**Final Project Reflection**

Isaac Euntak Jang

CS 330

Professor Gray

October 20th, 2024

**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.**

For my final project, I decided to recreate a very personal scene, which is an overlay photo of some of the special objects from my wedding earlier this year. The photographer did a great job with the composition of putting the object together, and I did my best to replicate it in 3D.

Finding the right texture was one of the most challenging parts of the project. For example, replicating the gold chain of the necklace required a lot of searching and having the chain as a 1024 x 1024 image was not applying well as a texture since the object was so small. I had to adjust the SetTextureUVScale() function to get the desired appearance. Another challenging task was making the unique hexagon form. I built a 3D design after watching an outdated OpenGL video on creating a flat hexagon. Because of lighting problems, I could see that the hexagon's upper half was darker than its bottom half. It was difficult and instructive to solve this without delving deeply into normal vectors and lighting calculations.

I gained a stronger understanding of 3D rendering and the intricacy required in making video games and simulations through the programming of these features. The project necessitated continuous problem-solving and spatial reasoning, particularly when utilizing XYZ coordinates to change items in 3D space.  
**Explain how a user can navigate your 3D scene.**

Both the mouse and keyboard can be used by users to navigate my 3D scene. Here's how the controls are mapped:

|  |  |
| --- | --- |
| **Navigation:**   * **W**: Move forward * **S**: Move backward * **A**: Move left * **D**: Move right * **Q**: Move up * **E**: Move down | **Perspective**   * **U**: Top orthographic view * **I**: Side orthographic view * **O**: Front orthographic view * **P**: Perspective view |

I made the navigation simple to use so that viewers could quickly explore the landscape from different perspectives. By beginning the camera view above the items, the user's connection to the scene is strengthened as they are given an instant visual reference that matches the original snapshot.

**Explain the custom functions in your program that you are using to make your code more modular and organized.**

I created my own functions in order to structure and modularize my code. For appropriate lighting, the vertices and normals are defined using the custom hexagon shape function. To simulate various materials, the DefineObjectMaterials() method sets material attributes such as ambient, diffuse, specular, and shininess. Texture management is centralized with the help of the LoadSceneTextures() method, which loads and binds textures efficiently. I increased the clarity and maintainability of the code by crafting unique render routines for particular items and optimizing the RenderScene() function. These features improve the structure of the code and can be used to other projects later on.