**7-1 Project Final**

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For my 3D scene, I created multiple objects. The magic 8 ball, for example, was just an extra touch I was excited to add. After weeks of trial and error, I finally managed to build the office scene from the 2D picture. For my plane, I chose a wooden desktop. The plane was made on a large scale to emulate a desk. For my objects, I chose an I-Phone, mouse, pencil, keyboard, piece of paper and magic 8 ball. I felt these objects pulled in a relaxed home office vibe and tied in well with the picture.

Achieving the functionality requirements into consideration, I spent a lot of time messing with different camera angles, key responses, and mouse control. I chose the most realistic textures I could find to give the objects life. The mouse is made from a dark gray plastic texture applied to sphere that was scaled to replicate a life size mouse. On the mouse we have the scroll which I manipulated a torus to replicate and gave it a lighter gray texture. The I-Phone has a generic smartphone screen texture. The magic 8 ball has a texture of the bottom of a real magic 8 ball. I kept the keyboard just colored a simple gray and used smaller cubes on top to replicate the keys. For the keys I used a black color and a loop to cover the length of the keyboard in black keys. The pencil uses a sphere for the eraser, which is kept a black color, The body of the pencil is made up of a cylinder and has a green tint to it. The point of the pencil is made from a beige colored cone. For my directional light, I kept with gray tones. The ambient color is a dark gray and illuminates the background. The diffuse color is medium gray and illuminates surfaces directly facing the light. The specular color gives highlights to shiny surfaces. I also provided five point lights to give the scene some color. One provides a blue tinge over the keyboard. Another provides a green tint ,and one has a pink tint. I chose these colors to give the feeling of light coming from a computer monitor.

Within my 3D scene, I created basic WASD key control. By clicking escape the user will exit the window. W will take the use forward. A will move them to the left. D will move them right and S will move them backwards. I slowed the camera down from my initial settings to allow for a smoother transition. After extensive research, I discovered my up and down controls, which are Q and E respectively, were moving at an angle. To fix this I changed the code from UP \* velocity to simply Up \* velocity. By pressing a combination of the keys, the user can orbit the scene. I also implemented O and P for orthographic and perspective views. By pressing O the user is taken to the orthographic 2D view and can use WASD to move around. By pressing P the user is returned to a 3D view. The mouse can also be used to move the camera around and focus on different areas. By scrolling on the mouse, the user may speed up or slow down the camera speed.

One of the most important custom functions within my project is URender. This function renders the whole 3D scene displayed. It is used to set up shader uniforms, defines transformations for different objects, and calls rendering commands. I also used UProcessInput. UProcessInput handles all keyboard input events. It updates the camera based on user input. The function UMousePositionCallback is used to handle mouse cursor movement. It takes the movement and calculates the change in cursor position while updating the camera orientation. UMouseScrollCallback handles mouse scroll events. It adjusts the camera speed based on the scroll direction. These functions can be easily reused in other projects. The only one that would require substantial adjustment is URender due to it being created based on the scene being made.