Benjamin Northrop
6/13/24
CS5310
Summer 24
****The PDF version does not support animated gifs, so you'll only see a single image. The word document (same file name) has the animated gif for reference****

Introduction
Project 5 introduces us to viewing pipelines and perspectives of 2D and 3D objects. We created transformation matrices and operations to handle transformations to more easily manipulate the points that we're drawing.
**Projects**

Test5b

For 2D transformations, we had this transformation code. Each line is drawn and then translated up through the view pane over each frame. Each line is also rotating as it moves up, making it look like a bunch of straws have been thrown across the screen in slow motion.

Test5c
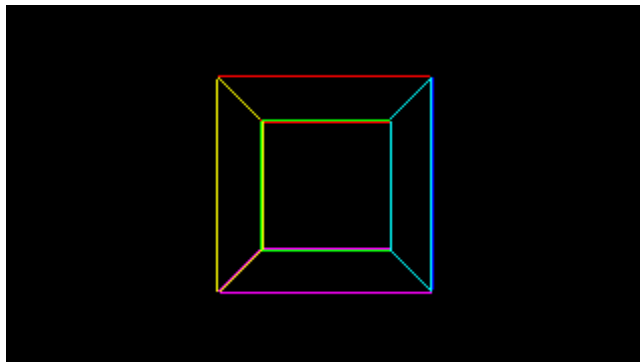
The second test file was for 3D viewing, and involved creating a 3D cube and this time the view frame was moving and the object stayed in place. Due to the background not changing, it looks like the cube is rotating.

Creative 1: Lightspeed
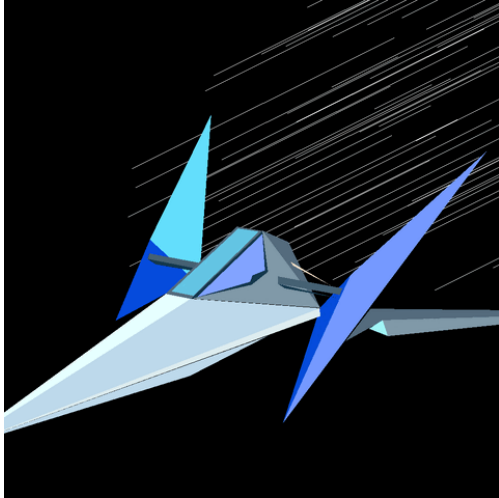
The first creative image is a 2D transformation. I created a background of stars as a number of points in random locations, then over each frame, they became lines that progressively stretched. As the ship goes into lightspeed. To maintain the look of constant acceleration, we use a cubic function from 0,1 to have a slow start, but then rapid acceleration. These frames were then used as the background for a composite image. I took the original starfox ship, changed the background to be a green screen, and then used an alpha mask to composite the images together.

Creative 2: Rotating Sphere
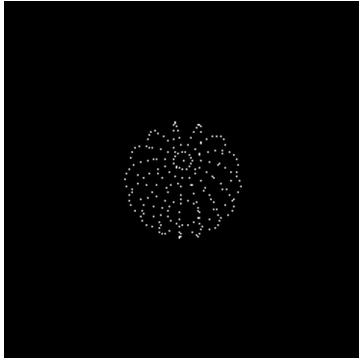
The second creative image is a 3D transformation. In this case, I created a unit sphere by layering unit circles on top of each other, and modifying the radius by yet another unit circle in order to create the sphere. The very top and bottom were left open, making it look like a tangerine. To rotate, the camera is looking down from an angle and moving around the object itself.

Extensions

I don't think it's fair to doubly claim extensions for the starfox ship's 3D look with colored polygons, though I do think I spent 2 projects worth of time on that thing. Maybe 1 point for combining the previous composite program with this one, proof that it is still robust enough to create this scene.

Reflection

My biggest challenge (and still) is mentally working through the model coordinates and then shifting to the world coordinates and then screen. One thing I wish I could have figured out was tilting the axis of the sphere or view plane. Right now, the object still rotates about the y axis that is the sphere itself, but I wanted the top of the sphere to be tilted so it would look more like the Death Star. I tried playing with the settings and transformations, but the images did not come out as expected, so I decided to cut my losses and keep the sphere.

Acknowledgements
The skeleton for both of the create images were provided by test5b and test5c. Each one I relied on for setting up the VTM and initial settings for the viewing pipeline.