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CS-330 Comp Graphic and Visualization

**Final Project Reflection**

For my 3D scene, I chose to use my computer desk with some objects I had around. The main objects in the scene are a coaster, a mug, a pen, a candle, a book, and the desk itself. Also in the picture is a computer monitor and computer speakers. The main reason I chose to exclude the monitor and speakers from the scene is because of scaling. The monitor and speakers are much larger than the other items and would take attention away from the other objects in the scene. So, I settled with the coaster, mug, pen, candle, and book as being the main objects to render for my 3D scene. After selecting the objects and arranging them on the desk, I took the photo that I would use as a reference for my scene. With the objects selected, it was time to plan what kind of basic shapes they would be comprised of. The desk is a plane object, and all the other objects “sit” on top of it. The texture I chose for this is wood grain that closely resembles its real-life counterpart. The desk’s material is dull but glossy, that reflects some light, but not much. The coaster is simple, since it is made with a single box object. This object doesn’t use a texture, instead using a grey color with transparency to make it look like glass. This object reflects a lot of light since the material is shiny. The mug sits on top of the coaster in my 3D scene, and is a complex object, made up of two distinct shapes: a cylinder and a torus object. The mug is ceramic and has a texture that matches it. Its material properties ensure that it reflects light, which is shown in the scene. The pen is another complex object, using two cylinders, a tapered cylinder, and a cone. Like the coaster, the pen doesn’t use textures, instead using colors, with the outside cylinder and tapered cylinder being transparent so it resembles a BIC pen. The pen has a dull texture that doesn’t reflect much light, if at all. The candle is a complex object that uses two cylinders, a half sphere, and a cone. The candle uses the same texture as the mug but is much duller and doesn’t reflect light like the mug does. The last object, the book, is made of 4 different boxes. Using the different boxes allowed me to create a book with covers and a spine, and a separate box for the pages.

Setting up the controls for the 3D scene was an important task. Being able to move around the scene makes it interactable instead of just a 2D image using 3D objects. It gives it depth, and the ability to view the scene from different angles. To move left, right, forward, and backward, the WASD keys are utilized. To move up and down, the Q and E keys are used. To map the controls to these buttons, the glfwGetKey() function was used. In addition to moving around the 3D scene, there are also other ways to interact with it. Pressing the O key switches the scene to an orthographic view, from the front. The orthographic view gives you a 2D view from the front, losing the “3D” effect from the regular view. In orthographic view, the ability to look around and move forward/backward is disabled. To go back to the regular view, pressing the P key returns to the perspective view with full controls. The mouse is used to look around the 3D scene. The mouse scroll down controls the movement speed of the camera, slowing it down. Scrolling up up likewise, speeds up the camera movement.

Initially, as I was creating the shapes and implementing them into the scene, I used the RenderScene() function that was part of the initial program. However, this quickly became cumbersome to work with. Then I decided to create a function for each object and used that function to render them. So instead of rendering the shapes in the RenderScene() function, it now calls each of the functions that render the objects. This makes updating and modifying the objects much less of a hassle, which is important since changing values and testing those changes constantly to see the differences is a big part of designing this 3D scene.