**CS 330 Final Project**

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**Development Decisions Made**

For the scene to replicate for this project, I chose a simple setup where I had my laptop, mouse, headphones, pencil, eraser, paper, Rubik's cube and a PlayStation 4 controller. All on top of my family’s kitchen counter. I selected these objects in particular because I wanted to portray a work setup that a college student may find themselves using. For instance, the inclusion of the pencil, paper, and eraser is meant to represent notes a student will be writing down. While the PlayStation 4 controller represents the potential for a college student to engage in one of their hobbies after concluding their work for the day. Keeping the scene grounded, realistic and relatable for some college students However, due to time constraints, I opted to exclude my PlayStation 4 controller and computer mouse from the scene. The PlayStation 4 was the most complex shape within my reference image, but due to the inclusion of multiple shapes, along with aligning and reorienting the shapes, I felt that this task would not be achievable within the time frame of the assignment. I also excluded my mouse due to the uniqueness of the shape and the difficulty with trying to replicate complex curves and edges.

To program the required functionality for my scene I used multiple functions from the OpenGl library to manipulate my scene in several ways. For instance, when I wanted to apply textures to the cylinders for my headphones, I used the DrawCylinderMesh() function twice. Where one was used to the draw the sides and the other for the top and bottom. This manipulation technique allowed me to apply two distinct textures to the cylinder to showcase a natural representation of the headphones.

Speaking of textures, I took some artistic liberty in the utilization of textures and applied custom textures using the LoadSceneTextures() function. I did this to make for the lack of some textures on the internet, such as the lack of Rubik’s cube texture or simply to have different significance, such as how my headphones use gold and silver textures to represent the fact that while working on assignments a majority of the time.

**User Navigation Through 3D Scene**

For users to navigate through the 3D scene, they’ll need to familiarize themselves with the WASD keys, along with Q, E, P and O keys, and a computer mouse. The WASD keys are used to pan in, move left, pan out and move right, respectively. While, the Q and E keys are used to move the camera up and down, respectively; the P and O keys are used to change from perspective (3D) and orthographic (2D) views. Lastly, the mouse is to orient the camera depending on the movement of the mouse. Additionally, the scroll wheel on the mouse changes the speed of user navigation. To complete this task, I focused on using the functions, Mouse\_Position\_Callback(), ProcessKeyboardEvents(), and Mouse\_Scroll\_Wheel\_Callback() inside the ViewManager.cpp file to orchestrate the events of user actions and make sure they are received by the program. To which the program recognizes and processes the call and executes a response as a result.

**Custom Functions in Use**

The only custom function I used revolved around the generation of the complex object in my scene, and not necessarily the simple shapes present. For instance, I made a function to generate a headphone object, and it is used in the program to limit the number of objects I would need to draw individually within the scene. This makes the creation of another headphone object easier, as I do not have to worry about connecting each piece cohesively and I can focus on coordinating its location and orientation. Though to be honest, I should have developed more functions like this for a more streamlined and intuitive development experience.