Boids Simulation Report

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**Observations of 10 Boids:**

As there are only 10 Boids, they are behaving in a more all over the place and unorganized manner. There is much more freedom in the movement of each boid which results in a weak dynamic as a group.

**Observations of 100 Boids:**

Now, as there are a lot more boids (100), there is a much more organized movement pattern between the boids. This behavior is consistent throughout the simulation.

**Observation of Separation & Cohesion:**

I noticed a weird dynamic in the movement as cohesion works against separation, the boids seem to be working to be grouped up together while at the same time trying to avoid collision so there is a little bit of “personal space” for the boids.

**Observation of Separation & Alignment:**

Boids concentrate on avoiding collisions while aligning with the average velocity of close neighbours by stressing separation and alignment. This leads to a trade-off between individual spacing and coordinated movement, resulting in unique flock trajectory patterns.

**Observation of Cohestion & Alignment:**

Keeping cohesion and alignment in mind highlights the relationship between keeping near to one another and taking a steady course. While alignment supports consistency in their heading, cohesiveness pushes Boids to stay close together. This combination a movement behavior kind of like a swarm.

**Explanation and Expectation of Modifications:**

To improve the adaptability and realism of the Boids simulation, obstacle avoidance and variable speed have been added. While variable speed adds a new element to their mobility, obstacle avoidance is designed to guide Boids away from impediments.

**Observations and Comparison of Modifications:**

We see Boids cleverly avoiding barriers in obstacle-avoidance simulations, which leads to more complex and adaptive collective behaviour. Variable speed additionally enriches the overall flock dynamics by introducing diversity in the individual velocities of Boids.