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SNHU: CS 330

Final Reflection

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**Design Choices**

For my final I chose a scene where four items were placed on my desk at home. The items included a water bottle, a knitted bumblebee decoration, a stick of lip balm, and wired computer mouse.

To build the water bottle I mostly used cylinders and made them transparent. Then I used a tapered cylinder for the cap. For the handle, I pieced together some elongated boxes. I chose not to use textures as I got a better result from just using the shader color and applying a material so that I would get the precise color, with consistency, and also get the sheen of blue light along the side. Altogether, the bottle was one of the easier shapes.

The knitted bumblebee was actually more of a challenge than I anticipated. I started with a wood cylinder for the base. Then I used an elongated sphere for the body. On top of that I placed a slightly pressed sphere for the head. The difficult part came when I needed to make the arms, wings, and details for the head. The arms weren’t too bad, and a basic torus shape helped with that. The wings were easy enough to shape with a cylinder that was flattened and turned on its side. The difficulty here, however, was getting the wings to align at the correct angle on the bee. After that I moved to the antennae which were rather tedious because the cylinders I used needed to be placed symmetrically and then angled outward. Once that was done, I needed to place the yellow bulbs at the ends of the black antennae. For the face I used two black spheres for the eyes and then a black torus for the mouth. I tilted it inward toward the head to cut off the top of the torus and make a smile. It was all rather time-consuming. Eventually, after some trial and error, I was also able to get textures that matched the original image quite well. This was one of two items that I textured.

Throughout the class, I used the stick of lip balm at the center to complete my milestones. It wasn’t much of a challenge to get the shape. I just used cylinders and leaned them on their sides. The real challenge came with finding the right textures to match the cap and the label. It was here that I learned I needed to use PNG files to upload textures. Before that, my textures loaded with no color and canted about 40º. Once the textures were sorted and the colors matched, I made materials for the lip balms so that the plastic would shine like it is in the original image.

The last item was by far the most difficult. When building the computer mouse, I tried a number of different shapes and combinations to try and get the form, but nothing worked. It all looked too lopsided, or it didn’t form as one coherent object with gaps throughout. I eventually just went into the meshes and built a custom shape. I followed the template of the box to construct the method and realized that as long as I was building a shape made of 4-vertex faces, I could add as many faces as I needed. In the end, I built roughly 30 unique faces and connected the vertices to build one contiguous piece. This became the body of the mouse. I opted not to use a texture here as I couldn’t find anything that showed as black after rendering. They all came out a bluish gray. Instead, I chose to use the shader color and applied a shiny material to the object. After I got the body of the mouse down, I used the combination of a cylinder and a torus to build the gray rubber mouse wheel. I matter this with a non-reflective material. Then once all of that was done, I used thin cylinders to build the wire. All told the mouse probably took as much time as the rest of the project combined but it was a rather rewarding experience.

I finished the scene with a diorama showing the background of my office and a left wall showing my computer monitor. Along with the wood-grain table-top, the entire scene becomes pretty immersive. I did, however, run into some challenges with lighting the space. I chose to use a blue light to replicate the light coming from the computer monitor but when combined with the yellow light of the lamp and ceiling fan, it turned the whole thing green. Eventually, after some experimentation, I realized that I could get the blue glow on the mouse and the water bottle by setting lights very close to those objects right. This way, on the object closest to the light get the blue shimmer. Everything else instead reflects the ambient white light from the ceiling fan. Finally, I added a yellow lamp low in the back right corner to provide some depth and natural color to the entire scene. With these changes to lighting and the walls of the diorama, I think the scene came together well.

**Navigation**

To navigate the scene, I bult simple functions that utilize both the keyboard and mouse to move the camera and even change the settings of the camera. For example, the basic mechanism allows the user to move the mouse around the screen. Depending on which direction the mouse moves, the screen adjusts to that angle. With the “Q” and “E” keys, the user and move vertically up or vertically down, respectively. The user can also use the “WASD” keys to move forward, backward, and side-to-side. Finally, if the user scrolls the mouse wheel, they can change the speed at which the camera moves. I had to make sure to add a floor to this to ensure the mouse speed never dipped below zero when the user was making adjustments. In the even the speed was negative, all of the controls would invert, making navigation quite difficult. However, once the floor was complete and effective, the camera navigation functions were quite helpful.

**Custom Functions**

There were a few custom functions that I developed during this project. The smaller ones included keeping the camera functioning properly regardless of how much user input changes the mouse settings. The big one that was most impactful to the overall project was the custom function to create a computer mouse shaped object. It was quite a challenge to keep organized but what I did was make three methods. One to draw the shape faces, one to draw the shape lines, then a third to load the shape. The real challenge was building all of the coordinates for the vertices and then connecting them into faces. This required a good deal of planning and design before hand to determine how many vertices would be needed to create a quality replica without overloading the system. In the end, around 30-faces were used to build the mouse and much of the code in the function was easy enough to keep organized by which side of the object was being built. The shape is also easily re-usable as it requires no additional effort beyond that of the other basic shape meshes.