CS 330

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CS 330 Final Project Design Decisions

For my project, I chose an image of an office. Out of the objects in this image, I decided to recreate the floor, wall, desk, computer, keyboard, mouse, lamp, books, and cup of coffee. These objects would be the easiest to recreate within the given timeframe while still conveying the meaning of the original image.

When designing the monitor, I had to find the desktop wallpaper shown in the original image. It turned out to be a stock image that was included with MacOS. Then, I placed a plane in the center of the monitor where the screen should be and textured the image across it.

However, this wasn't enough. A computer monitor in real life emits light. Texturing the image alone did not make the monitor look like it was emitting light. Instead, the image looked more like a painting on the wall. To fix this, I created a specific material with a high ambient light color property and set the material of the screen plane to that. This gave the impression that the screen was emitting light.

When designing the lamp, I made it appear to give off light by setting it to a material with a high ambient light color property. I also placed a light source close to the bulb to give the impression that light from the lamp was shining onto the desk.

In the original image, I decided to change the teacup containing coffee into an actual coffee cup because it was easier to create using the built-in 3D primitive drawing functions. Creating the cup in the image would have required custom code.

The books in the original image were positioned between two bookstands. However, due to the bookstands' complexity, I decided to omit them from the final image. It would have been unrealistic for the books to sit upright without any bookstands, so I decided to have them lay on their sides.

The user can navigate the scene using the keyboard and mouse. W, S, A, and D move the camera forward, back, left, and right respectively. Q and E move the camera up and down. O switches the view to an orthogonal view, while P changes to the perspective view. The mouse allows the user to change the pitch and yaw of the camera and look up, down, left, and right. The mouse scroll wheel speeds up the camera's movement along the X, Y, and Z axes.

While developing the scene, I noticed that I had to repeat much of the same code to set the scale, position, rotation, color, material, and texture. The repeated code grew exponentially as I constructed more objects in the scene since each object was constructed of multiple primitive shapes. To solve this, I created a custom function called "DrawMesh," containing all the repeated code to build the different primitive shapes. When calling this function, I had to pass the position, scale, rotation amount, type of shape, texture or color, and material. This allowed me to construct each primitive shape with only one line of code.