Milestone Seven: Reflection

The objects I selected come together to represent my kitchen counter. An area of modest complexity and clutter, the countertop provides a multitude of differently shaped objects, materials, and textures. This provides opportunities for several different approaches within texturing, shaders, lighting, and more. The more compact scene also introduces objects in the way of others, requiring a movement scheme to allow full visibility. Because of these aspects, the scene provides a mixture of complexity and approachability that encompasses many areas of OpenGL.

The main complex object within the scene is a vase, the centerpiece of the scene. This vase takes a cylindrical form, with a tapered neck that flares back out at the rim. In order to replicate this shape, I utilized a cylinder as the base. I then utilized two tapered cylinders facing opposite directions to create the taper and then flared shape of the vase’s neck. In addition, I added a torus ring around the top of the vase to give the rim a rounded edge like its real-life counterpart. To add to the visual representation of the vase, I added a ceramic texture to the vase and applied it to each individual object. This created a seamless, uniform texture along the vase that showcased its fragile ceramic appearance. Together, the complex multi shape object and texture meet multiple requirements while creating a replica of the scene in real life. Each of the other cups and glasses on the table also helped to fulfill a variety of requirements. Each of the plastic cups possess different colors such as black, blue, or red and the material tag of plastic. This creates a difference in lighting between the ceramic material of the vase and cups. In addition, the one glass on the table has a transparent shader and glass material tag. This allows light to pass through the glass and therefore allows the camera to see through it and view the vase. The plane sitting below the glasses and cups also has its own materials and texture. The texture of the plane is a green granite, replicating the granite of the original countertop. It possesses its own material properties which give it a duller appearance at most angles and therefore truer to life.

In order to explore this scene and view all of its complexities, I incorporated a camera movement system. Utilizing this system, the user can press W to move forward, S to move backwards, A to move left, and D to move right. This allows for very simple controls but fails to allow the camera to see over some of the cups and view the vase in its entirety. Therefore, I also implemented upward motion through the Q button and downward motion through the E button. Still this system needed further refinement as it failed to capture the entire scene at once. In order to do this, I used the scroll wheel to modify the FOV of the scene. Scrolling down moved the camera out while scrolling in zoomed in the camera. This allows the user to see a small portion of the scene up close, or the whole scene at once. To make the movement easier for the user, I also incorporated camera speed changes using J to increase camera speed and K to decrease camera speed, however, I restricted the domain of speed between zero and positive infinity. This prevented the user from accidentally experiencing reversed controls. The speed changes also allowed the user to adjust the camera speed which became especially important when changing zoom. These features together allowed the user to fully explore the scene and view the intricacies of each object. I also incorporated a separate camera mode which transitioned the 3D scene into a 2D perspective. This was done by converting the traditional perspective camera to an orthographic projection which could be done by pressing the O key. The user could also revert back to perspective at any time by pressing P. This allowed for further flexibility and allowed the user to view this 3D scene much like the 2D photograph it was modeled after. This type of camera work could also be easily utilized in many videogames and allow for conversion between 3D exploration experiences and 2D puzzle solving, map interaction, cutscenes, and more. The camera plays such an integral part in the experience of the user and therefore a robust camera system can bring the scene truly to life.