**7 - 1: Final Project**

**CS-330-14891-M01 Comp Graphic and Visualization**

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**Justify development choices for your 3D scene:**

For this project, I set out to recreate a small portion of my home office in digital form. The scene includes a mug, a candle though replicating the flame realistically proved more challenging than I anticipated a pencil, and a desk lamp. Beyond designing the objects themselves, I made sure to incorporate all the functionality outlined in the project rubric, meeting the technical requirements as well as the visual ones. I chose these particular items because they reflect the actual setup I use every day, making the space feel familiar and personal, even in its simplified, more everyday version. My goal was to capture the essence of my real workspace while still working within the scope of the assignment.

**Explain how a user can navigate your 3D scene:**

In my project, the user is able to navigate through the 3D scene using a combination of keyboard and mouse controls. Specifically, they can move around the scene using the standard WASD keys, where 'W' and 'S' allow forward and backward movement, and 'A' and 'D' enable left and right strafing. Additionally, I’ve included ‘Q’ and ‘E’ keys to provide vertical movement, allowing the user to move up and down within the environment, which is especially useful for exploring different levels or perspectives within the scene. To switch between different viewing modes, the ‘O’ and ‘P’ keys are designated for toggling orthographic views, giving the user the ability to switch from perspective to orthographic projection for a clearer, distortion free view of the scene’s layout. Furthermore, I’ve integrated the mouse scroll wheel as a dynamic control for movement speed; when the user scrolls forward, the movement speed accelerates, allowing for faster navigation, while scrolling backward decelerates the movement, enabling more precise control when approaching objects or specific areas of the scene. This combination of keyboard and mouse controls provides an intuitive and flexible way for users to explore and interact with the 3D environment efficiently.

**Explain the custom functions in your program that you are using to make your code more modular and organized:**

For the most part, my code is designed to be highly modular, allowing for flexibility and ease of maintenance. A significant portion of the main structure and core functions were derived from previous assignments, which provided a solid foundation. I was able to incorporate this existing code into my current project with only minor adjustments, making the development process more efficient. Looking ahead, I still see this code structure as being inherently modular. Much of it is based on guidelines and examples from the OpenGL documentation, which promotes a reusable and adaptable coding approach. This modularity means that the code can be easily customized for different needs; for instance, you can change specific variables to alter textures, or modify the shapes and objects being rendered. This approach not only saves time but also makes it straightforward to extend or modify the project in the future, whether you want to introduce new visual elements or adapt to different requirements. Overall, the focus on modularity ensures that the code remains flexible, maintainable, and scalable for various applications.