

DATT 2040

Math Code Art

General lab format

9.30 - Arrival and 15 minutes of set up/wake up. Lab delivery will start at 9.45 so make sure you are here and ready to go for 9.45.

9.45 - lab content delivery.

10.30 - break.

10.45 - Working on lab projects and weekly sketch assignments. Make sure to use this time to work on projects and understand the material from lecture and lab. I am here to chat, explain things and support you so **ask questions and ask for help!**

Emergence

In our next lab we will be thinking about motion, vectors, and emergent systems. Think about

- An emergent property that you notice in your day to day life. Some examples [here](#)
- What we need to create an emergent system?
- A lot of the examples we have seen of emergence are maximal (lot's of components). Can we have minimalistic emergent systems? Think about what this might look like.

To lab bring.

- Yourself
- Laptop

Before next lab:

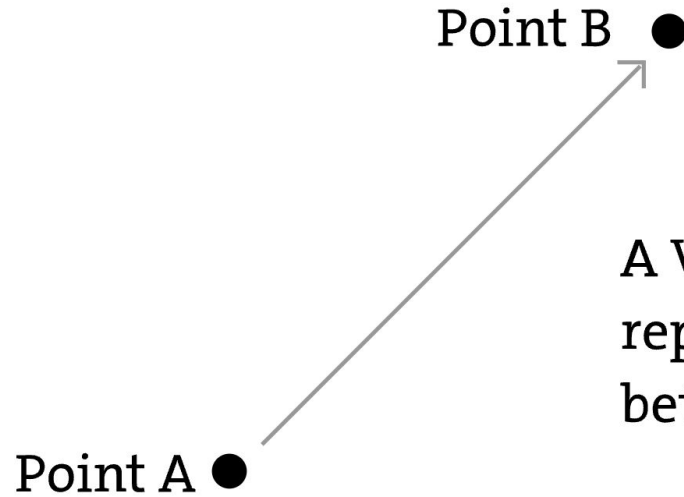
Watch this short minute video on [modulo](#) and [read this chapter on Generative Art](#) – we'll be having our first take home quiz on Friday (you will have 1 week to complete). There will be questions on week 1 lecture material, modulo and grids.

Aside from that modulo is a super useful and effective tool in our creative coding toolbox!

In today's lab we will be looking at creating motion in Processing with the PVector class.

We will start off by creating a single PVector and investigating the functions built into the PVector class.

We'll start adding more PVectors to see how several agents can interact with each other and finish by creating an array of PVectors that can interact with each other.



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

Methods

`set()`

`random2D()`

`random3D()`

`fromAngle()`

`copy()`

`mag()`

`magSq()`

`add()`

`sub()`

`mult()`

`div()`

`dist()`

`dot()`

`cross()`

`normalize()`

Example 1

PVector as position

Example 2

Movement and boundaries

Exercise 1.1

Take **5 minutes** to read through the [PVector reference](#).

Select **3 methods** that you find appealing. If you have time click on your chosen methods and take a closer look at their reference pages.

Exercise 1.2

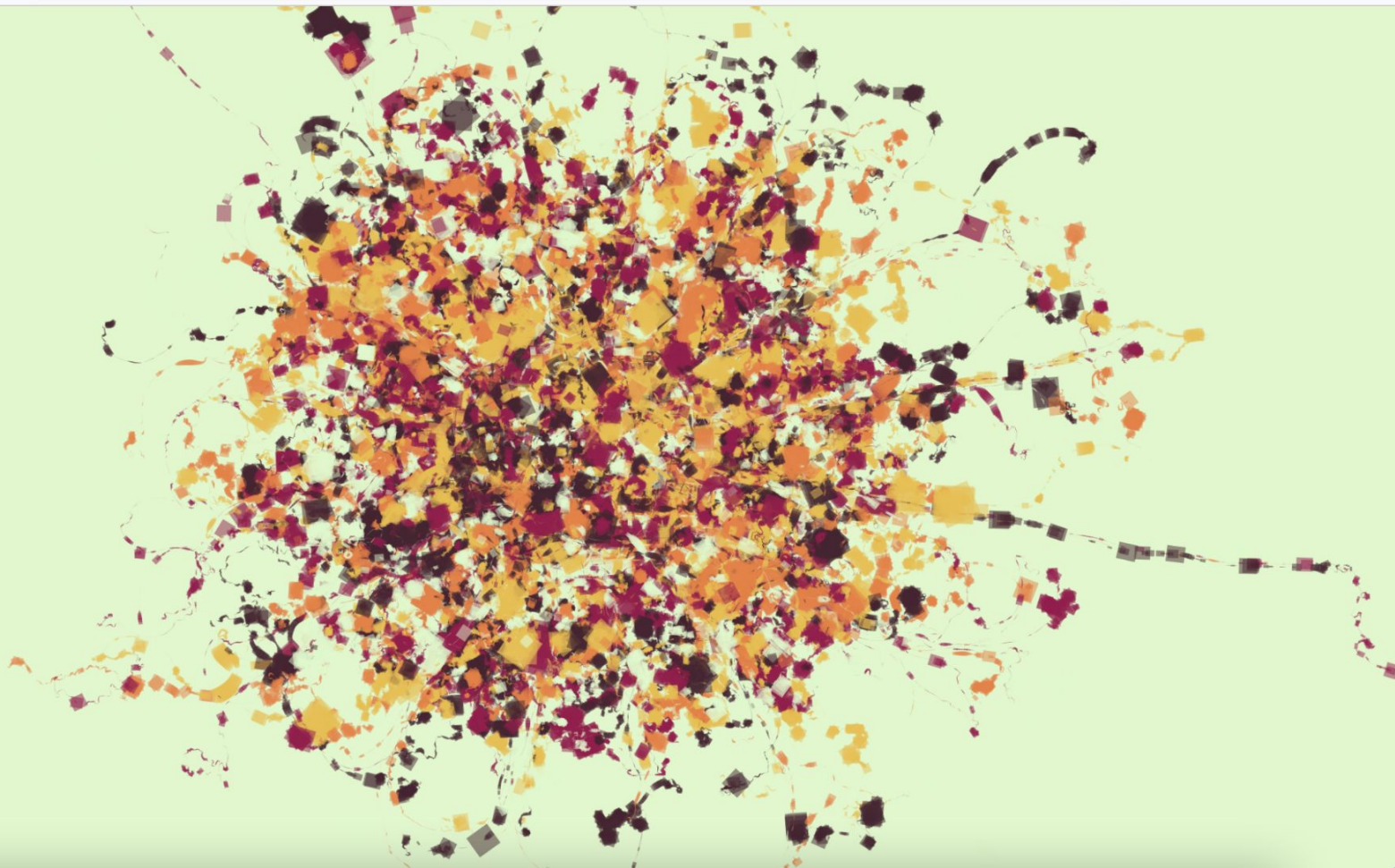
Select **3** PVector methods and try and implement them in the code we just wrote in lab.



color-wander.surge.sh



SEED — 735013
TAP TO RANDOMIZE



Pvector_distance_edge_ Processing 4.0b8

▶ ◻

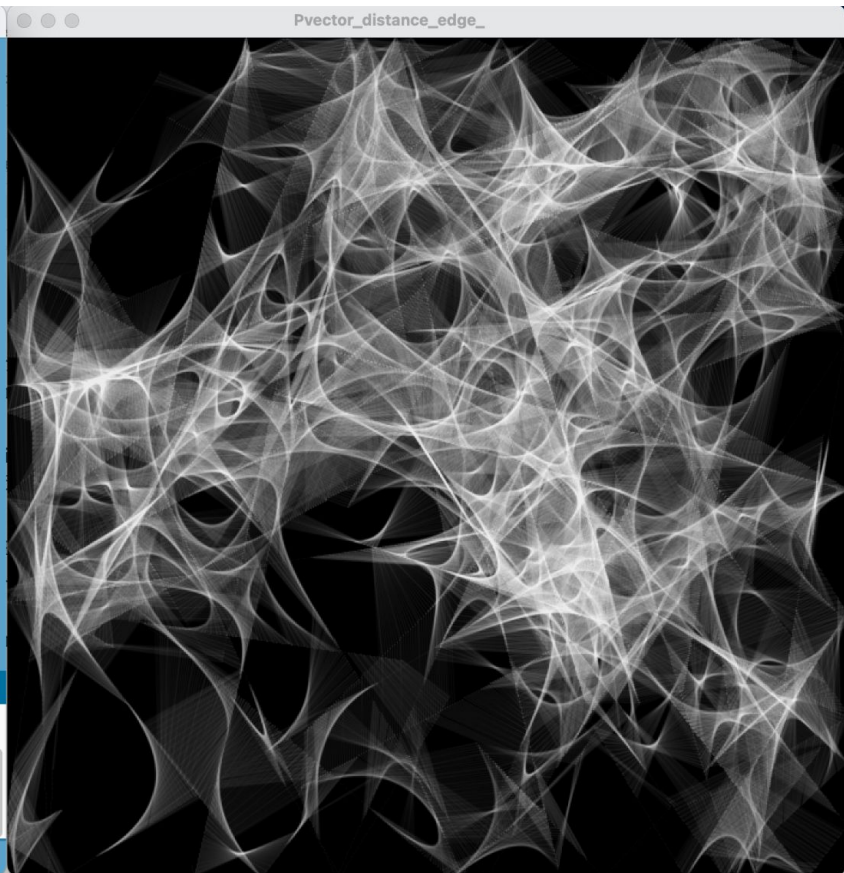
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Pvector_distance_edge_ ▼

```
1 PVector[] sp;  
2 PVector[] acc;  
3 int num = 50;  
4  
5 void setup() {  
6   size(700, 700);  
7   sp = new PVector[100];  
8   acc = new PVector[100];  
9   for (int i = 0; i < num; i++) {  
10    sp[i] = new PVector(random(width), random(height), random(5, 70));  
11    acc[i] = new PVector(random(-2, 2), random(-2, 2), 0);  
12  }  
13  stroke(255);  
14  noFill();  
15  background(0);  
16 }  
17  
18 void draw() {  
19  
20   //background(0);  
21   stroke(255,7);  
22  
23   for (int j = 0; j < num; j++) {  
24     sp[j].add(acc[j]);  
25  
26     if ((sp[j].x > width) || (sp[j].x < 0)) {  
27       acc[j].x = acc[j].x * -1;  
28     }  
29   }
```

⌘ ◀

▶ Console ⚠ Errors Updates 1

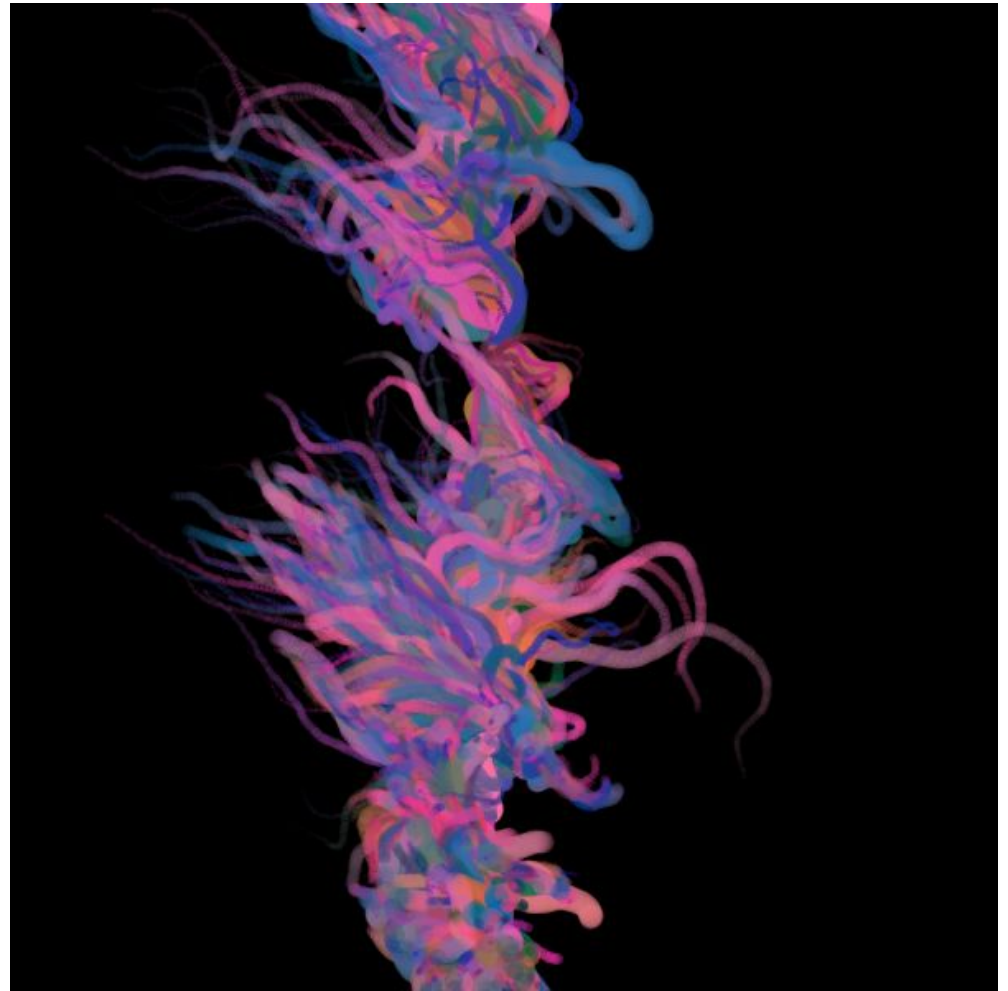
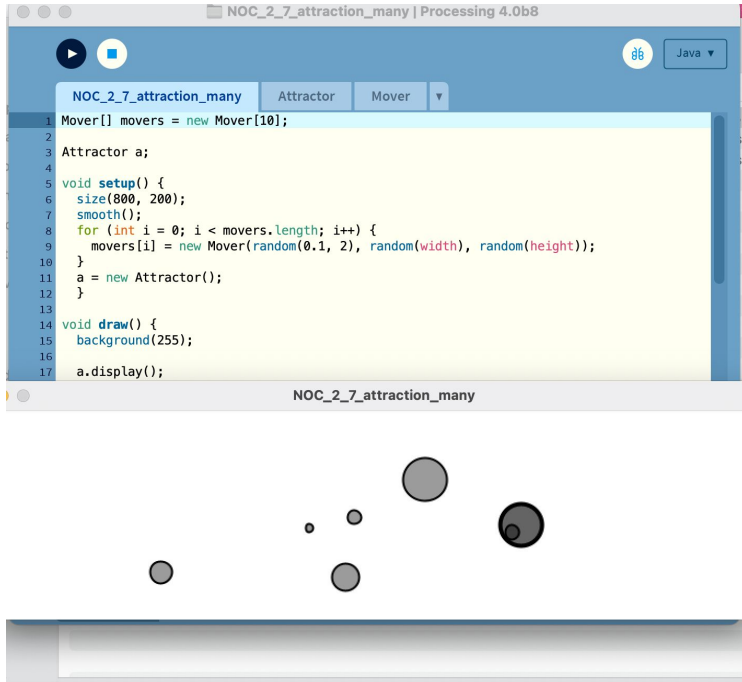


Example 3

A PVector array

(if there's time we will add interaction)

Examples and Case study



Homework

Make a creative sketch that is based around motion with [PVectors](#).

You must have at least 3 visual elements controlled by PVector, There is no limit so if you want to create lots of PVector elements go for it!

You must utilise a minimum of 2 PVector methods and a maximum of 5. Some can be obvious **add**, **sub**, **mult** etc... but also try and incorporate some less obvious methods - **dot**, **cross** and **lerp** could be interesting!

You will have one week to create a sketch. If you have lots of ideas you can try making multiple versions. Be as creative as you like and feel free to experiment!

Comment your work as much as possible.

If you want to save image outputs from your code take a look at [save\(\)](#) and [saveFrame\(\)](#) they are your friend.

[Submit](#) a PDF linking to your uploaded sketch on your Github account.