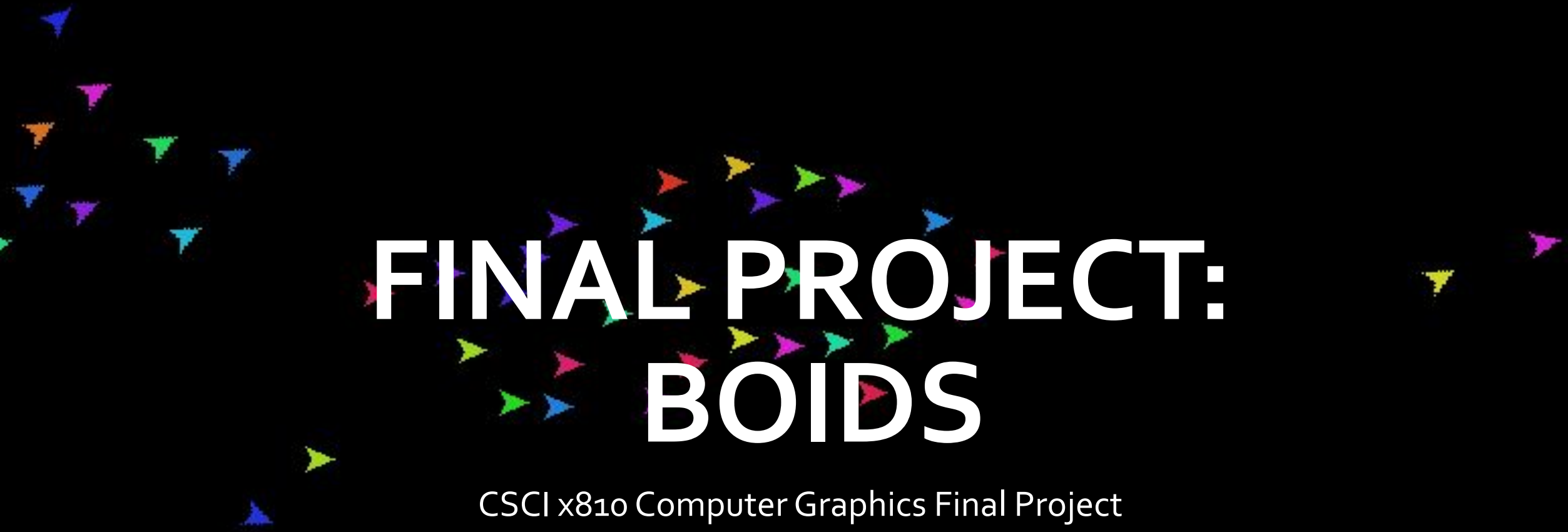


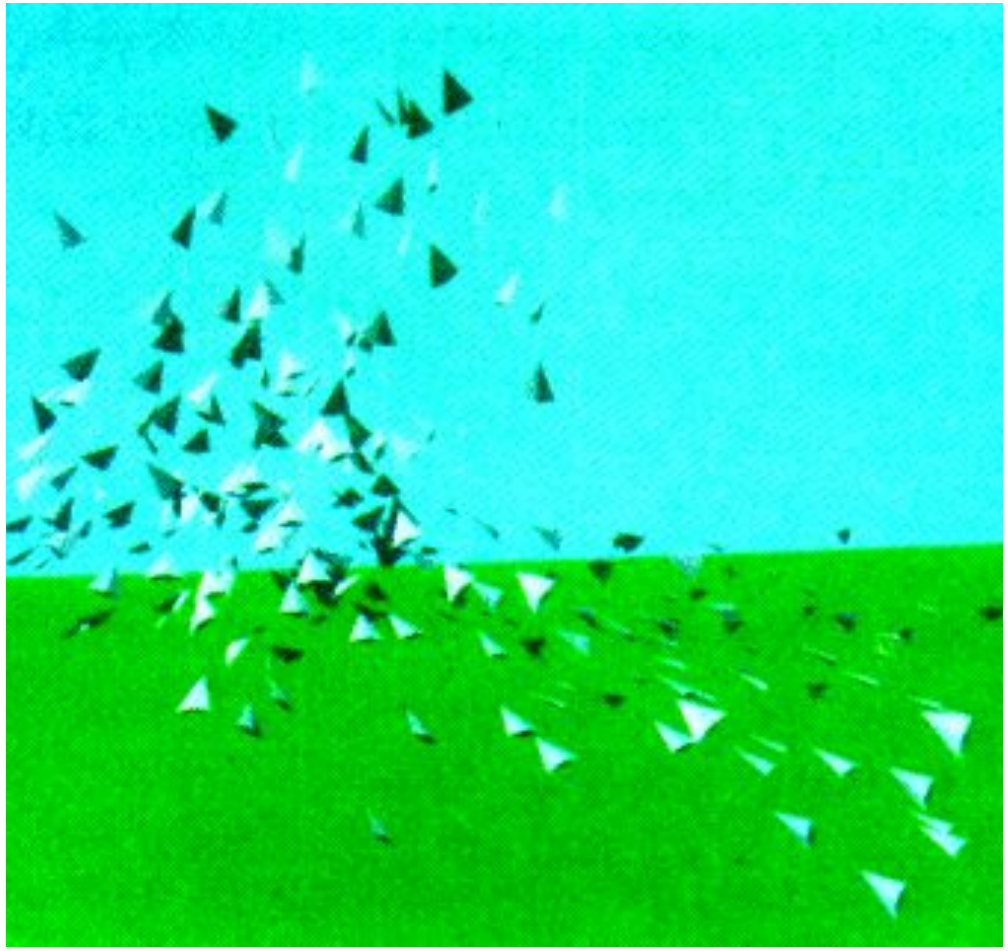
FINAL PROJECT: BOIDS

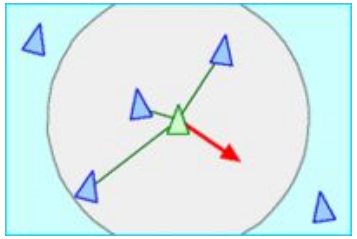
CSCI x810 Computer Graphics Final Project

Jorrin Thacker

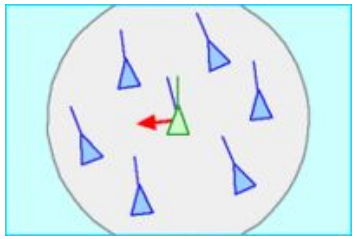
What is a Boid?

- Boid – A simulated bird like "bird-oid"
- Elaboration of a particle system simulation
- Each Boid is simulated independently
- Creates a "computer model of coordinated animal motion such as bird flocks and fish schools" – Reynolds





Separation



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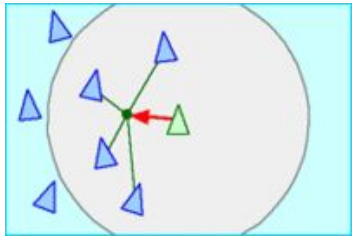


Cohesion

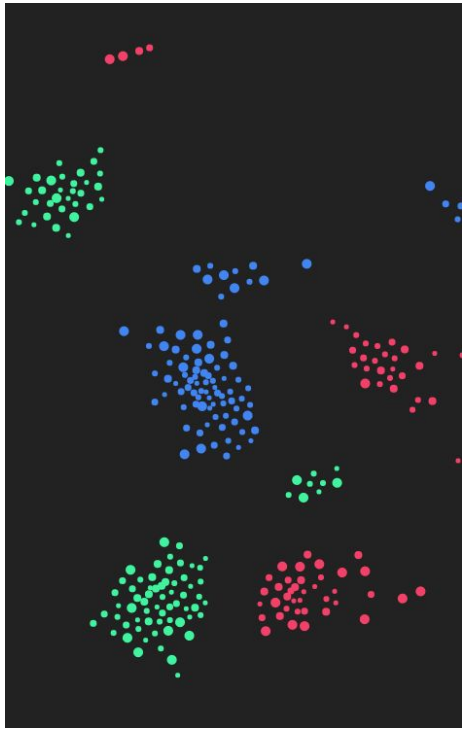
What makes a Boid work

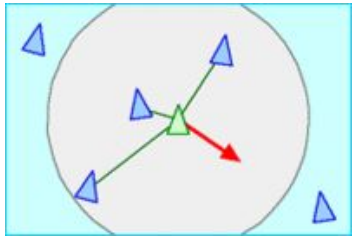
3 Main rules

- Separation – steer to avoid flock mates
- Alignment – steer to avg. direction of flock mates
- Cohesion – steer to center of flock mates

Additional Rules

- Collision Avoidance – steer to avoid obstacles
- Bias – gravitate towards their type
- Leadership – follow the Boid in front of it





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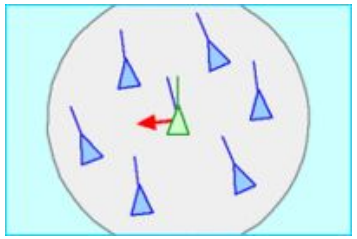
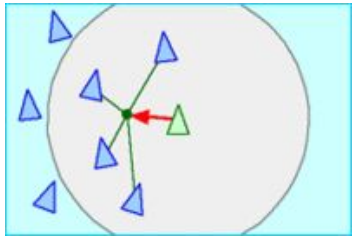


Alignment



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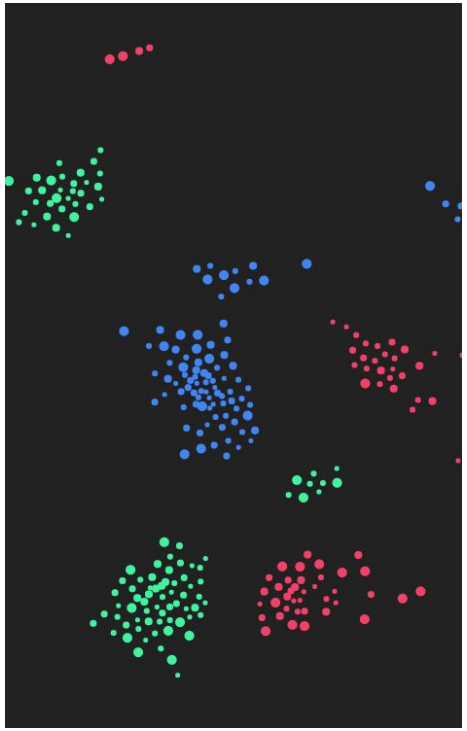
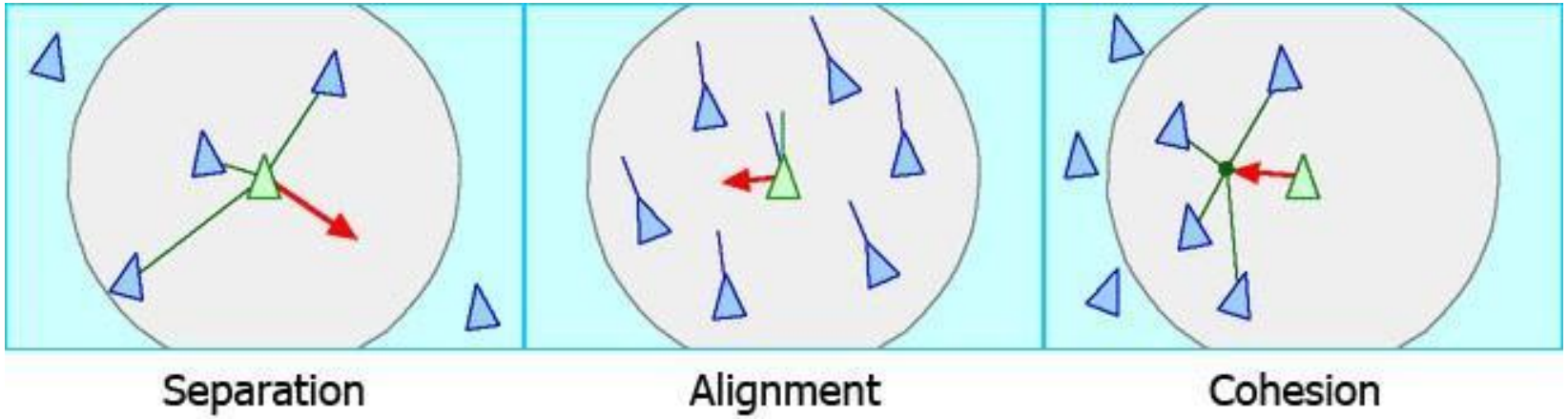


Milestone 1 (Complete)

- Project Setup
- Custom Shaders
- Simple Boid Logic (Movement, Rotation)
- Wall Boundaries

Milestone 2 (Complete)

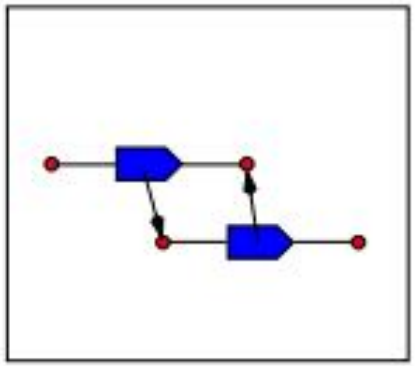
- Implement Boid Rules (Separation, Alignment, Cohesion)
- Add collision detection for boids (Walls, Objects)
- Create Boid Playground with many objects to navigate (cubes, Spheres, Torus, etc.)

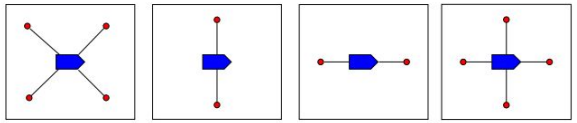


Milestone 3 (Complete)

- Add controls to change aspects of Boids
- Add additional Rules (Leadership, Swarms/Racism, etc.)
- Use a better Model for the boids

PROJECT DEMO





Future Work

– Add compute shader (for telling which boids are near each other)

– Implement a more animalistic flock formation (V-formation, torus, diamond, etc.)

– Add other formation options for the type of flock the boids will follow (fish, ants, locusts, etc.)

Sources

- Starling Flock Video - https://www.youtube.com/watch?v=V4f_1_r80RY
- Wikipedia page - https://en.wikipedia.org/wiki/Boids
- Original paper by Craig Reynolds: https://www.red3d.com/cwr/papers/1987/boids.html
- Youtuber that introduced me to boids: https://www.youtube.com/watch?v=bqtqltqcQhw
- Animalistic flocks: https://www.wired.com/2013/03/powers-of-swarms/
- Formation techniques: https://cobweb.cs.uga.edu/~maria/papers/icra-2000.pdf
- Implementation Design: https://jumpoffboids.netlify.app/