In developing the 3D scene, the primary goal was to replicate the reference image of a desk accurately while ensuring the project remained within manageable constraints. The selected objects, including the desk, shelves, and drawers, closely mirror the key elements in the reference image. The 3D model effectively captures the proportions and layout, demonstrating a thoughtful consideration of basic geometric shapes to form a cohesive and realistic object.

However, certain aspects of the scene could be refined to enhance accuracy and realism. The current color of the drawers and shelves is a bright cyan, which differs from the muted mint green in the reference image. Adjusting this color would align the 3D model more closely with the real-world object. Additionally, the floor texture in the scene could be modified to match the lighter, plank-style texture of the reference image, thereby achieving a more cohesive and realistic appearance.

Lighting is another area that requires enhancement. The current scene lacks custom lighting, resulting in a flat appearance without dynamic shadows and highlights. The reference image uses a light source, likely a desk lamp, to cast shadows and add depth. Implementing custom lighting, such as a directional light to simulate sunlight and a point light to mimic the desk lamp, would significantly enhance the scene’s realism, ensuring the objects are properly illuminated with appropriate shadows and highlights.

Adding more detailed elements, such as books or a lamp, could improve the scene’s complexity and visual appeal. These additional models would provide a more complete and engaging representation of the reference image, contributing to the overall realism.

User navigation in the 3D scene was designed to be intuitive and responsive, allowing thorough exploration. The WASD and QE keys provide full motion along the X, Y, and Z axes, enabling users to navigate from various angles. Mouse controls adjust the camera’s orientation, with the scroll wheel modifying movement speed, offering precise control. This combination ensures users can effectively explore all aspects of the scene.

To maintain a modular and organized codebase, custom functions were developed to handle specific tasks. The SetTransformations function manages scaling, rotation, and translation of objects, making the code more reusable and easier to manage. SetShaderMaterial applies material properties like ambient, diffuse, and specular components, critical for achieving realistic lighting effects. By modularizing these tasks, the code became more maintainable, allowing easy adjustments or additions.

Functions like PrepareScene and RenderScene were essential for organizing the workflow. PrepareScene initializes objects, materials, and lights, while RenderScene manages the drawing of the scene. This separation ensured that the code remained clean, organized, and easy to extend in the future.