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Creating My Desktop Scene in OpenGL

For my final project in CS 330, I created a 3D scene that replicates my real desktop setup. The goal was to recreate a realistic environment using basic geometric shapes and implement interactive camera controls, including switching between perspective and orthographic projections. The scene includes a desk, a laptop, a tablet, a mouse, and a water bottle, arranged to resemble my everyday workspace.

I used the following primitive shapes:

* Plane: Desk
* Box: Laptop and tablet
* Sphere: Mouse
* Cylinder: Water bottle

I carefully adjusted the position and rotation of each object based on my actual desk. The laptop is tilted back to look like an open screen, and the tablet stands slightly angled. The mouse and water bottle were scaled and placed to look natural. I used simple colors for each object to match real-life appearances.

I implemented complete navigation controls: WASD keys move the camera horizontally, QE keys move it vertically, mouse movement changes the view, and the scroll wheel adjusts movement speed. Pressing "P" switches between perspective and orthographic views.

The most challenging part was fine-tuning the camera movement to feel smooth, intuitive, and responsive. Initially, the camera rotation was either too fast or too stiff, making the navigation uncomfortable. I had to repeatedly adjust the sensitivity settings for mouse movement and tweak the camera speed controls tied to the scroll wheel. It took multiple tests to find a balance where the camera felt natural for users to explore the 3D space freely.

Another challenge was positioning the objects in a realistic and organized way. Since all shapes are initially placed at the center (0,0,0), I had to carefully adjust the positions, scales, and rotation angles to create a layout that looks natural without having objects overlap or float awkwardly. Small adjustments, like tilting the laptop screen and angling the tablet slightly, made a big difference in making the scene feel more believable.

Through this project, I gained a deeper understanding of 3D transformations, scene management, and interactive controls in OpenGL. I was able to build a clean, realistic 3D scene, which boosted my confidence in developing 3D environments.