CS-330: Project Design Decisions

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For this project, I chose to do a mini strongman training gym for a few key reasons. To start, this scene allowed me to create something I am passionate about, has a lot of complex design choices, and could easily be made with nothing other than basic shapes. Initially I was planning to do much more complex objects for the scene but then realized my past experiences with doing VPython and chose to do simple items to save mental stress. This scene included items such as atlas stones, dumbbells, rack, atlas stone platforms, and some lifting benches. The bench was created with a simple elongated box, and the support beams were from two sets of rotated boxes. The York Globe Dumbbells were made from a multitude of spheres and cylinders to keep the look as original as possible. These two helped me show off how basic transformations of objects can create realistic and complicated objects.

For ease of navigation, I had to make a couple basic choices for what was required. Currently, the O and P keys are set to toggle between a normal perspective camera view and a ground level view orthographically. Forward, backward, left, and right camera movement are all controlled WASD for a more convenient hand location when needing to adjust height. Height controls are done with Q being set to raise the camera and E set to lower the camera. Normal camera controls are done by moving around the mouse to look around the scene, and the camera moves according to mouse movement, rather than being fixed and requiring Q and E to adjust height. I was also required to add some form of camera speed adjustments using the scroll wheel. In the case of my scene, I had to adjust the speed stepping to be a bit aggressive considering the size of the scene itself. If the scene were to be much larger like I had originally intended, then the speed stepping wouldn’t have been an issue I had to work with.

There were a few custom functions that were required to be added to the project to make navigation and rendering work as intended. The biggest one is all of the adjustments made to the ProcessKeyboardEvents function so the WASD, QE, or OP inputs would control the camera as required. I also was required to set up a basic function to control the mouse scrolling to adjust camera speed. To make it easier to understand if someone were to just do a simple copy and paste into their own scene, it is done with a simple if statement that adjusts the value of a MovementSpeed variable based on scroll direction. In terms of the ProcessKeyboardEvents function, I wanted to keep the same sort of style of ease of use. I chose to keep it simple and make it so any key can be assigned by changing the GLFW\_KEY in the if statement to be whatever key the user chooses. This also helps to keep the code very reasonable even for someone with little OpenGL experience. Inside of the prepare scene view function is where the setting for the orthographic viewpoint is. This entire function is easy to paste into another project and work with next to no changes.

Inside the SceneManager class I had to add a few different functions for loading the textures, lights, and designated material properties for the lighting reflections. All of these are extremely reusable as another user would simply need to change the file names, light properties, or material properties to whatever is desired without worrying about creating it from scratch. All of these custom functions across all respective files were made with the ideas of modularity and refinement in mind as I absolutely plan to work on more scenes in the future.