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**3D Scene Reflection**

In my original photo I had an oversized wine glass, a wine bottle, an upside-down funnel, a box, and an eyeball stress ball all sitting on a table. The shapes I used were a cube, a pyramid, a plane, a funnel-type shape, and a cylinder-type shape. I had trouble making actual rounded edges on shapes, so the cylinder and funnel are approximations, and the eyeball is non-existent. To construct the wine glass, I used a cylinder-type shape for the base of the glass. I used scale to make this shape wide and flat to resemble the base of a wine glass. For the stem of the glass, I used another cylinder-type shape and stretched it to make it long and skinny. For the top of the glass, I used my funnel-type shape and flipped it so the point is on the bottom. I textured the glass with an image of water beads on glass. To make the wine bottle, I used two cylinder-type shapes stacked on top of each other with a larger one on bottom and a smaller one on top. To texture the wine bottle, I used an image of a wine bottle. I split the image into two images, one for the bottom and one for the top. To make the funnel I used my funnel-type shape with a cylinder-type shape. I started with the funnel shape and flipped it so the point is facing up. Next, I used a small cylinder-type shape and stuck it on top for the funnel spout. The texture on the funnel is an image of red wool because it was the best red color image I could find, and why not a fuzzy funnel? The box is made of a single cube shape. I used the brick texture from a previous project to apply to the box. Since I was not able to make a sphere, I decided to add a small hourglass shape. This is made from two pyramids with their points touching. I placed the hourglass shape on top of the box and used a gold texture on it. The last shape is the plane that the objects are sitting on. The plane is just a 2D square. The texture on the plane is from the picture I took of my table. I placed two lights in my 3D scene. The first light is a point light that can orbit around the scene or be stationary. This light uses a white color. The second light is just emanating from the center of the scene and I applied a green color to this light.

The user can navigate around the scene using the camera. W moves the camera forward, S moves back, A moves left, D moves right, Q moves up, and E moves down. The mouse cursor changes the view direction of the camera. The mouse wheel changes the camera movement speed. Pressing O changes to an orthographic projection and pressing P changes back to a perspective projection. Pressing L makes the point light stop orbiting and pressing K makes the light orbit again. Pressing the escape key will exit the window.

I made a separate UCreate function for creating each of the shapes I used. Each time the UCreate function is called for a certain shape type, it creates one basic instance of that shape. I can then apply a scale, translation, and rotation to modify the shape and move it to where I want it. I modified the URender function to accept the mesh data for a shape. This way I can pass in the data for one shape to URender and have it draw that shape. URender is then called once each time to draw each shape. This was the only way I could figure out how to actually draw more than one shape.