Design Decisions for 3D Scene: Desk Setup with Pumpkin Sculpture

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For my final 3D scene, I chose to recreate a simple but personalized workspace setup based on an image of a desk with a computer, keyboard, monitor, and a small pumpkin sculpture placed off to the side. I selected this scene because it reflects a cozy, real-life environment that blends both functionality and personality. The goal was to replicate the objects using low-polygon models while incorporating texture, lighting, and navigable camera controls to create a realistic and interactive 3D space.

To build the scene, I used a variety of primitive shapes and combined them where necessary. The computer monitor was modeled using a box shape for the screen and a cylinder for the stand. The keyboard was another box, but scaled down and detailed with textured keys. The desk surface used a large plane and had support legs created with cylinders. The most complex object was the pumpkin sculpture, which I modeled using a tapered cylinder as the base and a small cone for the stem, giving it the look of a stylized pumpkin with low-poly efficiency.

Two of the objects—the pumpkin and the desktop monitor—were textured using high-resolution (1024x1024) royalty-free images. The pumpkin texture gave it a vibrant orange color with soft grooves, and the monitor used a dark, brushed-metal texture. I mapped these textures accurately using UV mapping and ensured the projections fit the shapes naturally without stretching or distortion.

Lighting was an important part of my setup. I implemented two light sources. The first was a point light, placed above and to the left of the desk to simulate natural overhead lighting. The second was a colored ambient light (slightly orange) that mimicked the warm glow of a desk lamp or a cozy environment. I used the Phong shading model to apply ambient, diffuse, and specular lighting effects, which helped enhance the surface reflection on the monitor and brought out the roundness of the pumpkin. This gave the scene a polished and immersive visual style.

For object placement, I used the X, Y, and Z coordinates to match the photo reference as closely as possible. The monitor was centered at the back of the desk, with the keyboard right in front of it. The pumpkin was placed off to the side for visual interest. I made sure the spacing was accurate, and none of the objects were unintentionally overlapping.

Camera navigation was designed using WASD and QE keys for movement on all three axes. I also added support for the mouse cursor to control pitch and yaw, and the mouse scroll wheel to adjust the movement speed. This gives the user smooth and full control over how they explore the scene. The camera’s orbit radius was increased to ensure it captures all the elements no matter the angle. For added functionality, pressing a key (like P) switches between perspective and orthographic views. This allowed me to see the scene in both 2D and 3D formats while maintaining the same camera orientation.

To keep the code maintainable and modular, I used custom functions such as CreateBoxObject(), ApplyTexture(), and SetLightSource() to manage geometry, textures, and lighting setup separately. These functions helped me keep the logic clean, reusable, and organized throughout the project. Comments were added to each function to describe its role, and the code was properly indented and spaced for readability.

Overall, this project helped me understand how to convert a real-world scene into a low-poly, navigable 3D environment using basic shapes and smart design decisions. I enjoyed adding small creative touches like the pumpkin sculpture and implementing camera controls that allow viewers to explore the scene from different angles. The development process made me appreciate the importance of both technical structure and artistic vision in 3D modeling.