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CS-330 Computer Graphic and Visualization

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Reflection

**Justify development choices for your 3D scene**. Think about why you chose your selected objects. Also consider how you were able to program for the required functionality.

I chose the selected objects so that I could represent a scene of an office desk. The laptop, notebook, and pencil are common items found in an office, as such I decided to add them to the scene. I added appropriate textures to make the scene appear more realistic as well. I implemented functions to handle specific tasks such as CreateGLTexture and SetShaderMaterial. With the implementation of these functions, the code not only renders the scene effectively, but they also enhance maintainability and makes the code reusable.

**Explain how a user can navigate your 3D scene**. Explain how you set up to control the virtual camera for your 3D scene using different input devices.

I set up the navigation controls using functions like ProcessKeyboardEvents to enhance user experience and be able to navigate around the scene. After implementing these functions users can navigate through the scene using the keyboard and mouse input.

* WASD Keys – User can move the camera forward, backward, left, and right.
* QE Keys – These keys move the camera up or down.
* 1234 Keys – The user can flip through the different views or projections of the scene.
* Mouse – Controls the direction in which the camera is pointing.

**Explain the custom functions in your program that you are using to make your code more modular and organized**. Ask yourself, what does the function you developed do and how is it reusable?

* CreateGLTexture – The function loads textures through free-source images into OpenGL memory. Once you have created a texture using an image of your choice, you can reuse the texture for different objects or specific shapes in the scene.
* SetShaderTexture – This function allows you to actually set the texture to a shape after it has been created using the CreateGLTexture function.
* SetShaderMaterial – Using this function we can set specific material properties and modify them to make the scene appear more realistic. I used this function in the scene to achieve the correct reflection from objects. With certain light sources, the light would reflect too much from the objects making the texture not visible to the user. By modifying shininess, I could mitigate this issue.
* SetupSceneLights – Using this function I was able to add and modify light and its properties. By adjusting properties like position, color, and intensity, I made sure that the light sources weren’t too strong or too dim and integrated effectively with the scene.
* SetTransformations – This function was extremely useful when trying to replicate the scene of the photo I took. By adjusting the scale, position, and rotation about the XYZ axes, I was able to recreate the scene as accurately as possible. This function is reusable for every object that is implemented in to the scene so that each shape is positioned and scaled correctly.

A computer and remote control on a desk

Description automatically generatedA computer on a table

Description automatically generated