can utilize the translate function. This is like the rotate function. This function operates on the x, y, and z axis. If you wish to move it along a certain axis, change the corresponding axis in the direction you wish.