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Project B: Flying Through Assortment of Random Objects

User's Guide

Goals: Outside of satisfying the project requirements, I wanted to make the camera/movement feel not as stuttery as it was at first and to make distinct animations for my jointed assemblies, both of which I was able to achieve. The sphere I applied quaternions on rotates and accumulates rotations correctly from any orientation when the camera is in its default position looking directly down in the -z direction of the model matrix, but despite my efforts (probably 50% of the time I spent on this project was on that) I couldn't get it to work with different camera positions.

Instructions for interaction:

A and D to strafe left and right respectively, W and S to move forward and backward respectively, left and right arrow keys to turn the camera around the "glass cylinder." and up and down arrow keys to tilt the camera up and down. You can also rotate the sphere with the mouse, but like...yeah it doesn't work from most angles.

Results

From Figure 1, you can see that there is a ground grid, 5 jointed assemblies, multiple different places where axes lines are drawn including the middle of the world where it can be seen that the blue line is up (Z is up) for my world.

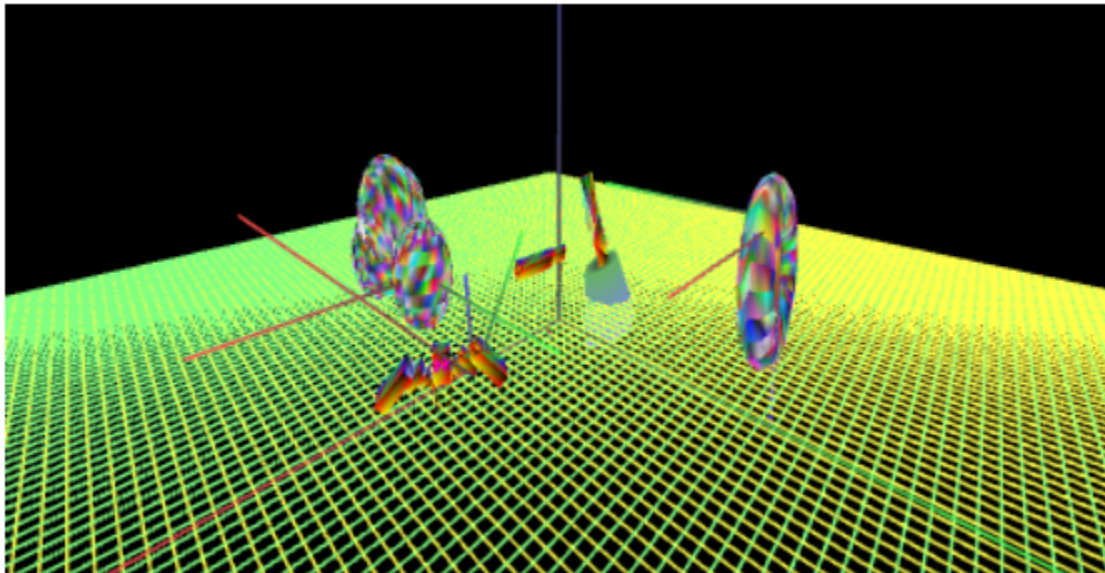


Figure 1: left viewport

Of course, the details of each assembly are hard to notice from an image so please check out my program for that, but because the most important assembly is the 3-jointed one-- the butterfly-- I provide an image of it in Figure 2.

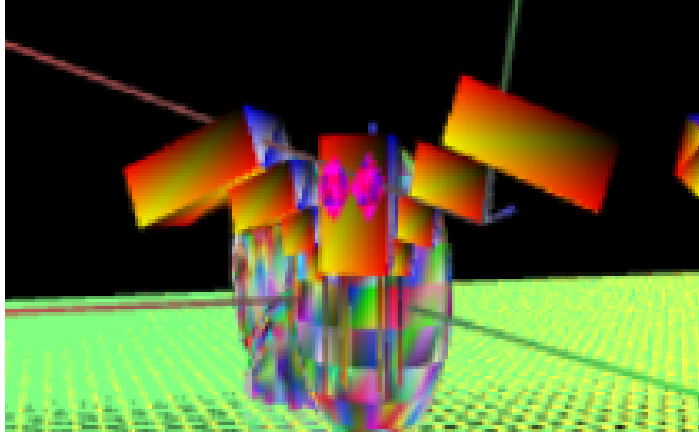
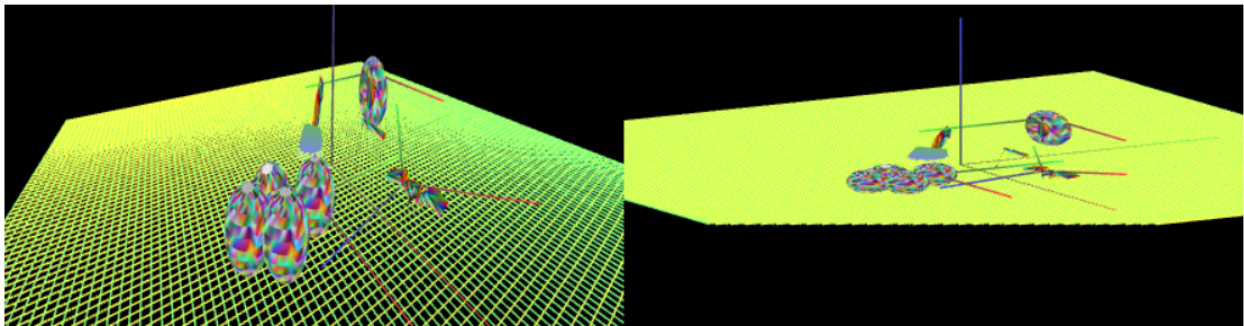


Figure 2: Butterfly wings with 3 joints and four fragmented wings

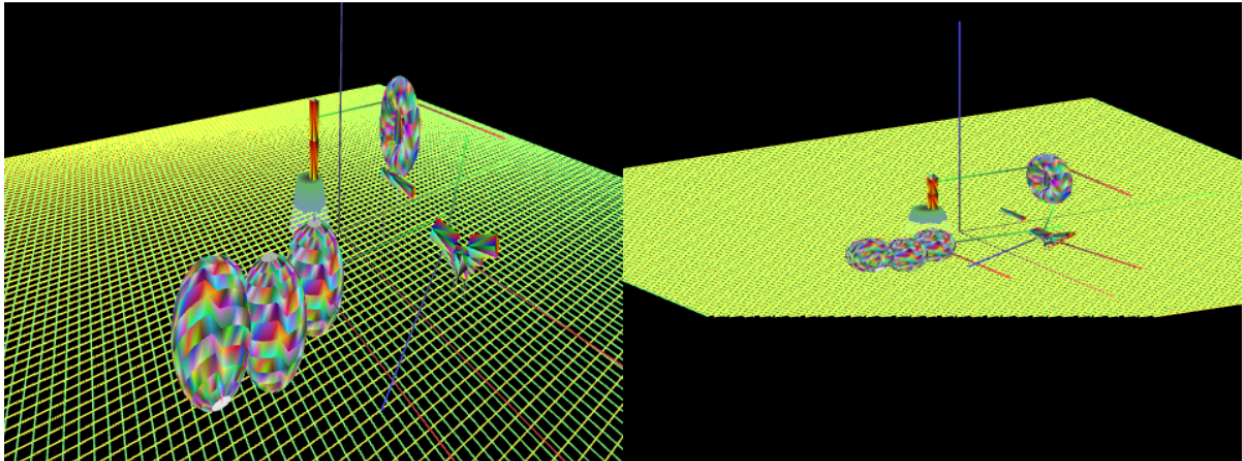
As per the requirements I have 2 viewports with equal znear and zfar as well as an equal size at $(zfar-znear)/3$ of the perspective camera. Of course, the right side is an orthographic view and the left is a perspective view (Figure 3). Furthermore, there are sensible instructions below the 2 viewports visible in Figure 3.



Moving: W: Forward, S: Backward, A: Strafe Left, D: Strafe Right ||| Camera: Up Arrow: Look/Tilt Up, Down Arrow: Look/Tilt Down, Left Arrow: Turn Left, Right Arrow: Turn Right ||| Rotate sphere: Click and drag on the screen to rotate the lone sphere

Figure 3: Left and right viewports with perspective and orthographic views respectively and sensible instructions underneath.

Figures 4 and 5 are examples of the resizing functionality without stretching or scroll bars appearing.



Moving: W: Forward, S: Backward, A: Strafe Left, D: Strafe Right ||| Camera: Up Arrow: Look/Tilt Up, Down Arrow: Look/Tilt Down, Left Arrow: Turn Left, Right Arrow: Turn Right ||| Rotate sphere: Click and drag on the screen to rotate the lone sphere

Figure 4: My program at full window size on my computer

Moving: W: Forward, S: Backward, A: Strafe Left, D: Strafe Right ||| Camera: Up Arrow: Tilt Up, Down Arrow: Tilt Down, Left Arrow: Turn Left, Right Arrow: Turn Right ||| Rotate Lone Sphere: Click and drag on the screen to rotate the lone sphere



Figure 5: My program at a very small window size. Note there is no stretching or other types of distortion as well as no scroll bars. That said, the text at super small window sizes scroll bars appear so you can scroll through the text but I heard that was fine from a TA.

Figure 6 is an image of my rotating sphere that doesn't quite work correctly, and Figure 7 is an example of an angle from which the sphere's rotations work correctly. Also, hopefully from all this it is clear that my camera is free-moving, but of course do check out the program to experience it first-hand. I hope you find it interesting!

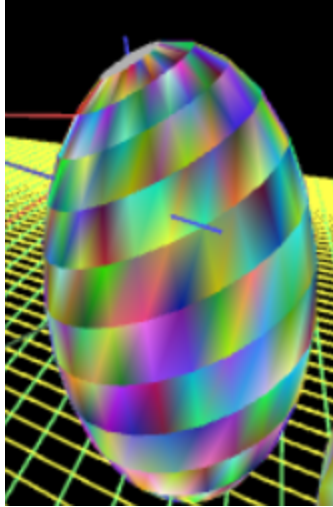


Figure 6: Rotating sphere

Moving: W: Forward, S: Backward, A: Strafe Left, D: Strafe Right ||| Camera: Up Arrow: Tilt Up, Down Arrow: Tilt Down, Left Arrow: Turn Left, Right Arrow: Turn Right ||| Rotate Lone Sphere: Click and drag on the screen to rotate the lone sphere

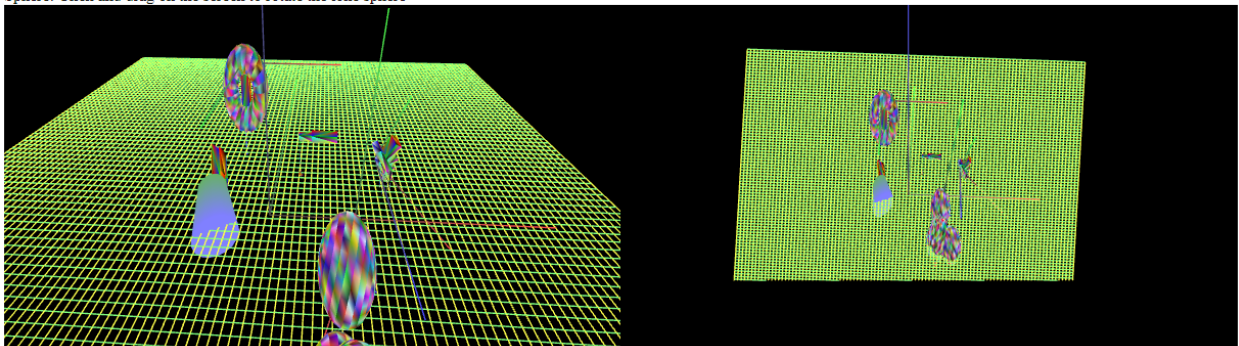


Figure 7: The sphere only responds to camera positions directly above or nearly directly above the sphere naturally; I couldn't get it to work from any camera position.