

I read the Nature of Code web-book and based my implementation on its logic. I built four simple behaviours: seek, arrive, wander, and containment.

Seek

1. A vehicle picks a position vector as a target.
2. We generate a desired vector based on our position vector, the target's position vector.
3. A vehicle has a velocity.
4. Our steering vector is the (desired vector – our current velocity).
5. We apply that steering vector to our vehicle.

Arrive

1. Similar to Seek but with one extra process.
2. We normalize the desired vector and then times it with a magnitude that is relative to the current distance between the vehicle and the target.
3. As we got closer to the target, we decrease the magnitude of the desired vector until it finally becomes zero when it arrived.

Wander

1. The vehicle generates a point within a specified distance and creates a circle with a specified radius on it.
2. We get a random point along the circumference of that circle.
3. We seek that point.

Containment

1. Set border coordinates.
2. If the vehicle position exceeds those border, reverse its velocity.

I built two complex behaviours: leader following and flocking.

Leader Following

1. Iterate through the vector of vehicles.
2. The first vehicle arrives at a moving target (a mouse, or in my case, a player character).
3. The rest of the vehicle arrive at the inverse velocity of the previous vehicle.

Flocking

1. Flocking contains three simple steering behaviours.
2. Separation: it calculates the amount of velocity each vehicle needs to stay away from other vehicles and set it as your desired vector. This velocity is the average of all the desired vector towards a point between each vehicle with another. It calculates that point by getting the vector from a vehicle that points away from another vehicle and then weighted that vector by dividing it by specified magnitude.
3. Cohesion: Get the average position of each vehicle and steer towards that position.
4. Alignment: Get the average velocity of all vehicles and steer towards it.