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CS 330

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Final Project Reflection

For my 3D scene, I chose four objects that would allow me to use more than four of the basic shapes. To do so, I used what I had available on my desk at the time, which was a notebook, pencil, empty glass, and a Rubik’s cube. These four objects allowed me to use the box, cone, cylinder, plane, tapered cylinder, and torus basic shapes. The notebook and the pencil were also made of at least two of these shapes, which met the requirements for the scene. I did have to simplify some of the designs, since adding 35 tori to the notebook for the spiral bound would be excessive, so instead I put three on it to give the idea of a spiral bound notebook. I also simplified some of the pencil’s design and only added a texture to highlight its more prominent blue and metal design. The Rubik’s cube was also a tricky endeavor, but I used Adobe Illustrator to create the design patterns for each face, exported them as a PNG to the texture file, and used the custom ShapeMeshes command to draw each of the faces individually.

For navigation of the 3D scene, I was able to use the ViewManager class to take input from both the keyboard and mouse. These functions allow the user to move around the scene using the WASD keys for navigation. For example, the W key moves the camera forward, the A key moves the camera to the left, the S key moves the camera backward, and the D key moves the camera to the right. The user can also use the Q and E keys to move the camera vertically. The Q key moves the camera upward, and the E key moves the camera downward. Apart from the keyboard, the user can also use their mouse to affect the camera. Using the same ViewManager class, the mouse’s position and scroll wheel can affect the view angle and movement speed of the camera. For example, moving the camera left, right, up, and down will slightly change the view angle depending on what direction the user moves the mouse. Using the scroll wheel and scrolling up slows down the responsiveness of both the mouse movement and keyboard directional movement, while scrolling down speeds those two functions up.

The program to create the 3D scene uses various custom functions that give it the before mentioned navigational abilities and the ability to create the 3D objects with their textures and lighting. For example, the code uses 5 main source files including the MainCode.cpp, SceneManager.cpp, ViewManager.cpp, ShapeMeshes.cpp, and Shadermnager.cpp. The main code class initializes the program and calls on the rest of the source files and all of their headers and external dependencies. The scene manager class oversees creating all the 3D objects including their meshes, textures, materials, and lighting. Each of these utilities is compartmentalized into their own method with clear code commenting that explains what each method does. Editing this class allows for the creation and deletion of objects, moving objects around, and changing their color, texture, material, and lighting. This class also calls on the shader manager and shape mesh classes to create the scene. Finally, the view manger class deals directly with the camera and the input devices for navigation. This class only has 7 methods, but each of these is clearly commented on to explain their functionality and can be edited to change the camera view for the entire scene.