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CS 330 Computational Graphics and Visualization

Final Project

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I created a scene for this client using C++ and OpenGL. I chose to use a rectangular plane for the table. I applied an oak wood texture to the plane to make it appear similar to the table depicted in the 2D image. The picture depicted a mechanical stamp which I recreated by using several different shapes. I created the rounded top of the stamp by using a cylinder and making its width greater than its height. Then, I used a cube shape to create the middle of the stamp and overlayed it with the cylinder. Next, I used another cube to make the bottom and made it smaller than the middle cube to match the image.

I made a cube to make the main body of the notepad. I made a smaller cube to create the binding of the notepad. I used a square to create the eraser and then a second cube to create the paper wrapping for the eraser and overlayed the two squares. To recreate the pencil, I used a cylinder for the pencil’s body I used another cylinder to create the metal eraser holder on top of the pencil, and then a third cylinder to create the pencil eraser. I created a sharpened pencil tip by using a cone shape.

To create a lamp, I used several cube shapes. I used a large, flattened cube to create the base of the lamp. I then used several long cubes to create the arms of the lamp. I used a large cone to create the light bulb holder. Then, I used a two small cylinders to create the knob on top of the light holder. I used a light source inside the lamp to create the bulb.

I used the basic gaming controls for navigation in my 3D scene. The W button moves forward, while the S button moves backward. The A button moves left, while the D button moves right. I used the Q button to move the camera up and the E button to move the camera down. For aim movement, I used the mouse to control where the camera is directed. For movement speed, I used the mouse scroll wheel.

Open GL can be quite difficult due to the amount of code necessary to render functionality and objects. I made the code more modular by creating many user-defined functions. I created a function to initialize my OpenGL workspace including activating my window and setting up my environment. I created a function to process input and define what the input does. I created mouse and scroll callback functions to define what the actions would be when the input was detected. I created a function to flip images vertically due to many image files storing images upside down.

One of my biggest functions was my render function. The purpose of this function is to define my objects, light sources, and their translations and strengths and send them to the GPU. Another function I created was to create and destroy the shader programs.