- ☐ **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.
- ☐ **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.
- ☐ **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?

Project Design Decision & Reflection

When I first chose the scene I would be creating I did not fully understand the depth of complexity some of the objects within the scene had in them. With the way the drawing of objects works the best scene would have been one without so many different complex objects. Specifically circles and spheres require much more math and time to get just right. Because of this the objects that I selected in this scene I chose simply for the reason that I believed they would be the easiest object to code in. With the past work of working on a pyramid, a cube and a plane are both easy enough to code in with triangles. Circles and Spheres are ALOT harder have I would have to do alot of testing to get them just right. For this reason I stuck to easier to create objects, as I was having difficulty earlier in the class. Because the objects are all built with triangles I wanted to make sure that anything I created was easily made with triangles.

Setting up the controls for the scene was actually one of the easier parts of this assignment in my opinion. The key inputs for WASD were already in the base so I just had to reverse engineer the Q and E movements for the required functionality. Then made sure I put the variables in the unused namespace. The changing of the point of view was a bit trickier and I tried but could not get it to fully work. Basically though Q and E will move the camera up and down along the Y axis. W and S will move the camera along the Z axis. A

and D will move the camera along the X axis. One way to make sure this is the case is to define which axis the camera moves on through coordinates. + 1,0,0 would mean it goes forward on the x axis, + 0, 1, 0 would be Y etc.

Some of the functions used to make the code more modular and organized are well commented functions explaining their purpose. Comments help a ton in projects like this, They are the main reason projects of this size can exist. It would be near impossible to debug and figure everything out if there were not the well placed comments saying which function does what. When it comes to actually drawing the objects it helps determine which object is which as well. Otherwise it would just be a bunch of numbers that I would have to continuously test to check which one is which.

Overall I feel like I have learned a lot in this class and feel like I did MUCH better the second time taking this class. It seems like I will not be having to retake this class a third time which is the best part about it. Figuring out the right way to make sure the files all run correctly was quite frustrating, especially when I thought I had it figured out at first because it was running on my end. That was probably the hardest part of the course, but figuring it all out in the end makes me feel much better about it. I chose the same scene as I did the first time I was taking the class and if I could do it over again I would choose an easier image to recreate. More squares, triangles and planes rather than spherical or cylindrical objects. Some final closing thoughts would be that I hope I can continue learning and figuring out these problems as they arise as I did not expect my biggest challenge to be the setup work. Well I wrote this before completing the code for my project so I will be getting to work on that now, hopefully adding in more objects will be an easy solution, but I am fully expecting this to take the remainder of the day to complete. I have learned to give myself more time on these coding projects as you never know what kinds of issues you will run into.