Module Seven Assignment

Scott M. Laboe

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When selecting some objects to model, I chose things that could be easily reproduced with primitive shapes like a cylinder, taurus, cube, and plane. When I first started writing the code, I knew I would need to plan for the addition of at least four other models. I quickly realized how impractical and limited it was to work with individual vertices. I could write code to create individual components of an object, but to get the translations correct was messy. There was very little reason to dynamically generate the models, so I chose to find a simple obj import utility that I could integrate with my program. I chose a very simple implementation so I could understand how I could improve it, and how the obj files were structured. I created the models in blender using these primitive shapes and exported them as obj files that could be loaded into my program.

Another part of this assignment was replicating lighting and textures from the reference image. When writing the code for the lighting I was careful to code everything so I could easily add as many light sources as I needed. I created a data structure for each light which contained the parameters that I needed to change for each light. I wanted to achieve good shadows so I figured I might as well bake the shadows into the textures in Blender. To ensure the textures export properly I defined UV seams to prevent overlap and overly complicated unwrap geometry. I had never really used Blender, so it was a good experience for learning the very basics of creating and texturing models in that software.

To navigate the scene, the user uses a WASD control scheme where ‘W’ moves forward, ‘A’ moves left, ‘D’ right, and ‘S’ moves the camera backwards. ‘Q’ and ‘E’ are used to raise and lower the camera depending on how the camera is oriented. A mouse is used to pan around the scene, with the scroll wheel configured to increase or decrease the speed of movement. ‘P’ toggles the camera view mode from orthographic to perspective.

Some custom functions I used to improve the useable and improve readability are the import model utility and some rendering functions. To pass the data for the lights in the scene I used a loop with some string utilities to ensure the process of adding more lights would be trivial, and only require changing the NUM\_LIGHTS variable and adding the configuration for another light to the main program.

The experience of writing the code and developing the models for this project has been very beneficial for my journey to understand computer graphics. I never had much of an interest in graphics, but this project has shown me how enjoyable it can be to write visual programs, and how much control you can have over the end-product. If I had additional time to work on it, I would continue to improve the models, by first trying to get the glass in the cup to render correctly. I originally tried baking the glass material into the texture, but quickly realized certain material properties must be implemented in the program’s shader. I would also like to improve the metallic look of the lighter by increasing its specular reflection.