Oscar Rosa

CS-330

Southern New Hampshire University

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Final Project Reflection

1. **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 this specific project I chose to do a scene with a small living room table with a wine bottle, a couple of wine glasses and a cigar box. The original scene contained a small stack of magazines, a glass cup, and a vase with a plant inside. I chose to deviate from the scene specifically because of the textures used in the new scene as the objects in the original scene did not look aesthetically pleasing and did not fit the scene I was going for. The changes made to the scene also added to an additional challenge I was aiming for as the original scene did not provide many complex objects to work with and the new objects added did provide more complexity I was aiming for and helped to broaden my abilities to create such objects within my code. I will admit that while working on this project, there was a steep learning curve in which I had to work through and although I did complete many of the challenges I was aiming for, I did not complete all of them. As stated above the new scene contains a table from the original scene however, the textures used were vastly different than the ones that were shown in the original, this led me to change the objects on top of the table to match the new scene. In addition, because of the new objects being used the number of lights used and how they were positioned also played a big factor in how I presented my scene in which the four lights used in the scene were used as spotlights, 2 of which were positioned to the left and right of the table with the other 2 being centered on the table but positioned to the front and back of the table and applying enough light to brighten the scene without it being cast entirely in darkness. In terms of functionality added to my project, when the program starts users can look around the scene using the mouse allowing them to look from side-to-side and up and down. With the WASD keys users can move about in the scene and in conjunction with the mouse are able to explore the scene in its entirety as well as zoom in and out of objects to get a better look. As stated previously, I was able to overcome many challenges while working on this project such as the positioning of the objects and applying shaders and textures to the simple shapes used in the scene, however I was unable to fully overcome the challenge I had with the lights in the scene. Originally, I intended for my lights to be positioned near the upper left side of the scene towards the center and have the lights angled towards the table and objects located in the center. In addition, I had planned to change the color of my lights to a warmer color to signify the time of day such as late evening, however this was not done due to the complications I experienced and was not able to solve. To overcome this issue, I decided to change the textures used to be darker and utilized the Phong shading model to the best of my abilities to achieve an effect that I feel suited the scene more than what I had originally intended.

1. **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.**

As stated before, users can navigate through my scene using the mouse and keyboard. With the mouse, users can move the camera to look left and right as well as up and down while remaining stationary. With the keyboard, users can move the camera’s position utilizing the WASD keys and the QE keys, with the “W” key moving the camera forward, the “A” key moving the camera to the left, the “S” key moving the camera backwards, and the “D” key moving the camera to the right, if the user presses the “Q” key then the camera will move up whereas if the user presses the “E” key then the camera will move down. By using the keyboard and mouse in conjunction with one another users can explore the scene by manipulating the camera’s position to pan around the scene and move about. In addition, users can also change the speed at which the camera moves with the use of the scroll wheel. If the user scrolls the wheel up, then the camera’s speed will reduce and vice versa if the wheel is scrolled down then the camera will speed up. Furthermore, if the user presses the “O” key, then the user will be able to change the perspective of the camera to that of an orthographic projection which places the camera directly in front of the table making it appear 2D, whereas if the user presses the “P” key the camera will change back to the perspective projection or back to a 3D view of the scene.

1. **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?**

Aside from the function used to help users navigate the 3D scene there were not a lot of custom functions added into the program. I think if I did add more custom functions, it would be to add an indices array and vertices array into my program to help me simplify things and make my program easier to work with. By incorporating these concepts into my program, it would have allowed me to reuse vertices in different areas of my program where it was needed and would have eliminated the need to develop extra vertices needlessly. Overall, I think this would have helped with optimization purposes, however despite not having implemented this in my program I did ensure that what I did use in my program was well maintained and organized such as using proper spacing, commenting, and the logical placements of the functions I used within my program. By organizing my code in this manner felt the most logical to me and due to the commenting practices I utilized, I believe that if another programmer were to follow up with what I have already done with this program and expand upon it, these individuals would have no issues following along with what has already been done and understand the thought process I had while completing this project and add or alter additional functionality if they so choose without issue. Overall, I feel that this project has been a great learning experience and has taught me quite a bit on how to develop code for a 3D scene and how to apply textures, shading, and lighting to make a close to realistic scene as possible.