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Lab 10 Report: Making it Real

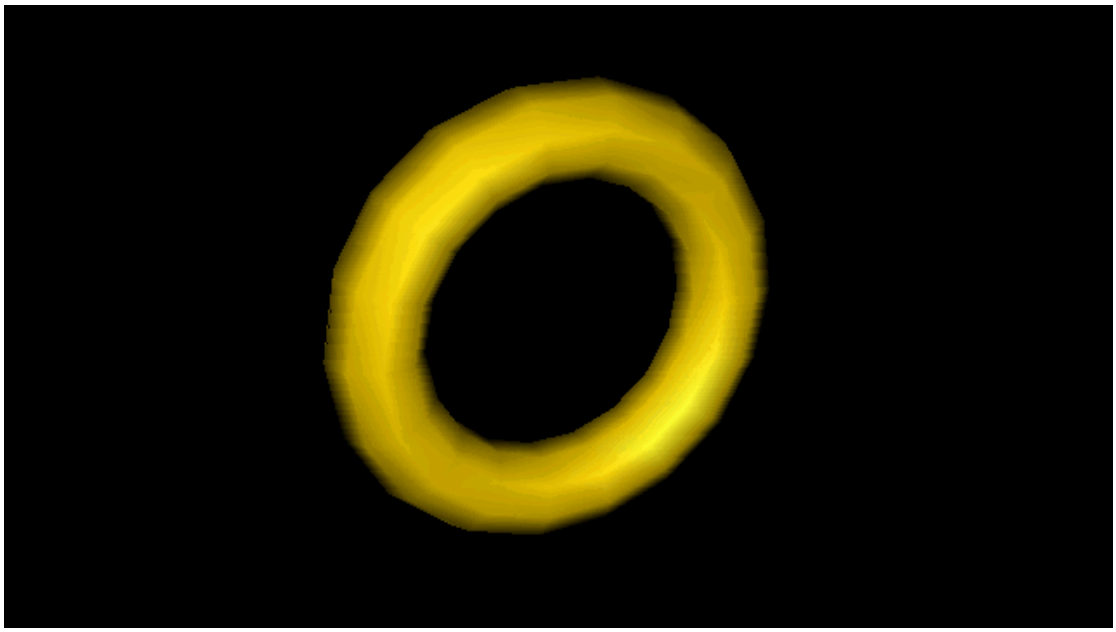
Summary

The purpose of this project was to add two new features to my rendering system. I ended up implementing behavioral animation through swarms, and another 3D graphics primitive in a torus. These additionals were used to produce creative 3D images.

Required & Portfolio Images

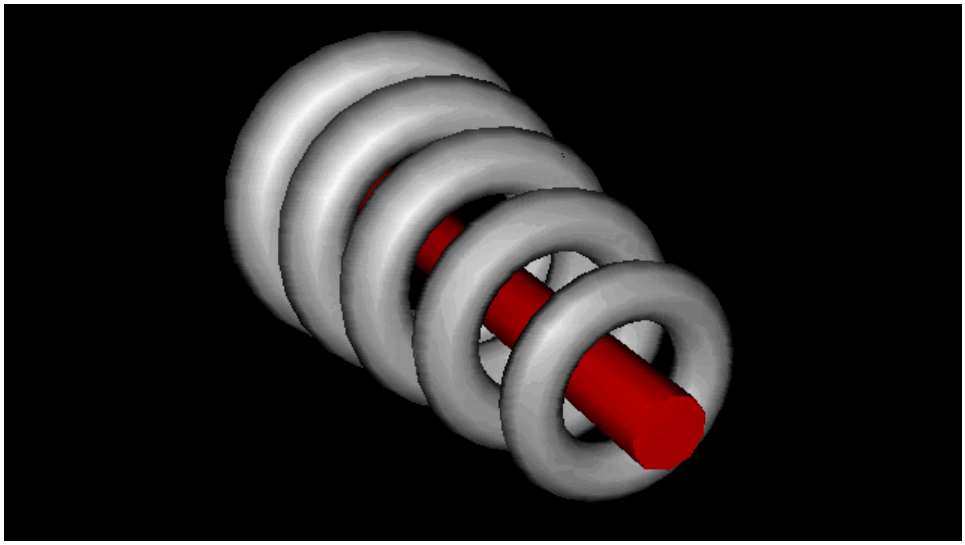
1. ***Spinning Gold Ring (test-ring.c)***

   Description: This image was generated using the new torus primitive by producing a series of frames and combining them into a gif of a spinning golden ring like the ones that appear in the Sonic games. The test confirmed that the 3D shape was rendered as expected. There were small artifacts here and there on the surface but it seems these may be due to precision errors in the scanline fill algorithm that can be fixed later.



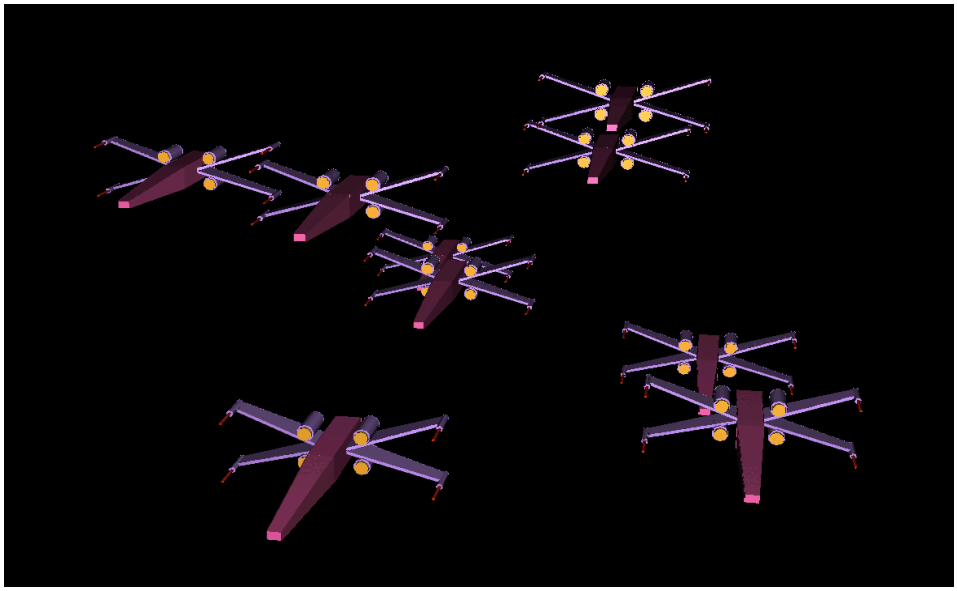
2. ***Charging Ray Gun (torus.c)***

Description: This image was generated with toruses and a cylinder by producing a series of frames with one ring as a different color and combining them into a gif that resembles a charging ray gun. The test was slightly more complex than the ring and included one other graphics primitive to show how interesting scenes can be created.



3. ***X-Wing Fleet (swarm.c)***

Description: This image demonstrates the new swarm behavior in action by creating a fleet of recolored X-wings. The test confirmed that the function was able to create a swarm of a given module (the x-wing in this case) with varying accelerations and velocities in each direction. Some ships started to overlap with one another when a large number were generated so that can be an issue to fix in the future.



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Reflection

This project provided neat new features to my graphics system and was a nice way to round off a semester-long development process. Implementing swarm behavior deepened my knowledge of how velocity and acceleration vectors can be applied to each individual unit in an animation to achieve realistic graphics while the torus allowed me to create some new fun images. Overall, these additions further enlightened me on how I can improve my system in the future and expanded the range of pictures that I can now produce.

Acknowledgements

I would like to recognize the following for helping me complete this assignment:

- **Instructor and Course Material:** Professor Maxwell's lecture notes and videos provided me with guidance and reference materials for implementing the algorithms. My chat with him during office hours helped me realize how small chunks of code in my system could be creating artifacts.
- **Classmates:** N/A
- **Online Resources:** Various online tutorials and articles from sites like W3schools on scanline and barycentric algorithms contributed to my understanding of the concepts.