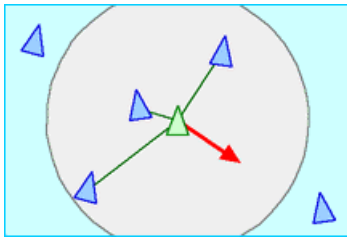


# Procedural Animations of Groups

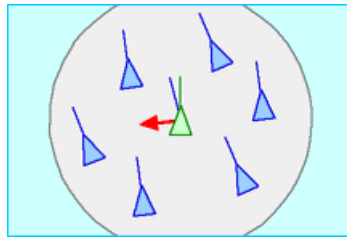
- Flocking behavior
- Swarm behavior
- Schooling behavior
- Crowd behavior

# Flocking Boids

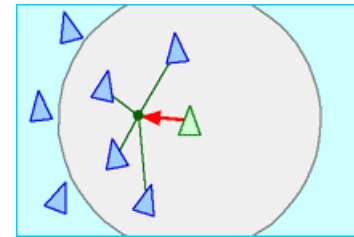
- Boids use a combination of three simple rules to produce complex flocking behavior



Separation: avoid colliding with local flockmates and obstacles



Alignment: match the average heading and velocity of local flockmates



Cohesion: move toward the centroid of local flockmates

- Each rule contributes a vector to a sum that gives the final movement vector
- First used commercially in *Batman Returns* for the bat swarm and penguin animations

COURSE: 07

COURSE ORGANIZER: DEMETRI TERZOPOULOS

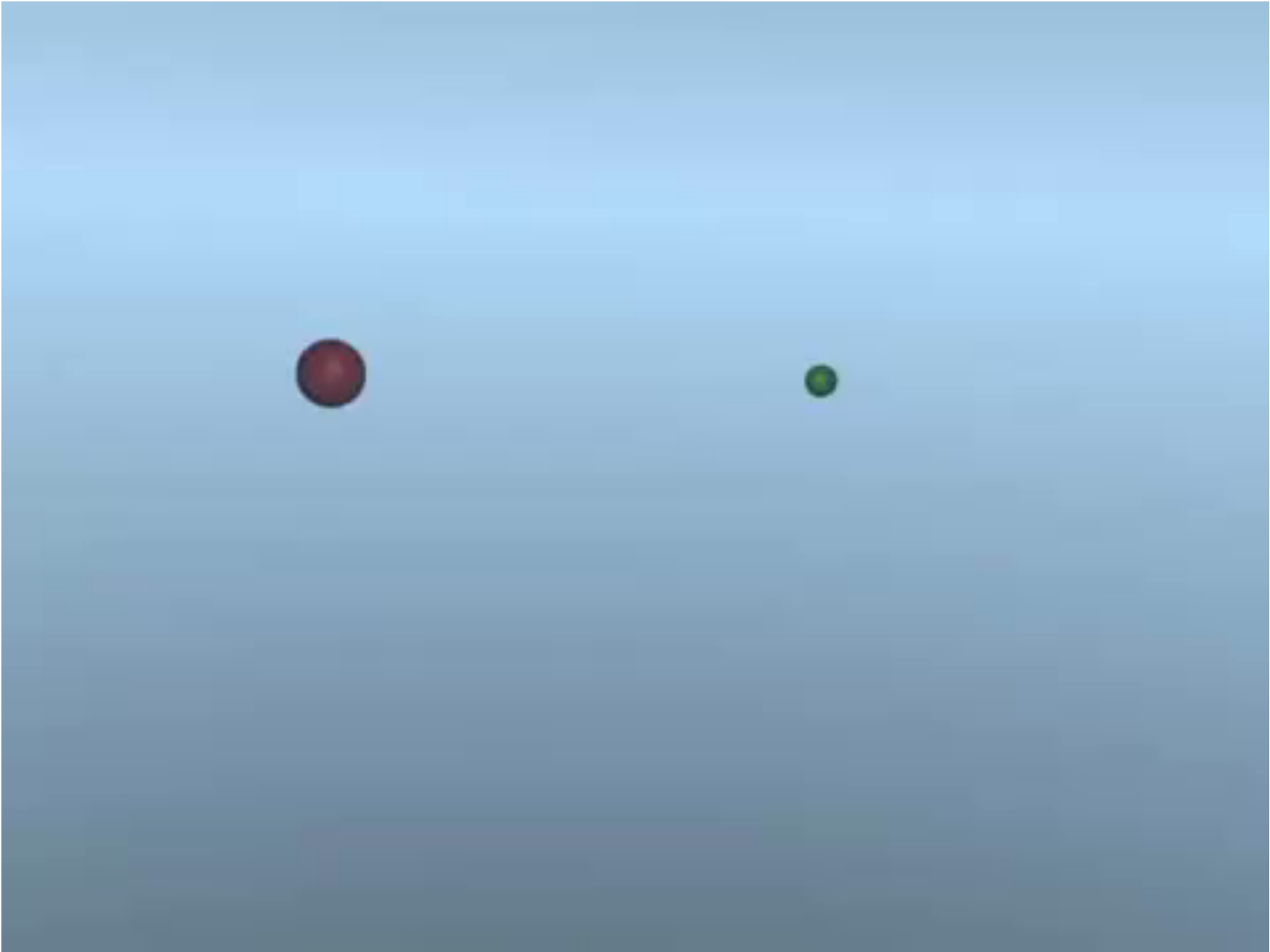
"BOIDS DEMOS"


CRAIG REYNOLDS

SILICON STUDIOS, MS 3L-980

2011 NORTH SHORELINE BLVD.

MOUNTAIN VIEW, CA 94039-7311





Flock simulation tests  
made using particles boid in Blender 2.48a

Enjoy it !

Dalai Felinto  
<http://blendercia.orgfree.com>

Also worked in this demo:  
Mike Pan  
<http://mikepan.homeip.net>

Mateus Machado (fish models)

# Flocking Boids

- Boid animations:
  - <http://www.vergenet.net/~conrad/java/Boids/example2.html>
  - <http://www.vergenet.net/~conrad/java/Boids/coogee.html>
  - <http://www.red3d.com/cwr/boids/>
- Boids are an example of *emergent behavior*: global behavior that results from local rules

# Aside: emergent behaviors

- Ant colony optimization
  - Ants wander randomly
  - Upon finding food, they return to the nest laying pheromones
  - Ants are more likely to follow pheromone trails
  - More ants traveling the path with food reinforces the pheromone trail
- Used for path-finding, TSP, other optimization problems
- An example of swarm intelligence
- <http://website.lineone.net/~john.montgomery/demos/ants.html>