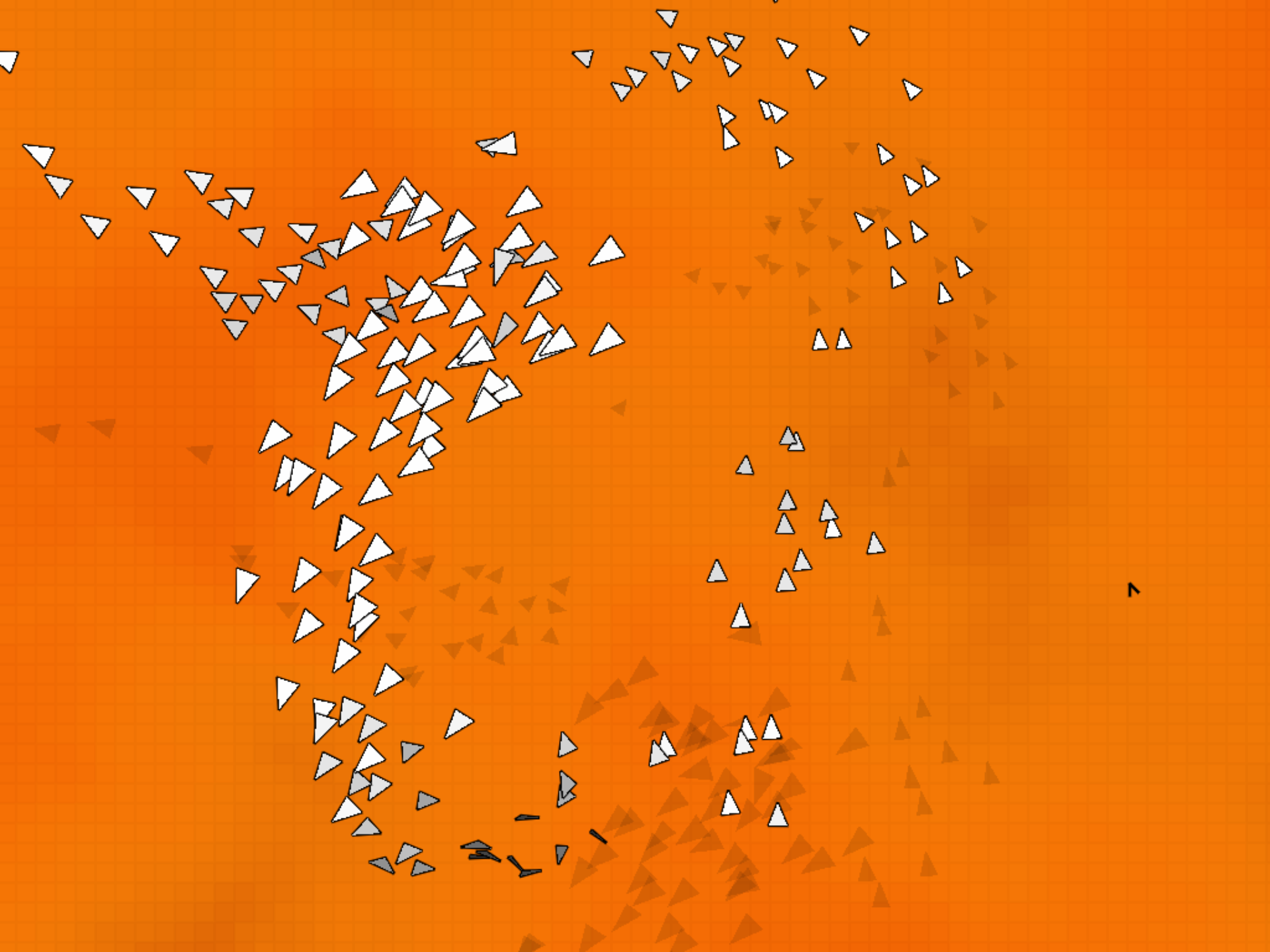
BOIDS

FLOCKING BEHAVIOUR



DEMO OVERVIEW

Basic flocking implementation

Obstacle avoidance

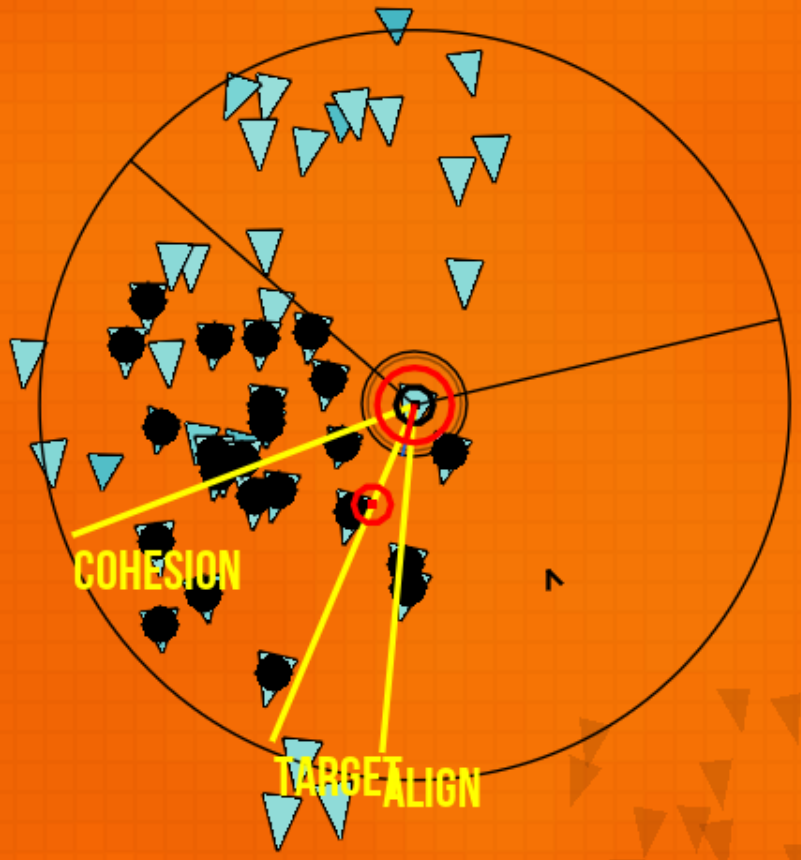
Modelling food sources

WHAT DO BOIDS DO?

Boids react to local flockmates

- Limited sight radius
- Limited field of view

SELECT A BOID TO VIEW IT'S LOCAL FLOCKMATES

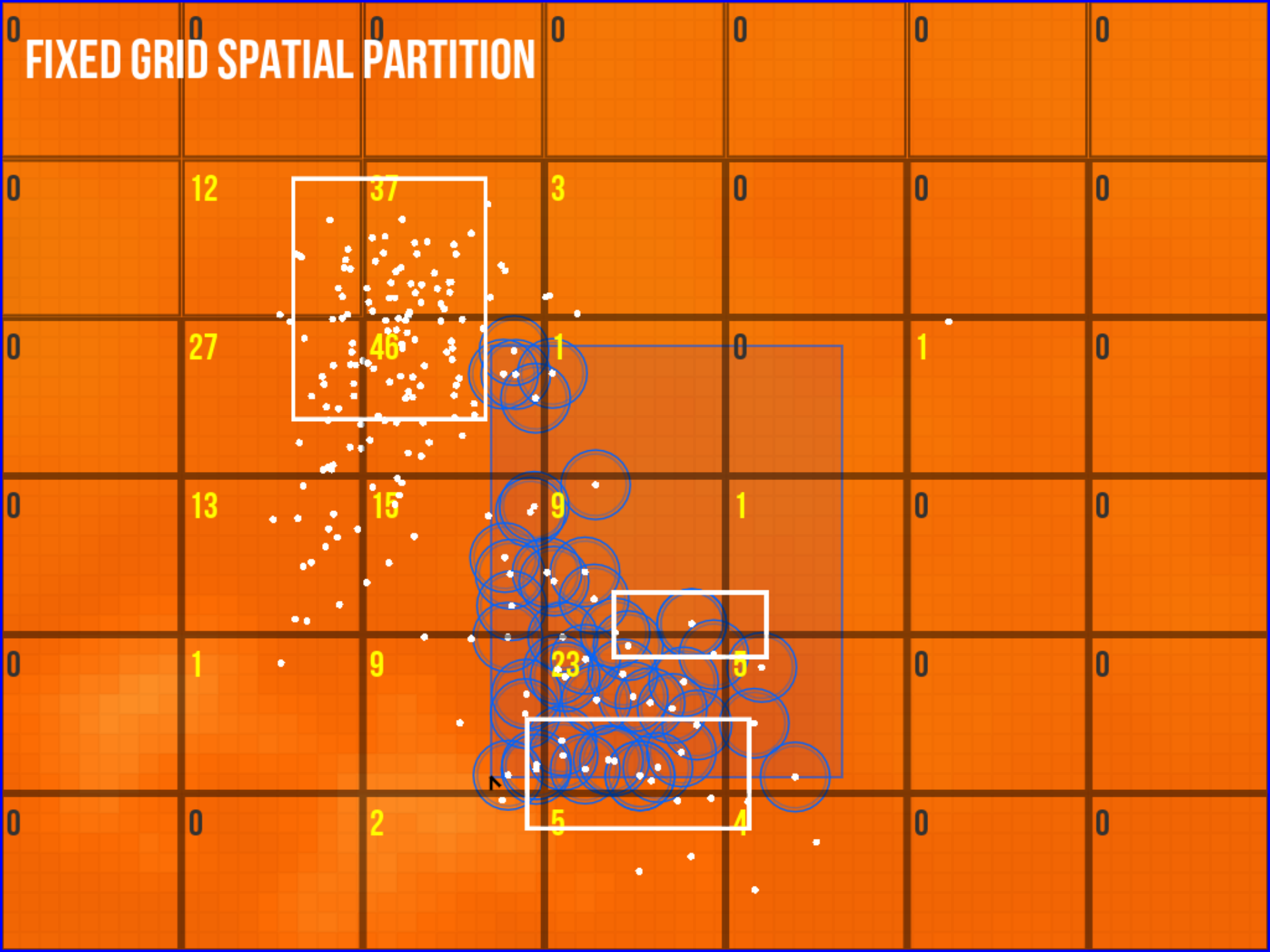


QUERYING FLOCKMATES

Every boid is aware of its neighbours

Naive solution runs in O(n^2)

Use 2D fixed grid spatial partition for fast neighbour queries


FIXED GRID SPATIAL PARTITION
0 0 0 0 0 0 0
0 12 37 3 0 0 0
0 27 46 1 0 1 0
0 13 15 9 1 0 0
0 1 9 23 5 0 0
0 0 2 5 4 0 0

BOIDS FOLLOW RULES

Each rule produces a vector

Sum rule vectors to create a target

Boids move towards their targets

ALIGNMENT RULE

Steer towards the average heading of local flockmates

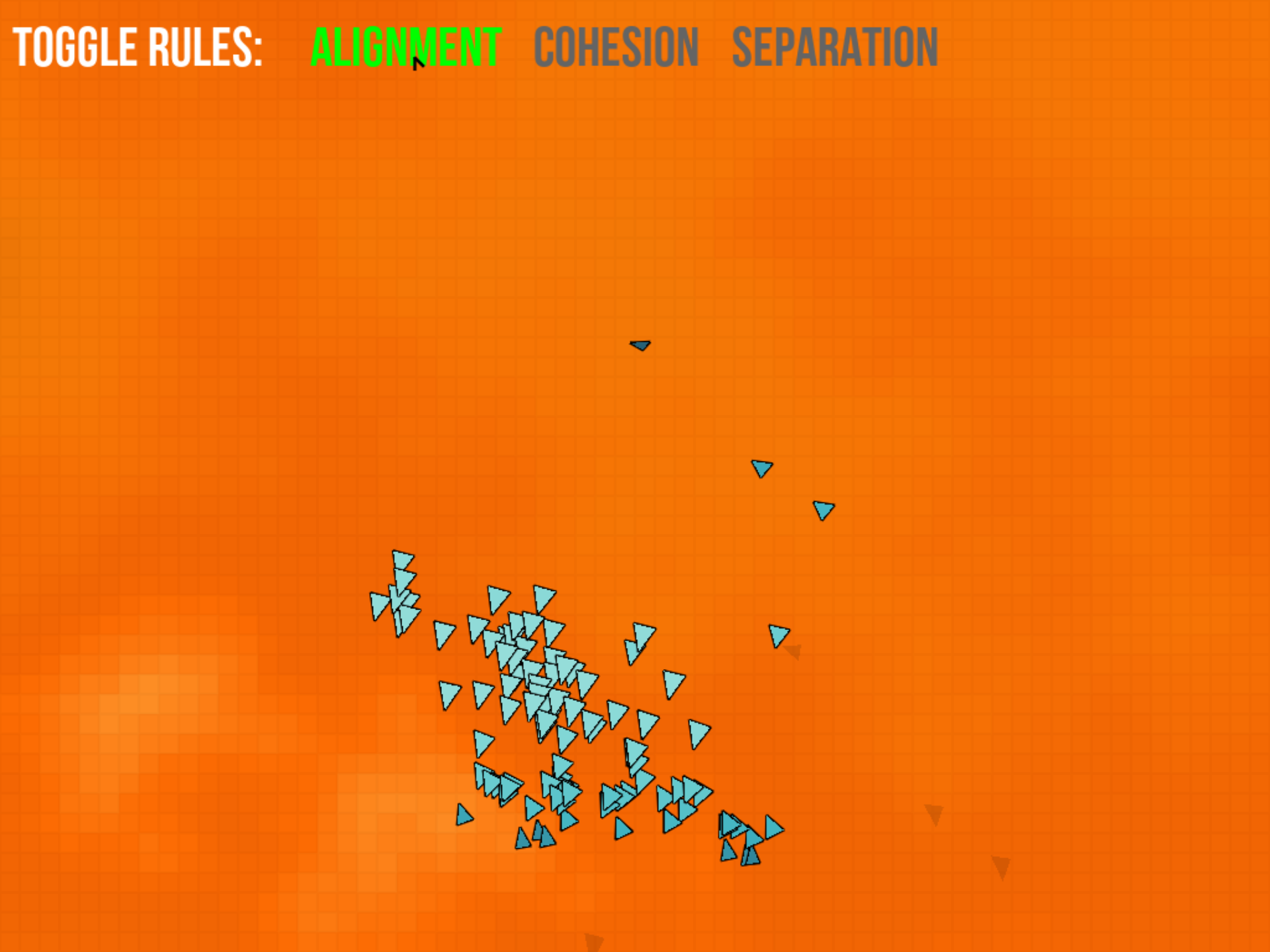
COHESION RULE

Steer towards the average location of local flockmates

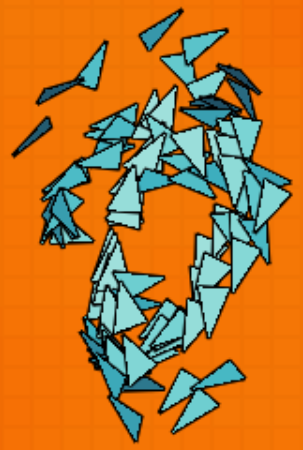
SEPARATION RULE

If local flockmates get too close, steer away from their average position

TOGGLE RULES: ALIGNMENT COHESION SEPARATION


TOGGLE RULES:
ALIGNMENT
COHESION
SEPARATION

TOGGLE RULES: ALIGNMENT COHESION SEPARATION



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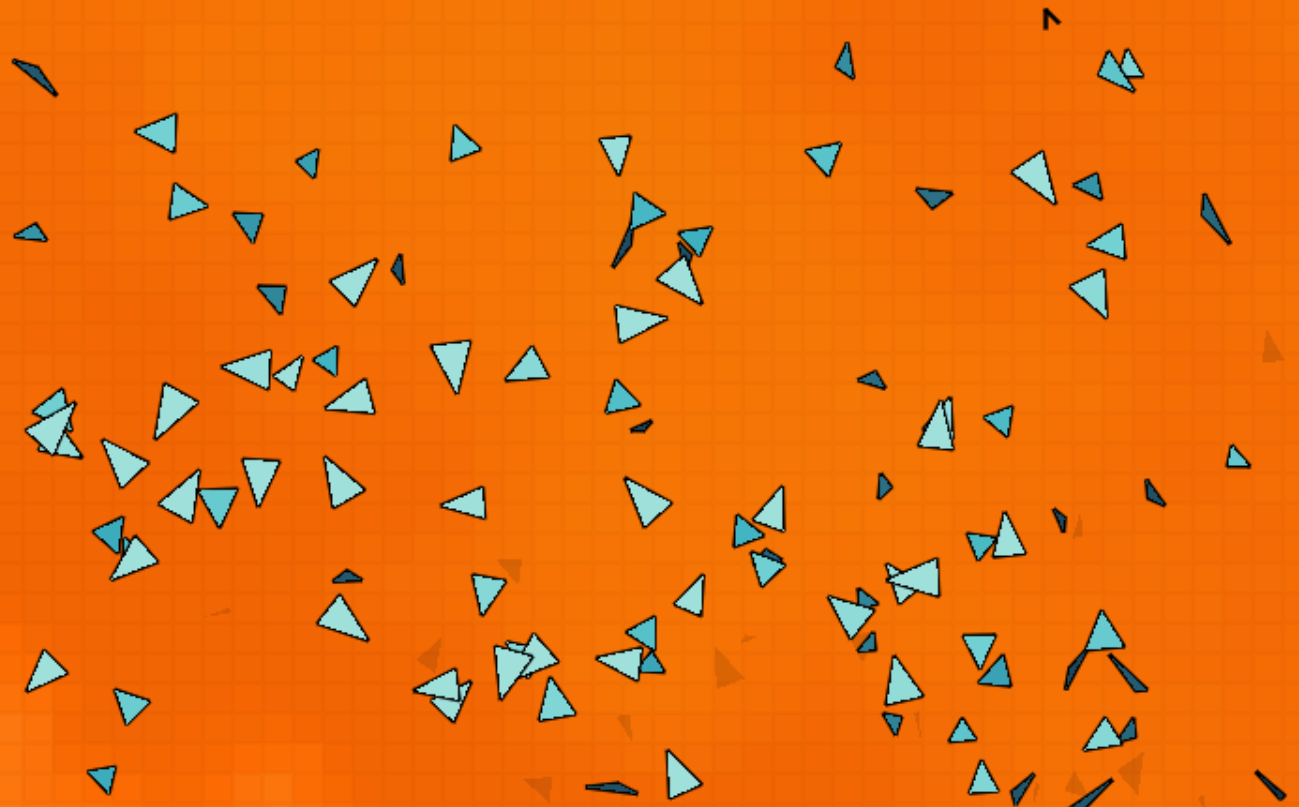

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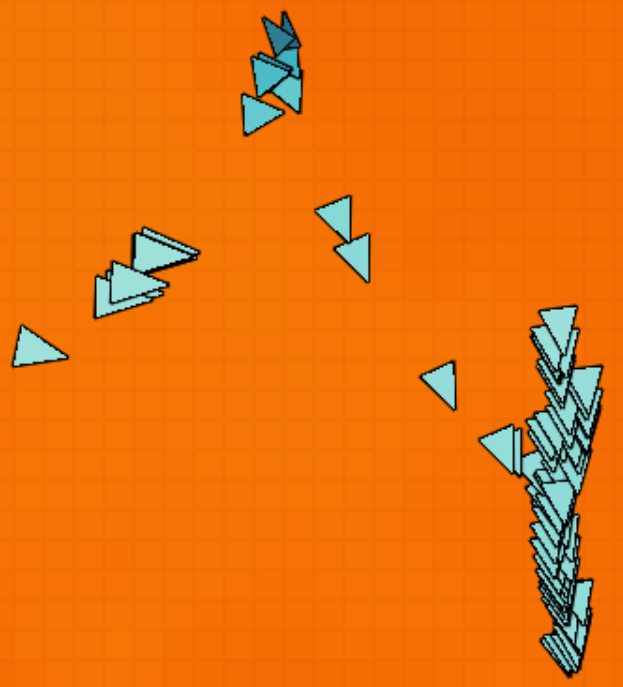

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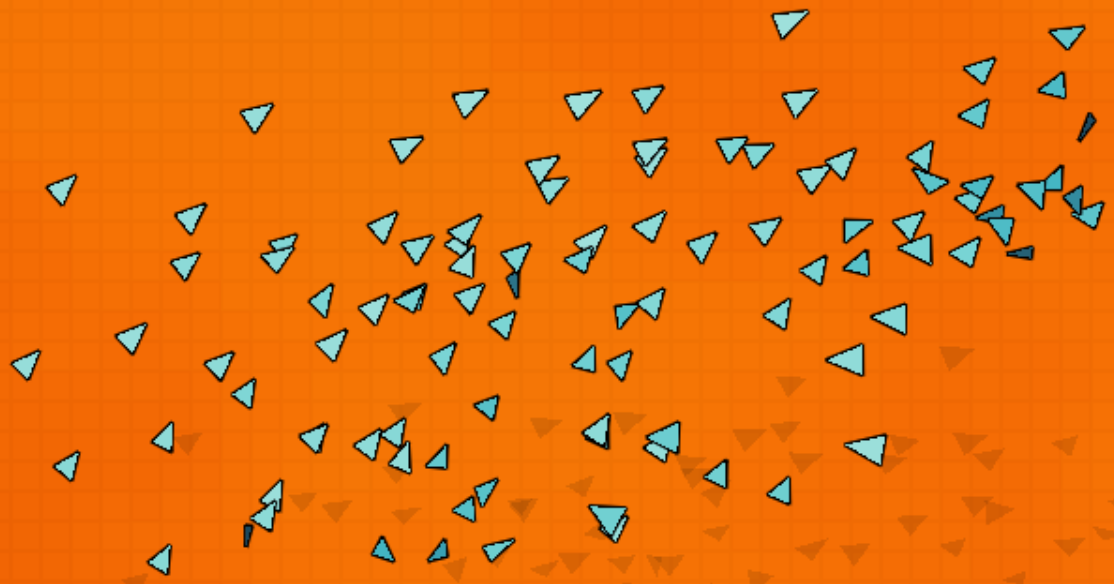
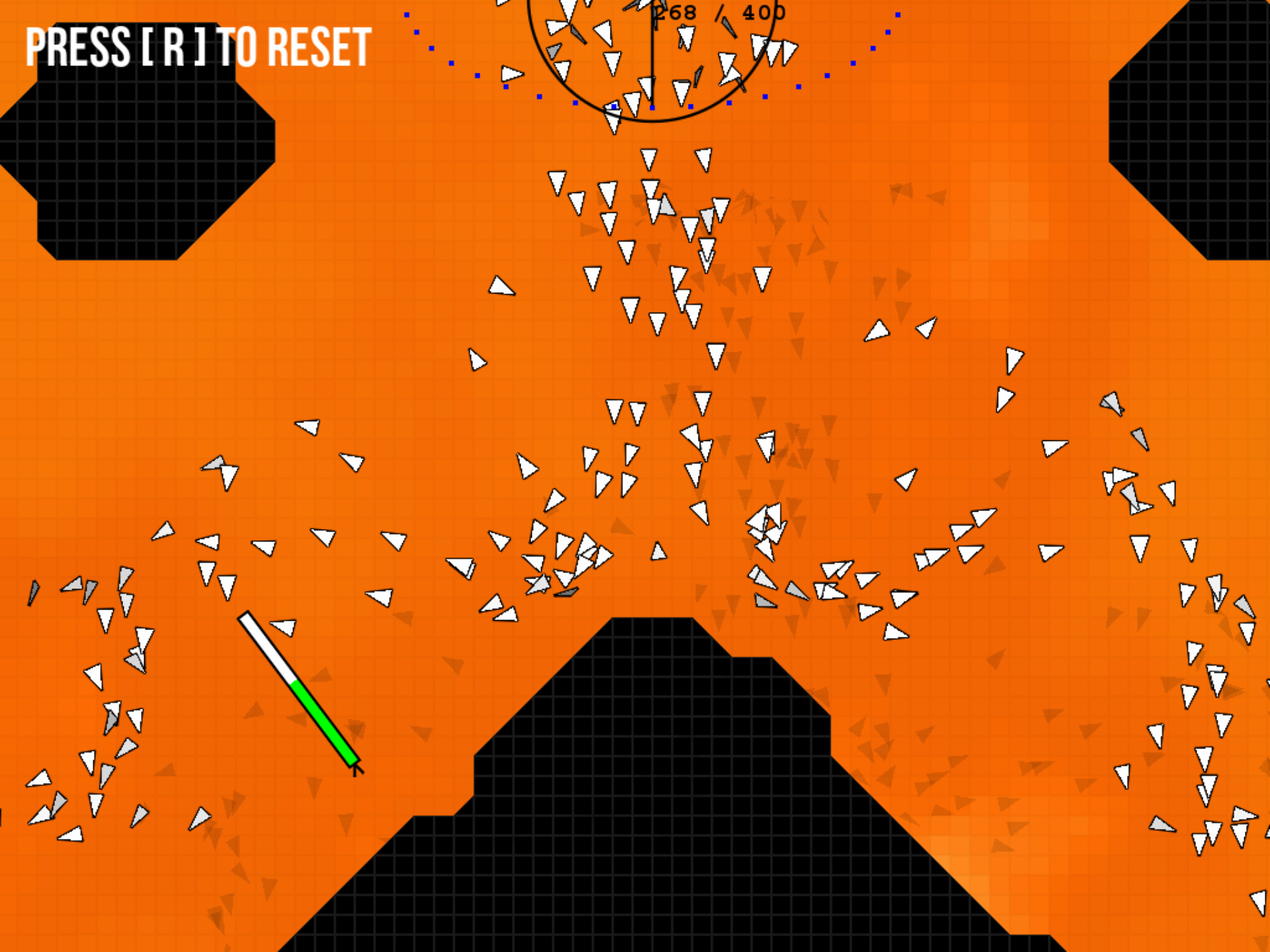


OBSTACLE AVOIDANCE

Create obstacles with implicit surface polygonizer

Field function values and normals aid boids in avoiding obstacles


PRESS [R] TO RESET
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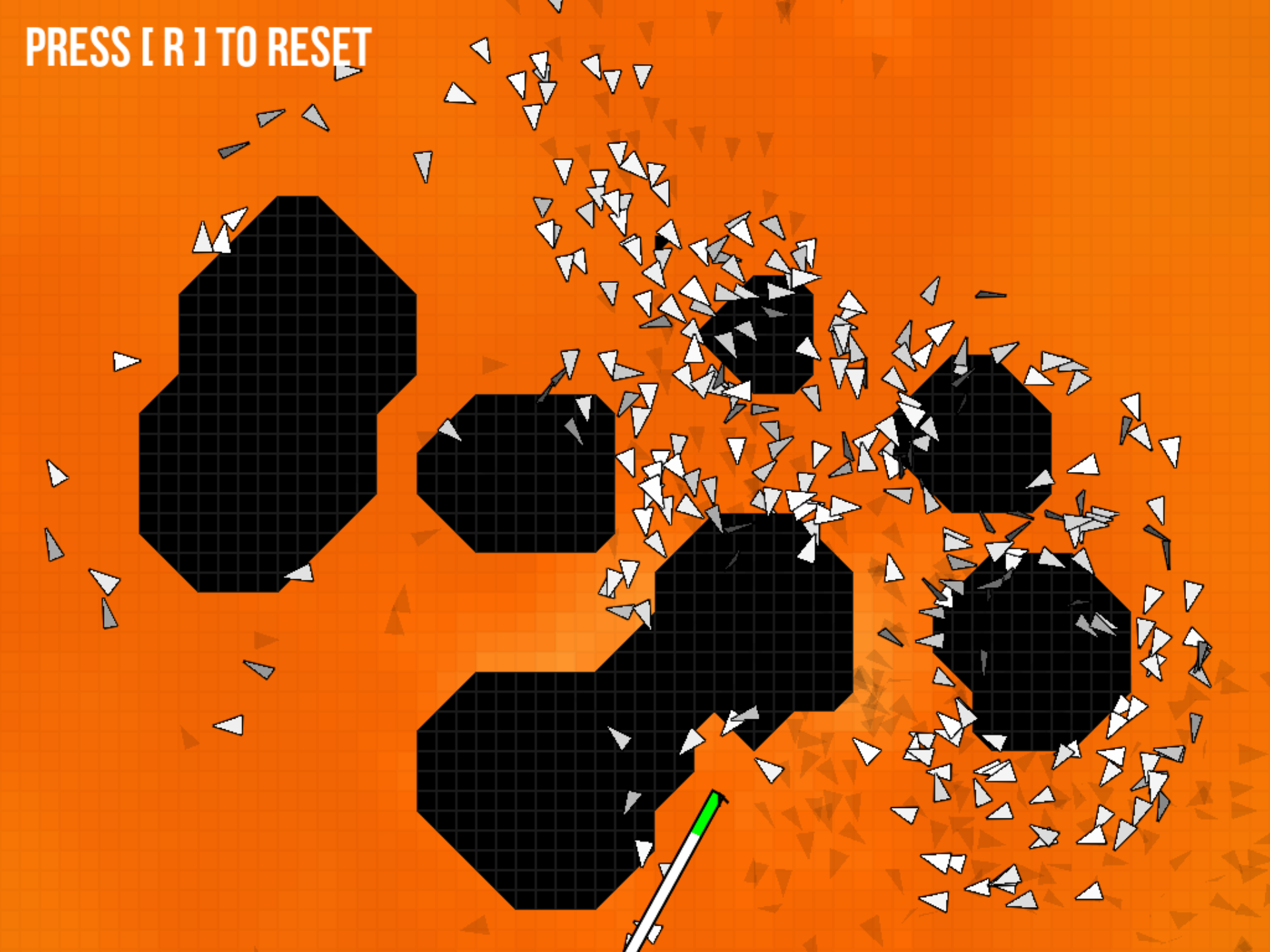
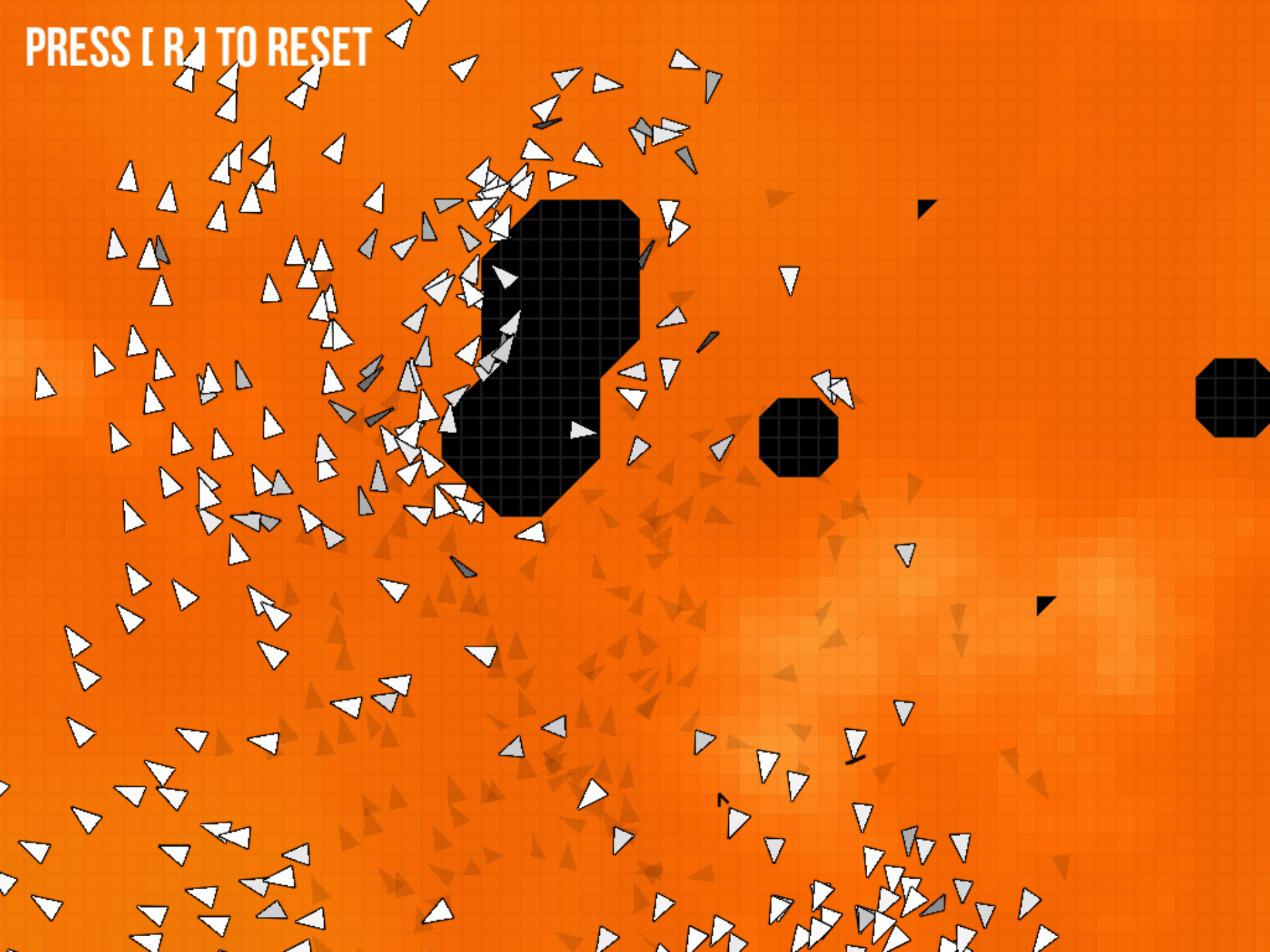
FOOD RESOURCES

Negate field function to draw boids into food source

Shrink radius of primitives as boids feast


PRESS [R] TO RESET


PRESS [R] TO RESET


PRESS [R] TO RESET

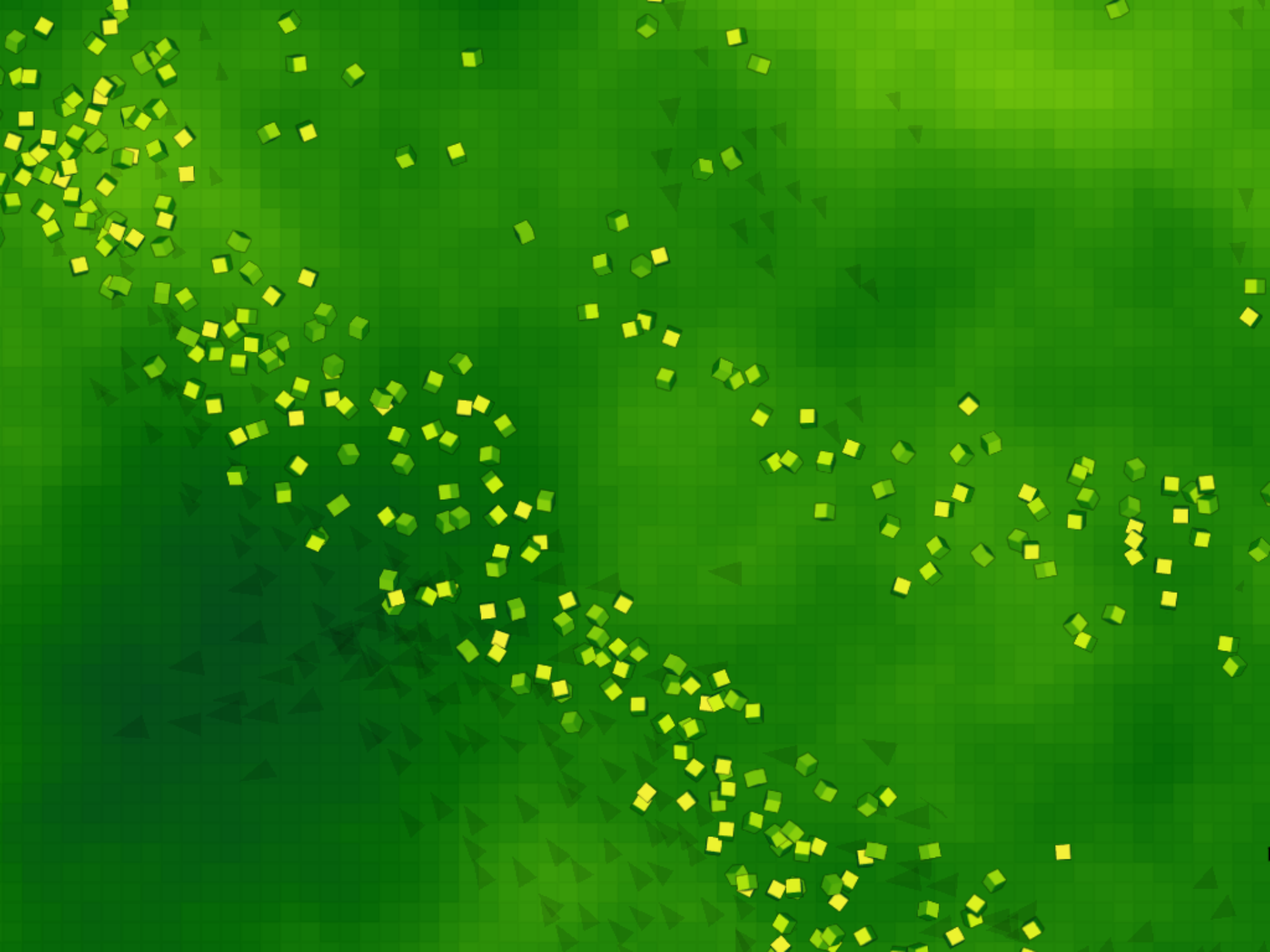
EXTRA FUN STUFF

Neighbour graph of a flock

TOGGLE RULES: ALIGNMENT COHESION SEPARATION

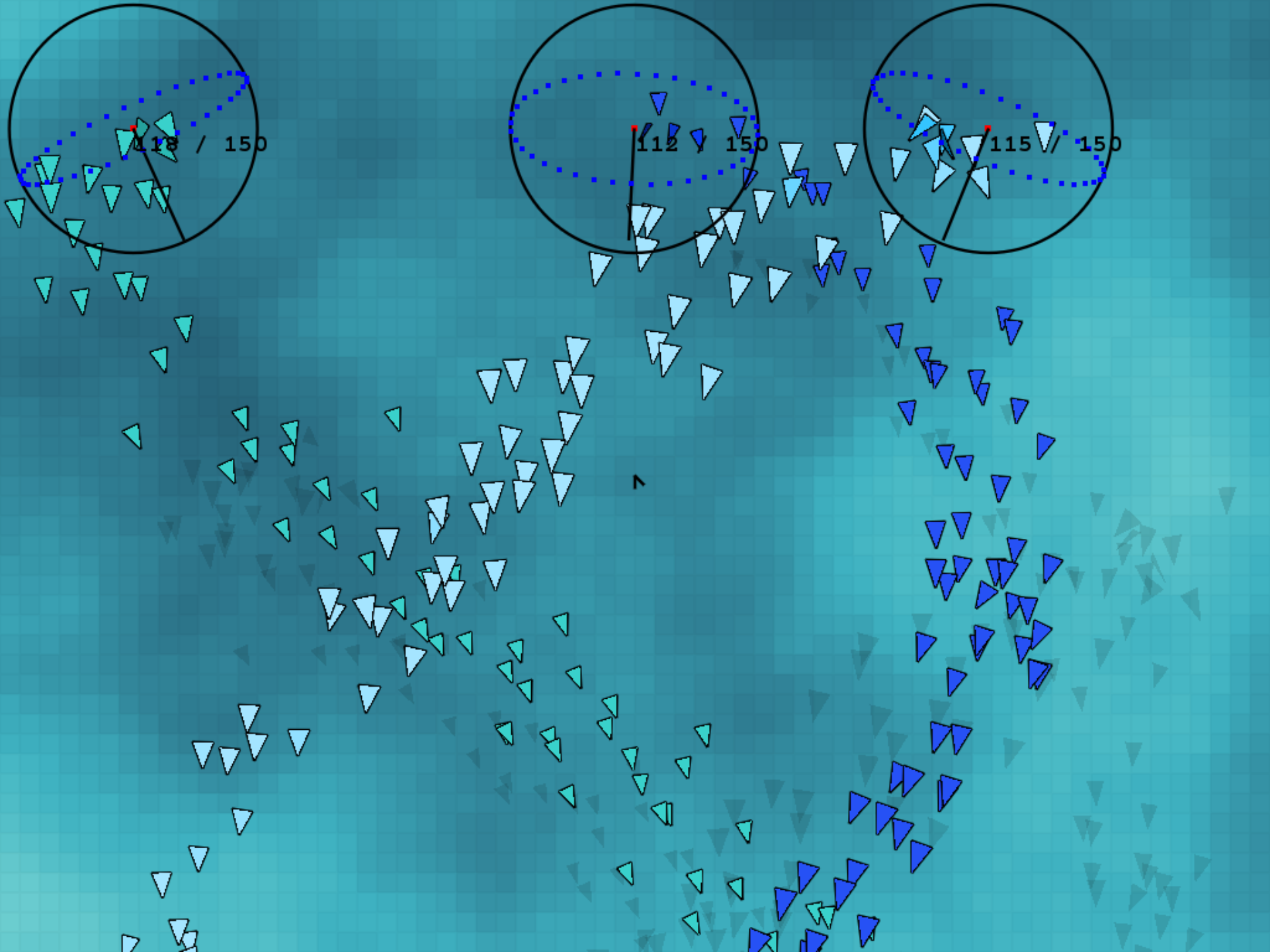
EXTRA FUN STUFF

Flocking cubes



EXTRA FUN STUFF

Boid emitters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