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CS-330-11374-M01 Comp Graphic and Visualization

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**2-3 Milestone One: Project Proposal**

**2D Image Selection**

For this project, I have chosen a photograph of a home office desk scene. This scene includes various objects that are commonly found in such an environment, providing a good mix of shapes and textures to replicate in 3D. To ensure accurate modeling, I will take multiple photos of the desk scene from different angles.

**Objects to Replicate in 3D**

* Laptop: A central item on a desk, serving as the focal point of the scene.
* Desk Lamp: Adds complexity with its various components and serves as a light source.
* Coffee Mug: A common desk item that adds realism.
* Book: Contributes additional detail and personal touch to the scene.

These items are chosen because they each have distinct shapes and textures, presenting various modeling and rendering challenges. Their diversity will allow me to demonstrate a comprehensive understanding of different geometries and how they interact with light and textures.

**Basic 3D Shapes Used**

1. Laptop:

* Box: For the main body and screen.

1. Desk Lamp:

* Cone: For the lampshade.
* Cylinder: For the lamp stem.
* Sphere: For the bulb.
* Box: For the lamp base.

1. Coffee Mug:

* Cylinder: For the main body.
* Torus: For the handle.

1. Book:

* Box: For the main structure.

1. Plane:

* Used as the desk surface to ground the objects.

**Explanation of Choices**

* Laptop: The laptop primarily uses a box shape, making it straightforward to model while still being an essential part of the scene.
* Desk Lamp: The lamp incorporates multiple shapes (cone, cylinder, sphere, box), making it an interesting object to model and adding complexity to the scene.
* Coffee Mug: Using a cylinder and torus, the mug provides a good exercise in combining different shapes.
* Book: A simple box shape, the book is easy to model but adds realism and detail to the scene.
* Plane: The plane serves as the desk surface, essential for positioning and scaling the other objects correctly.

These choices make sense because they provide a mix of simple and complex shapes, ensuring the project is exciting yet achievable. By breaking down each object into basic 3D shapes, I can manage the complexity while ensuring a high level of detail and realism.

**Implementation Strategy**

* Modeling: Start by creating the basic shapes for each object using OpenGL's geometric primitives.
* Texturing: Apply textures to enhance realism, such as a desktop background for the laptop screen and a textured cover for the book.
* Lighting: Implement lighting effects, using the desk lamp as a light source to cast realistic shadows and highlights.
* Rendering: Render the scene, ensuring all objects are correctly positioned and scaled relative to the plane.

This structured approach will help create a visually appealing and technically accurate 3D scene.

**References:**

*3D Graphics with OpenGL - The Basic Theory*. (n.d.). <https://www3.ntu.edu.sg/home/ehchua/programming/opengl/CG_BasicsTheory.html>

Rehman, A. (2024, February 28). Beyond the Surface: Advanced 3D Mesh Generation from 2D Images in Python. *Medium*. <https://medium.com/red-buffer/beyond-the-surface-advanced-3d-mesh-generation-from-2d-images-in-python-0de6dd3944ac>