Vectors & Boids

use artificial life program to simulate animation of the nature phenomenon

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Vectors in Mathematic:

- Vector includes two parts: direction and size.
  Example: (3,-4)

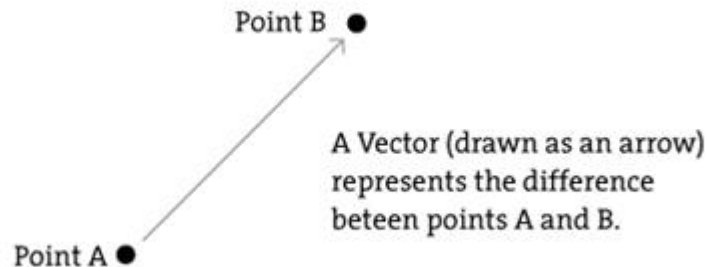- Basic operation: add(+): (3,-4)+(5,6)=(8,2)

  substract(-): (8,2)-(5,6)=(3,-4)

  multiply(*) and divide(/)

- Methods in Processing

http://processing.org/reference/PVector.html

Vector

- The most basic building block for programming motion is the ***vector***.

- A vector is used to describe an organism that transmits infection from one host to another.

Point B ●

A Vector (drawn as an arrow) represents the difference beteen points A and B.

Point A ●

A vector is a collection of values that describe relative position in space

Example :Parabola motion

- PVector pos = new PVector(30,300);
- PVector vel = new PVector(4,-5);
- PVector gra = new PVector(0,0.1);
- void setup(){
- size(800,800);
- }

- void draw(){
- background(0);
- pos.add(vel);
- vel.add(gra);
- rect(pos.x,pos.y,30,30);
- }

Boids(flocking)
by Craig Reynold's

- **Boids** is an artificial life program, developed by Craig Reynold in 1986, which simulates the flocking behavior of birds.

- His interests center around using computer programs to simulate complex natural phenomenon

- Each boid steers itself based on rules of separation, alignment, and coherence.
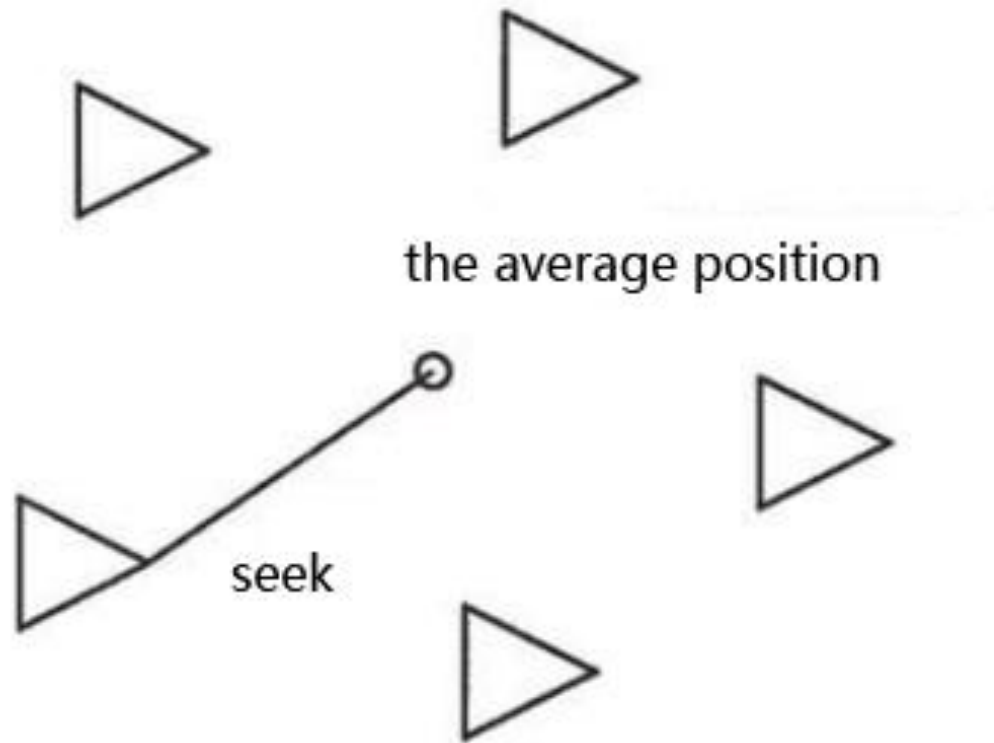
Steering behaviors
complex behaviors

steer to avoid crowding

too close to flockmates
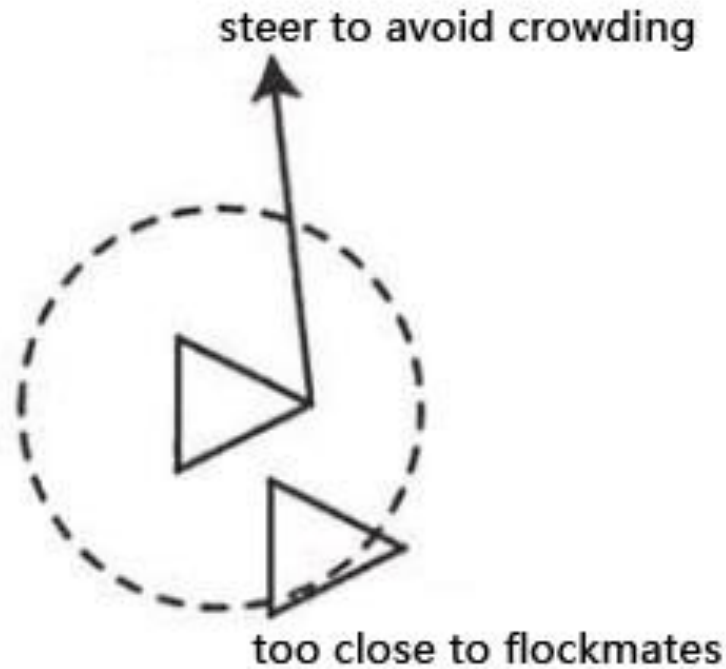
- **Separation**: steer to avoid crowding local flockmates

steer towards the average heading
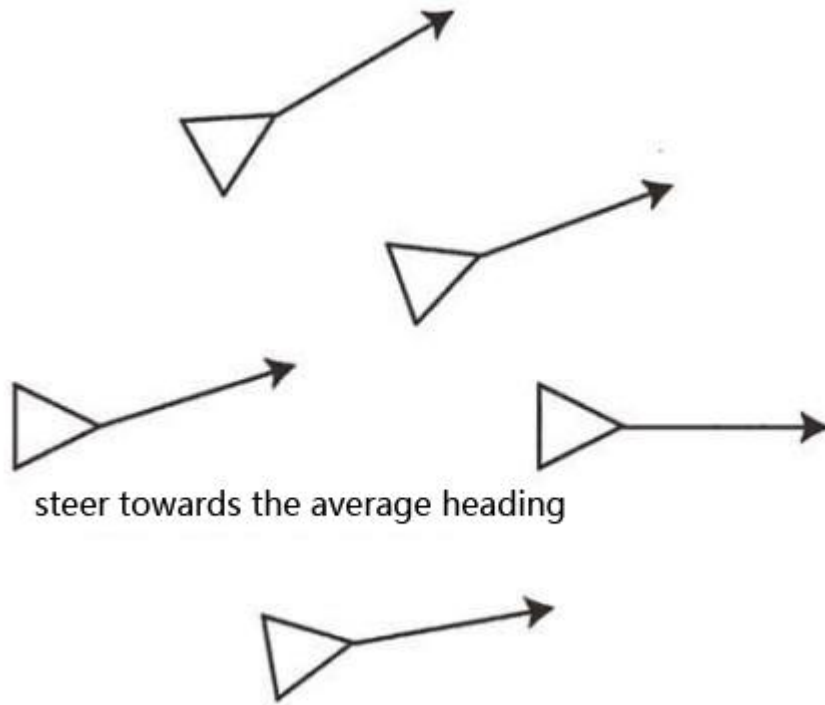
- **Alignment**: steer towards the average heading of local flockmates

the average position

seek

Cohesion: steer to move toward the average position of local flockmates