Final Project Reflection

**Justification of Development Choices**

For my final project the 3D scene, I decided to replicate my personal desk setup because it presents a realistic and relatable environment. This setup includes a lavender corner desk, three monitors, and a keyboard. The selection of these objects allowed me to highlight a range of skills, from modeling large, complex shapes to adding fine details and textures. Additionally, replicating a familiar scene motivated me to achieve a high level of accuracy and detail.

**Design Decisions:**

1. Selection of Objects: I chose to include the corner desk, monitors, and keyboard to highlight a functional workspace. The lavender color of the desk adds a unique touch, while the monitors and keyboard demonstrate my ability to model both large and small objects.
2. Use of Basic Shapes: The corner desk is constructed using box shapes for the surfaces and legs, and a prism for the corner piece. The monitors are made with thin boxes and planes for the screens, and cylinders for the stands. The keyboard is a single box shape with a texture applied to represent the keys.
3. Texturing: I applied a lavender texture to the desk to accurately represent its color. The monitors have a screen texture to simulate the display, and the keyboard has a detailed texture to show the keys.
4. Lighting: The scene includes multiple light sources to create realistic lighting effects, including ambient, diffuse, and specular lighting. This enhances the visual appeal and realism of the scene.

Navigation in the 3D Scene

The 3D scene may be navigated by users with ordinary keyboard and mouse inputs. I configured the virtual camera to rotate and move, giving me a thorough overview of the complete desk configuration. The camera controls include:

* W, A, S, D keys for forward, left, backward, and right movement, respectively.
* Mouse movement for rotating the camera, allowing users to look around the scene.
* Scroll wheel for zooming in and out.

By allowing users to view the picture from various perspectives and lengths, these controls improve their engagement and enjoyment with the virtual world.

Custom Functions for Modular and Organized Code

To maintain modularity and organization in my code, I developed several custom functions:

1. SetTransformations()

* Purpose: Applies scaling, rotation, and translation transformations to objects.
* Reusability: This function can be used for any object in the scene, ensuring consistent and efficient application of transformations.

void SetTransformations(glm::vec3 scaleXYZ, float XrotationDegrees, float YrotationDegrees, float ZrotationDegrees, glm::vec3 positionXYZ);

1. SetShaderColor()

* Purpose: Sets the color values into the shader for rendering objects without textures.
* Reusability: This function allows for quick color changes to any object, making it versatile for various parts of the scene.

void SetShaderColor(float redColorValue, float greenColorValue, float blueColorValue, float alphaValue);

1. SetShaderTexture()

* Purpose: Binds a texture to an object for rendering.
* Reusability: This function can be used to apply textures to various objects, enabling quick texture changes and consistent application across the scene.

void SetShaderTexture(std::string textureTag);

1. LoadSceneTextures()

* Purpose: Loads and binds all necessary textures for the scene.
* Reusability: This function streamlines the texture loading process, ensuring that all textures are prepared before rendering.

void LoadSceneTextures();

1. SetupSceneLights()

* Purpose: Configures and positions the lights in the scene to achieve the desired lighting effects.
* Reusability: This function allows for easy adjustments to the lighting setup, making it adaptable to different scenes.

void SetupSceneLights();

**Milestone Progress**

**Milestone One: Project Proposal**

In the first milestone, I proposed to recreate my personal desk setup in 3D. This included a lavender corner desk, three monitors, and a keyboard. The proposal outlined the basic shapes needed and the textures to be applied.

**Milestone Two: Beginning a 3D Scene**

In this milestone, I began transforming the basic shapes for the desk and monitors. This involved modeling the primary surfaces and ensuring they were positioned correctly to reflect the real-world setup.

**Milestone Three: Interactivity in a 3D Scene**

For the third milestone, I incorporated input devices and camera movement, allowing users to navigate the 3D scene. This interactivity added depth to the project, making it more engaging.

**Milestone Four: Texturing Objects in a 3D Scene**

In the fourth milestone, I applied textures to the desk, monitors, and keyboard. This step was crucial for achieving a realistic look, as the textures added detail and depth to the objects.

**Milestone Five: Lighting Complex Objects**

In this milestone, I applied lighting to the scene, including ambient, diffuse, and specular lighting. This enhanced the visual appeal of the scene, creating realistic shadows and highlights. I also added LED lighting under the upper desk surface to replicate the look from the reference image.

**Final Project Submission**

The final project submission will bring together all the elements from previous milestones, refined based on feedback. The submission will include the complete 3D scene and a document explaining the design decisions. This project demonstrates my ability to model, texture, and light a realistic 3D scene, highlighting the skills learned throughout the course.

This reflection covers the development choices, navigation setup, and custom functions used in the project, aligning with the requirements of Milestone Five and the final project submission.