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CS330

7-1 Final Project Reflection

For this project, I selected and displayed six objects from around my house that I felt were good representations of basic 3D shapes or could be recreated by combining several basic 3D shapes. Each of these shapes required a slightly different approach to recreate, striking a balance between variety, complexity, and achievability.

A table with food and a book

Description automatically generated

The container of cashews is accomplished by combining two boxes, two cylinders and a plane. The lower box is textured to represent a collection of cashews, while the upper box is transparent, giving the sense that the container is not quite full. A plane is aligned to the front of these boxes to display the label. Two cylinders are aligned to the top of the boxes to represent the opening of the container and the lid.

A can of pumpkin puree is represented by two cylinders. The first cylinder only renders the sides of the cylinder and is textured with a recreation of the can’s label. The second cylinder only renders the top and bottom of the can and is textured to look like the metal lid of the can.

A hand grip trainer is represented by a torus and colored to approximately match its physical counterpart.

A tennis ball is represented by a sphere. The details of the tennis ball are recreated by a texture.

A bottle of soda is recreated with a cylinder and three tapered cylinders. The large part of the bottle is created by the cylinders, with two of the tapered cylinders representing the slope of the bottle neck up to the aperture. The bottlecap is represented by the third tapered cylinder. The cylinder and first tapered cylinder and darkly colored to give the impression of fluid in the bottle, while the middle tapered cylinder is white and partially transparent to indicate the empty part of the battle. A red color and metallic material are used on the top tapered cylinder to recreate the bottlecap.

A hardcovered book is accomplished by using four boxes and a plane. Three boxes are arranged to represent the front and back cover and spine of the book, with the fourth box smaller to represent the pages. The fourth box is also textured to give the impression of a stack of pages, completing the illusion that there are many individual pages to the object, rather than a single box. The cover of the book is recreated in a texture applied to a plane aligned to the front cover of the book.

Users can navigate the scene by using the WASD keys to move the camera forward, backward, pan left, and pan right, respectively. The camera can pan up by pressing Q and down by pressing E. The rate of movement can be adjusted with the scroll wheel. The camera’s facing can be controlled by moving the mouse. Additionally, by pressing O, the view can be switched to an orthographic (2D) view. P will switch the scene back to the perspective (3D) view. In total, these controls utilize both the keyboard and mouse for control inputs.

The rendering commands for each object are broken into separate functions, and the positions for each object are referenced relative to a unique set of coordinate variables. As a result, each object can be created individually and moved as a single unit, making it simple to add or remove objects or rearrange the entire scene. Continuing this approach would also allow the scene to be expanded to much greater levels of complexity and still be manageable.