Creative Technology Lab

Introduction to Creative Coding

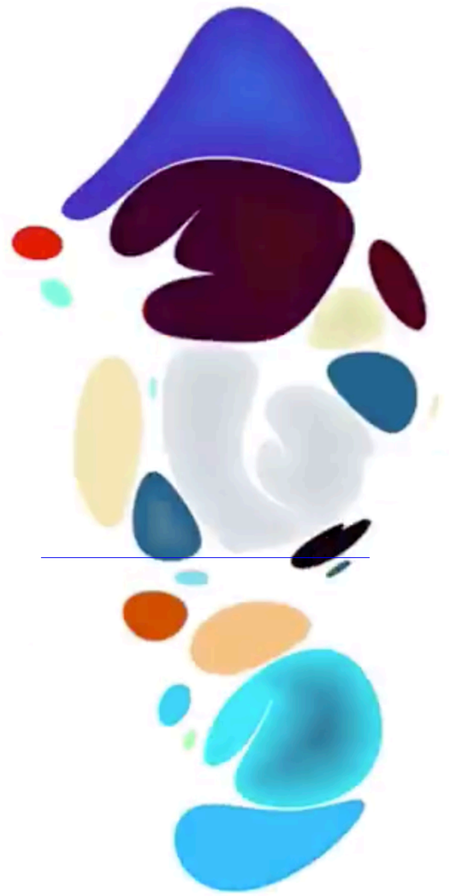
https://bit.ly/2SFKF98

Agenda

- What is Creative Coding
- What is P5.js
- Functions
- Program structure
- Variables
- Conditionals
- Loops

What is Creative Code?

Creative coding is an expressive approach to programming used to create experimental interfaces, interactive art installations, and live visuals.

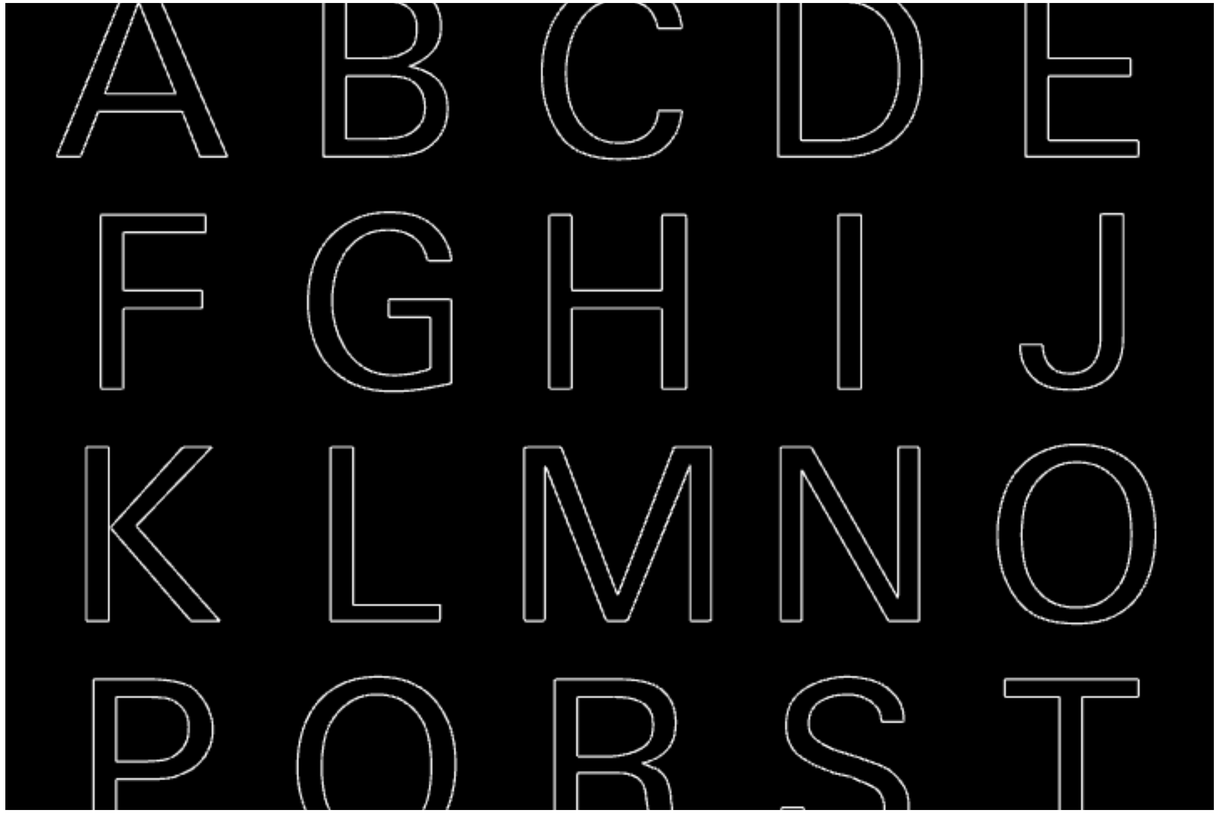


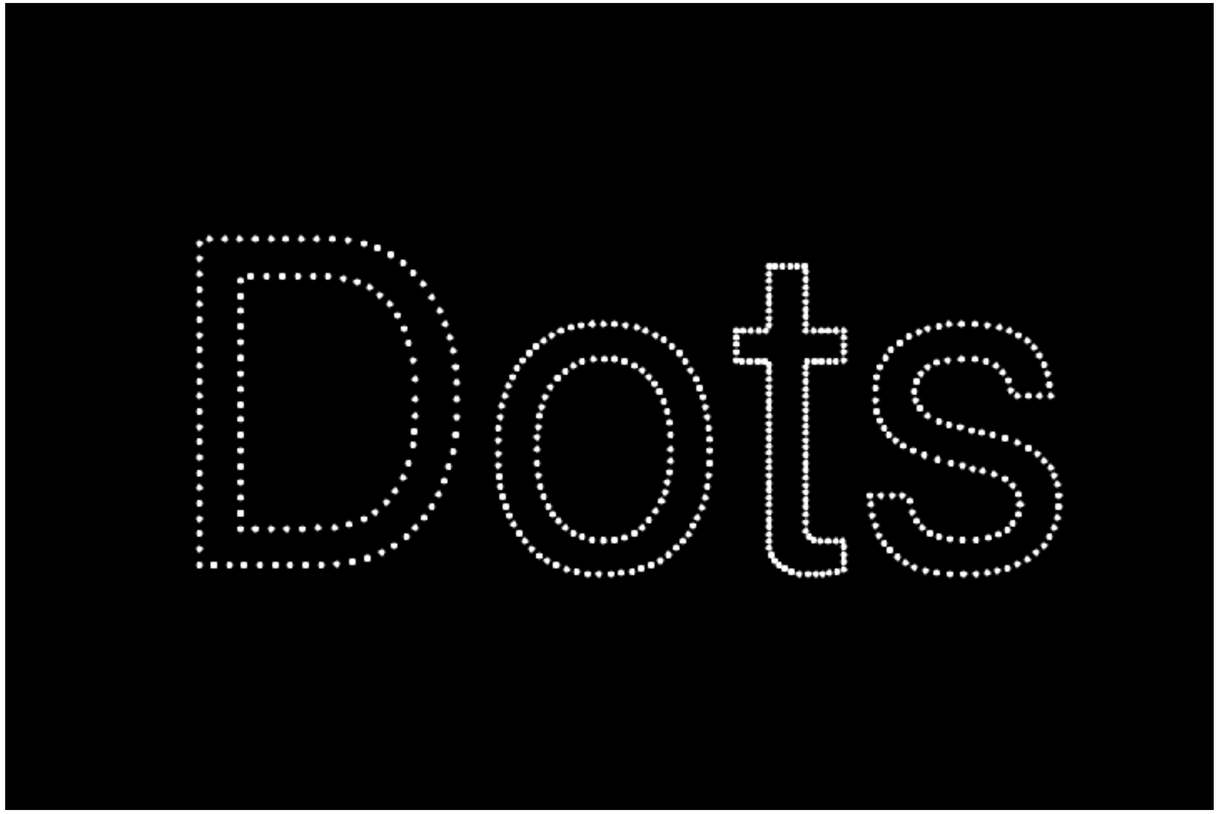
https://www.instagram.com/zach.lieberman/?hl=en

https://www.instagram.com/p/Bw3Eg9dja5x/

Nervous Systems - Kinematic Dress

https://n-e-r-v-o-u-s.com/projects/sets/kinematics-dress/





https://www.instagram.com/laurent.malys/

Border Tuner / Sintonizador Fronterizo

https://www.lozano-hemmer.com/artworks/border_tuner__sintonizador_fronterizo.php

Tools

- P5.js
- Processing
- Open Frameworks
- Max
- VVVV
- Pure Data
- Touch Designer

JavaScript

Tool

What is P5.js?

Community

Library

https://editor.p5js.org

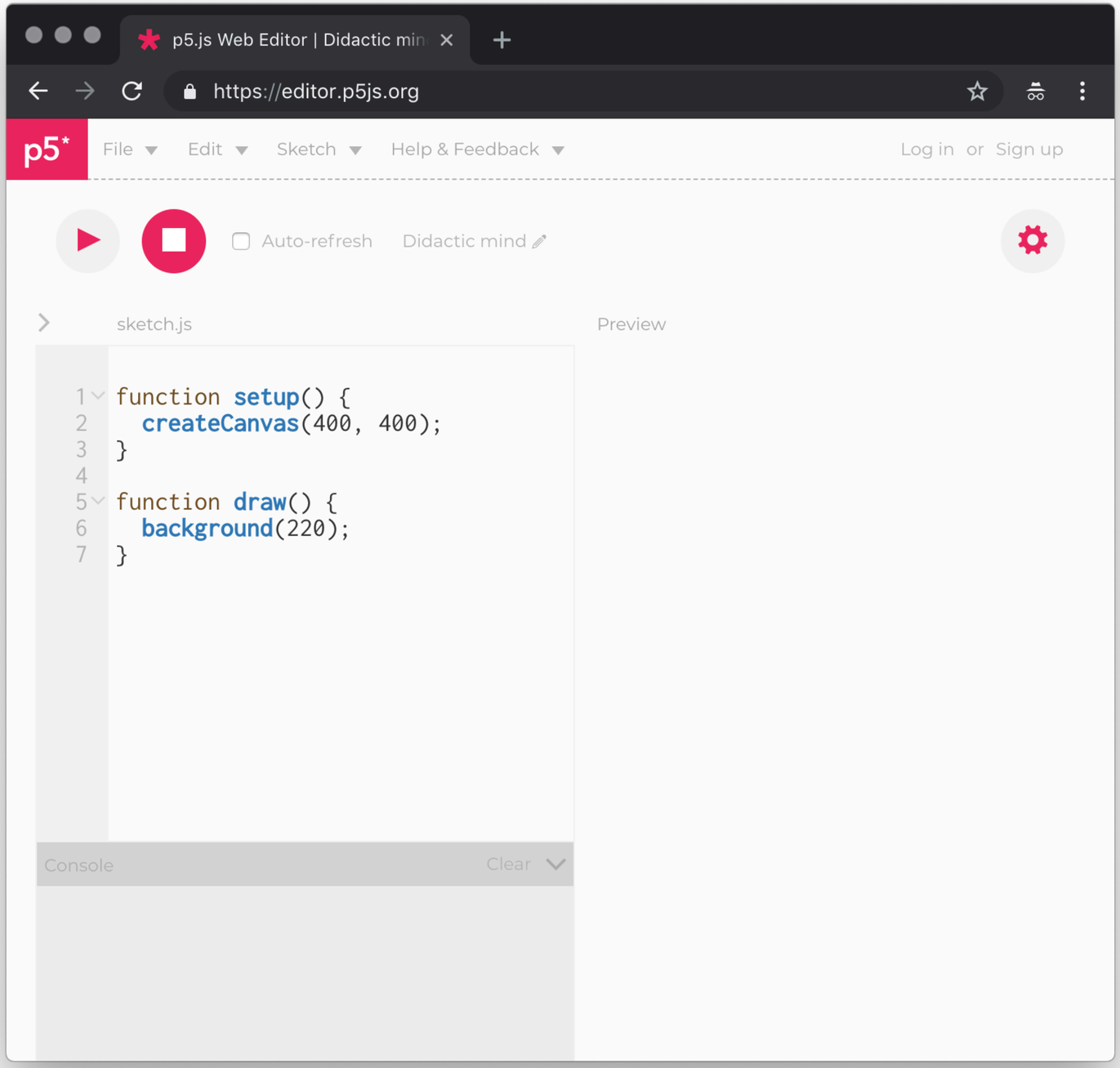
Please use Google Chrome not Safari

It is already installed on your computer!

Controls

Code

Console



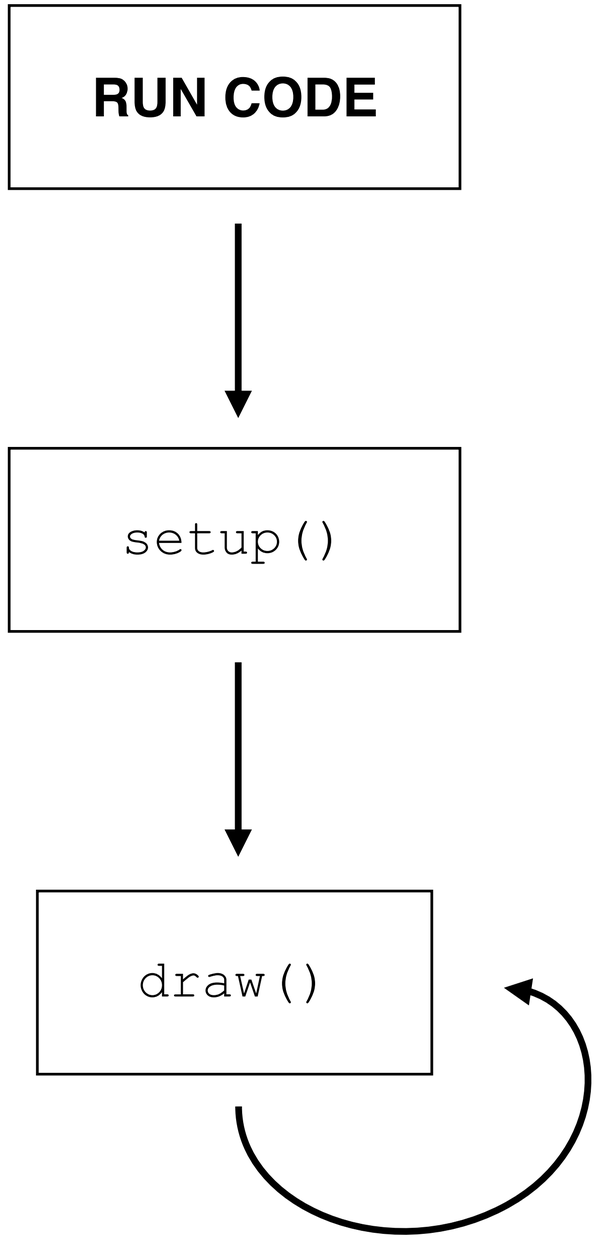
Preview

P5 provides us with a set of useful *functions* and *variables*

Functions:- A piece of code that carries out a specific task

Variables:- Nicknames for values!

(more on both of these later)




```
function setup() {
  // Setup code
}

function draw() {
  // Draw code
}
```

https://p5js.org/reference

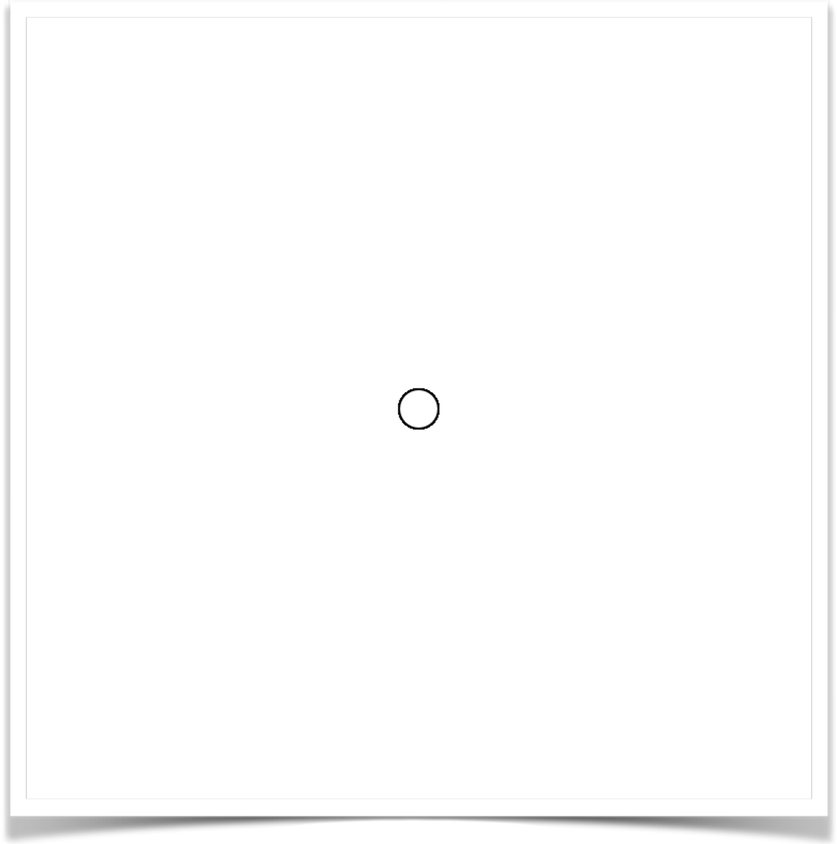
Draw a circle

Functions & basic program structure

```
function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  background(220);
  ellipse( 200, 200, 20, 20 );
}
```

https://editor.p5js.org/unknowndomain/sketches/HJenXEG27

```
function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  background(220);
  ellipse( 200, 200, 20, 20 );
}
```



https://editor.p5js.org/unknowndomain/sketches/HJenXEG27

Code

```
function doSomething() {
/* code to make something happen */
}

doSomething();
```

Result

```
Action
```

Code

```
function doSomething() {
/* code to make something happen */
}

doSomething();
doSomething();
```

Result

```
Something happens!
Something happens!
```

Code

```
function doSomething() {
  console.log( 'Action' );
}

doSomething();
```

Console

```
Action
```

Code

```
function doSomething() {
  console.log( 'Action' );
}

doSomething();
doSomething();
```

Console

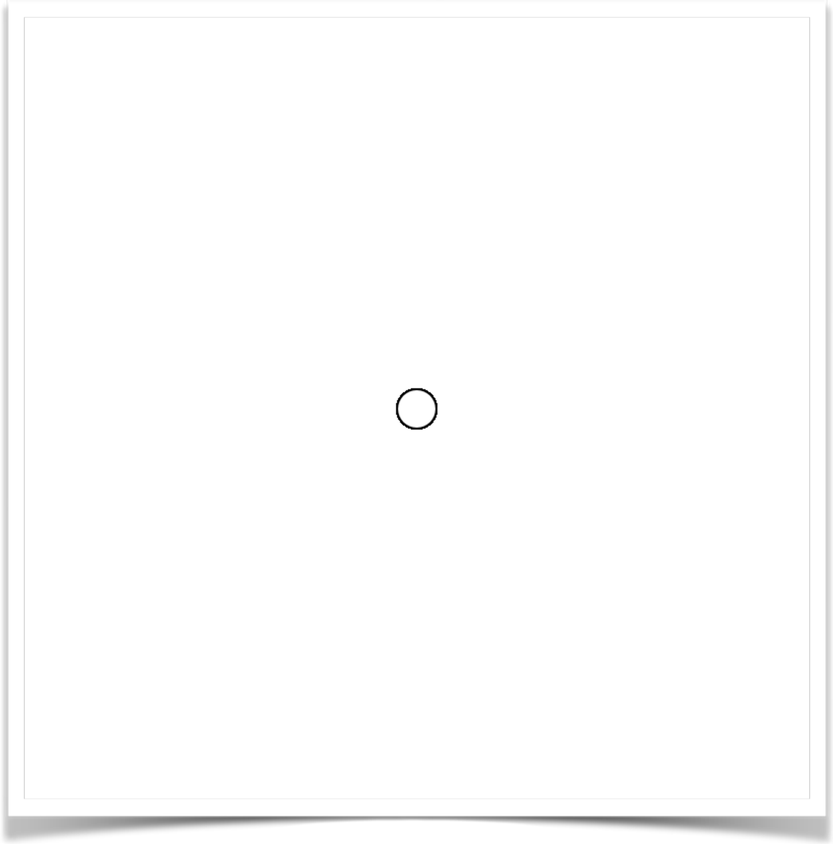
```
Action
Action
```

Variables (but still circles)

```
var radius = 20;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  background(220);
  ellipse( 200, 200, radius, radius );
}
```

https://editor.p5js.org/unknowndomain/sketches/H1MiNVG3Q

```
var radius = 20;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  background(220);
  ellipse( 200, 200, radius, radius );
}
```



https://editor.p5js.org/unknowndomain/sketches/H1MiNVG3Q

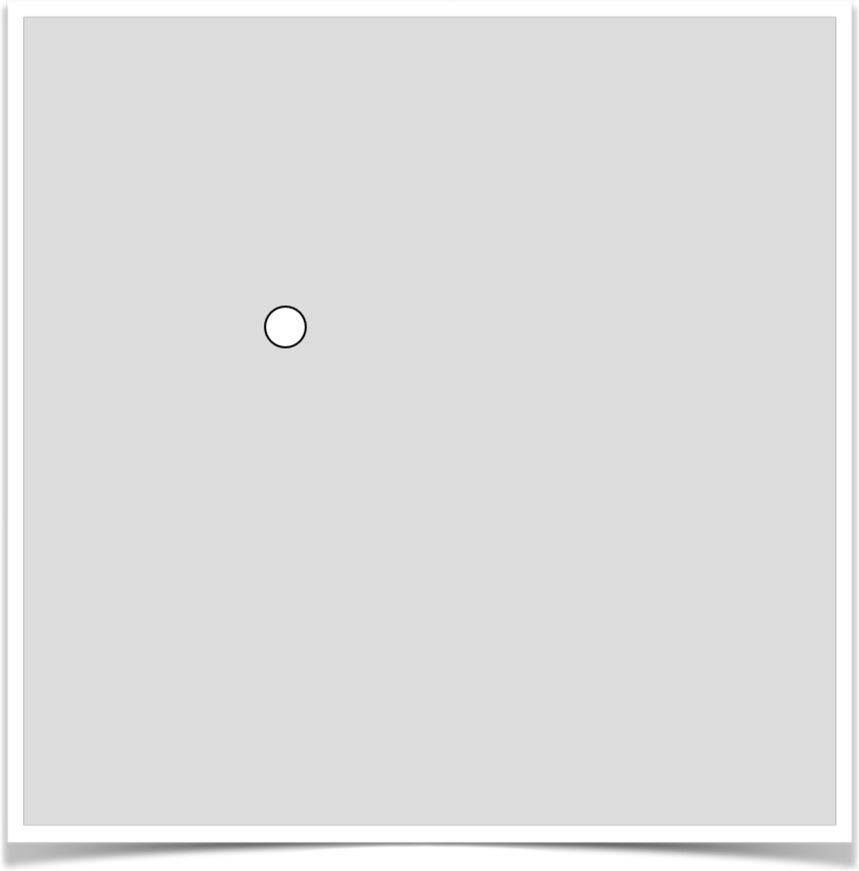
Predefined variables

- Mouse position
  - `mouseX`
  - `mouseY`
- Canvas size
  - `width`
  - `height`

```
var radius = 20;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  background(220);
  ellipse( mouseX, mouseY, radius, radius );
}
```

https://editor.p5js.org/unknowndomain/sketches/HykTNEG37

```
var radius = 20;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  background(220);
  ellipse( mouseX, mouseY, radius, radius );
}
```

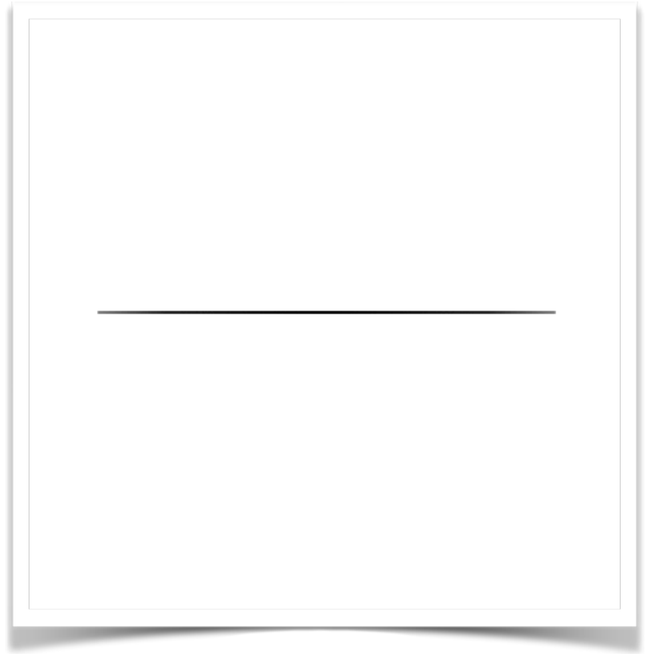


https://editor.p5js.org/unknowndomain/sketches/HykTNEG37

```
function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  background(220);
  ellipse( width / 2, height / 2, mouseX, mouseY );
}
```

https://editor.p5js.org/unknowndomain/sketches/rymchNz27

```
function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  background(220);
  ellipse( width / 2, height / 2, mouseX, mouseY );
}
```

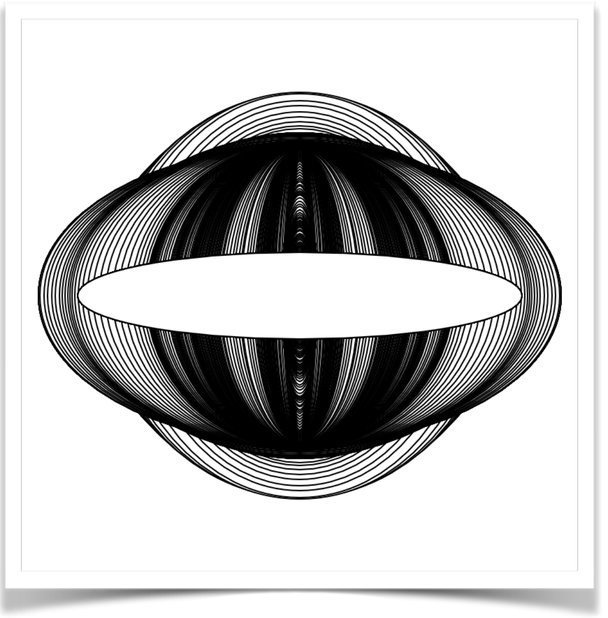


https://editor.p5js.org/unknowndomain/sketches/rymchNz27

```
function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  ellipse( width / 2, height / 2, mouseX, mouseY );
}
```

https://editor.p5js.org/unknowndomain/sketches/r1tAVEzh7

```
function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  ellipse( width / 2, height / 2, mouseX, mouseY );
}
```

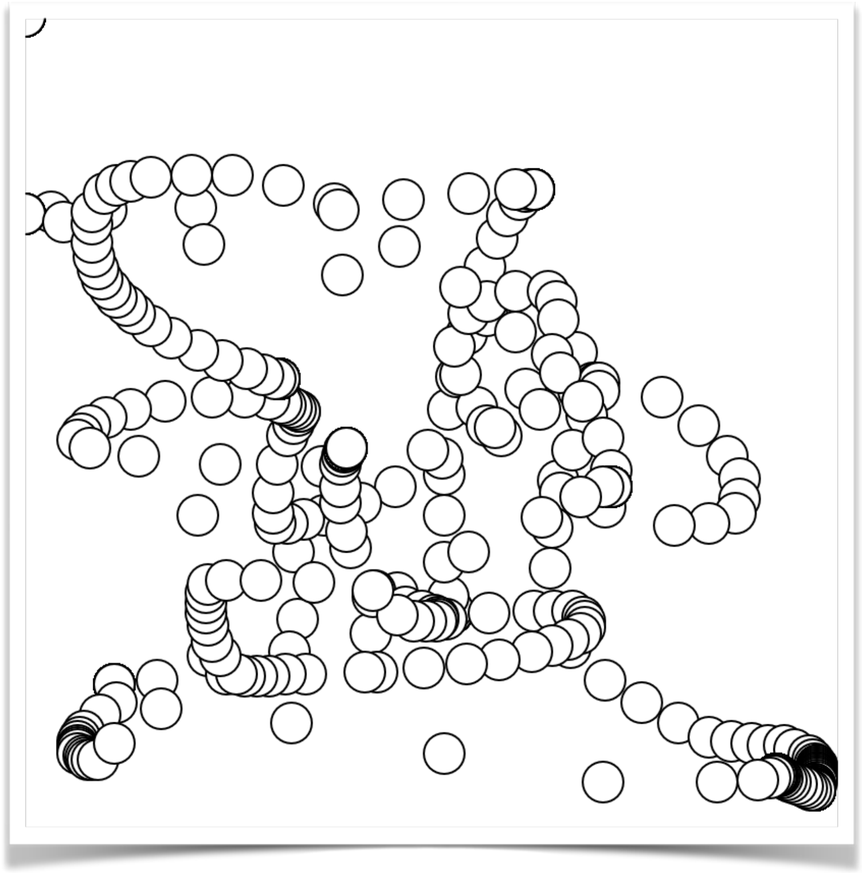


https://editor.p5js.org/unknowndomain/sketches/r1tAVEzh7

```
var radius = 20;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  ellipse( mouseX, mouseY, radius, radius );
}
```

https://editor.p5js.org/unknowndomain/sketches/HykTNEG37

```
var radius = 20;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  ellipse( mouseX, mouseY, radius, radius );
}
```



https://editor.p5js.org/unknowndomain/sketches/HykTNEG37

If Statements

Making things happen under certain conditions

```
if ( /* condition */ ) {
    // do something
}
```

```
if ( /* condition */ ) {
    // do something
} else {
    // do something else
}
```

```
if ( /* condition */ ) {
    // do something
} else if ( /* condition */ ) {
    // do an alternative thing
} else {
    // do something else
}
```

Code

```
if ( 1 == 1 ) {
  console.log( 'Hello, world!' );
}
```

Console

```
Hello, world!
```

Code

```
if ( 1 > 2 ) {
  console.log( 'A' );
} else {
   console.log( 'B' );
}
```

Console

```
B
```

Code

```
var name = 'tom';

if ( name == 'sam' ) {
  console.log( 'Hello Sam!' );
} else if ( name == 'tom' ) {
  console.log( 'Guten tag Tom!' );
} else {
  console.log( 'Hello there stranger...' );
}
```

Console

```
Guten tag Tom!
```

Conditions with operators

x == y	Does X equal Y
x < y	Is X less than Y
x > y	Is X greater than Y
x <= y	Is X less than or equal to Y
x >= y	Is X greater than or equal to Y

```
let mode = 1;

function setup() {

  createCanvas( 400, 400 );

}

function draw() {

  if(mode == 1){
  ellipse( width / 2, height / 2, mouseX, mouseY );
  } else if (mode == 2){
    ellipse( mouseX, mouseY, 20, 20 );
  }

}
```

https://editor.p5js.org/odmundeetgen/sketches/rkc1-_ep

```
let mode = 1;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {

  if(mode == 1){
  ellipse( width / 2, height / 2, mouseX, mouseY );
  } else if (mode == 2){
    ellipse( mouseX, mouseY, 20, 20 );
  }
}

function keyPressed(){
  if(key =='1')
    mode = 1;
  else if(key == '2')
    mode = 2;
}
```

https://editor.p5js.org/odmundeetgen/sketches/Hzjhuqqs

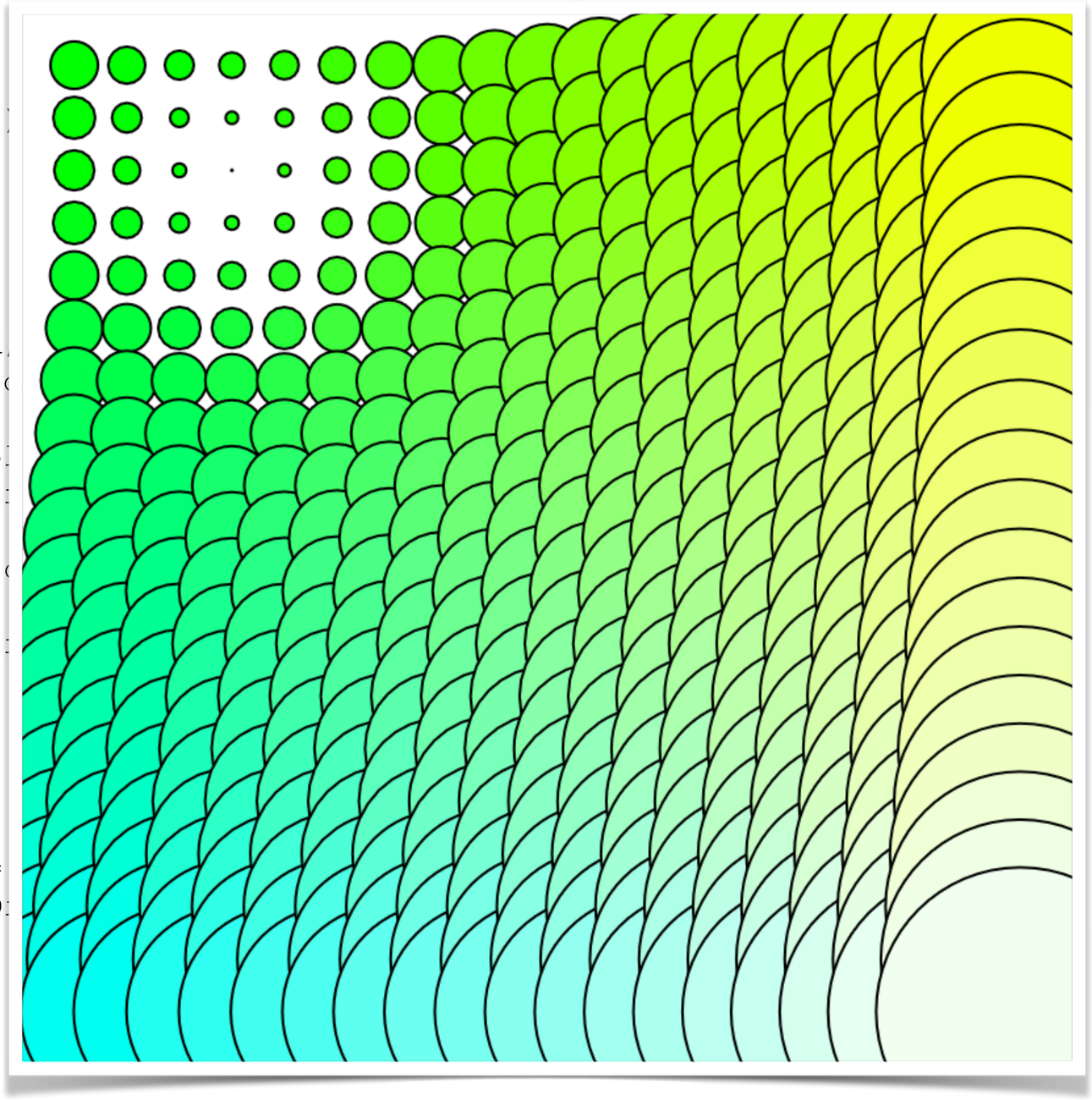
```
let mode = 1;

let drawBackground = true;
let r, g, b;
function setup() {
  createCanvas( 400, 400 );
}

function draw() {

  if(drawBackground)
    background(0);

  fill(r,g,b);

  if(mode == 1){
  ellipse( width / 2, height / 2, mouseX, mouseY );
  } else if (mode == 2){
    ellipse( mouseX, mouseY, 20, 20 );
  }
}

function keyPressed(){

  if(key =='1')
    mode = 1;
  else if(key == '2')
    mode = 2;
  else if(key == 'b' || key == 'B')
    drawBackground = !drawBackground;
  else if(key == 'r' || key == 'R') {
    r = random(255);
    g = random(255);
    b = random(255);
  }
}
```

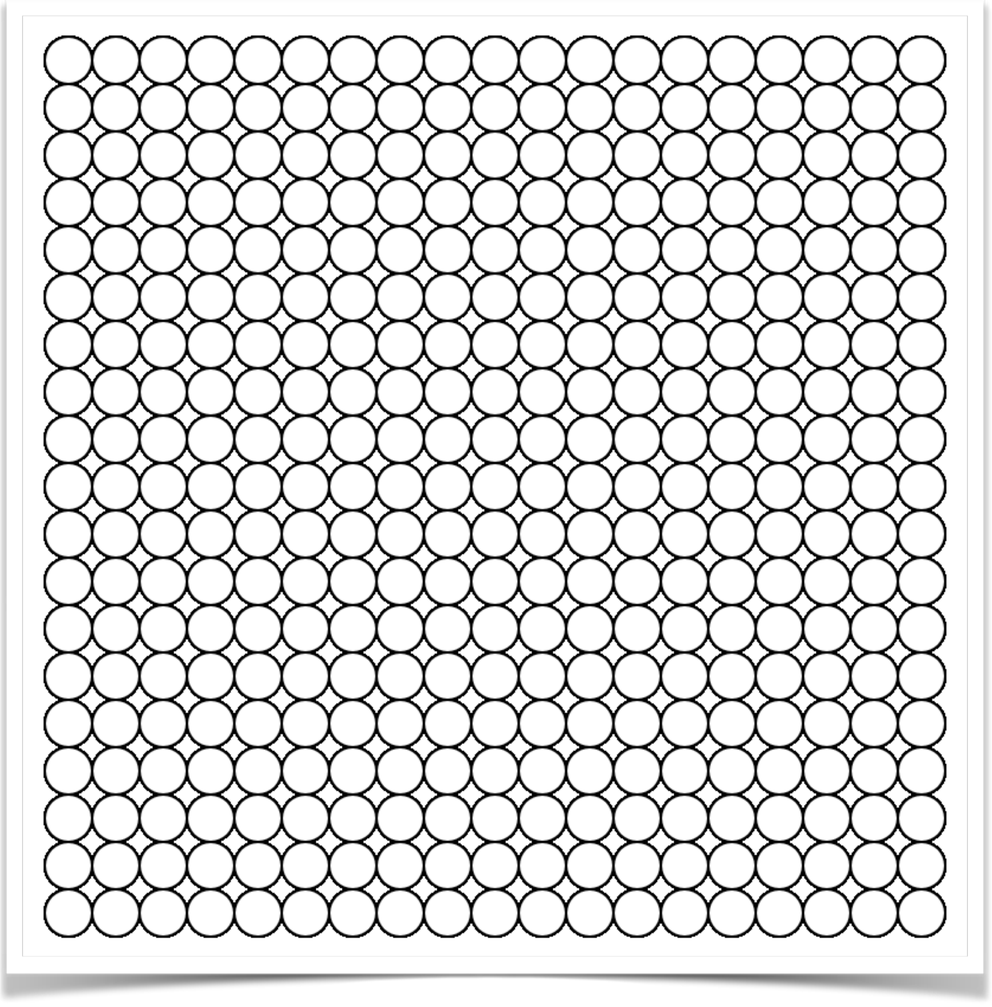
https://editor.p5js.org/odmundeetgen/sketches/QtU_P1cv

How Would We make a Grid of circle?

Loops

```
var grid = 20;

function setup() {
  createCanvas( 400, 400 )
}

function draw() {
  background( 255 );

  var cols = width / grid
  var rows = height / gri

  for ( var x = 1; x < co
    for ( var y = 1; y <

      var r = map( x, 0,
      var g = 255;
      var b = map( y, 0,
      fill( r, g, b );

      var ellipse_x = x *
      var ellipse_y = y *

      var mouseDistance =
      var radius = mouseD

      ellipse( ellipse_x,
    }
  }
}
```





```
var radius = 100;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  background(220);


  ellipse( 50, 50, radius, radius );
  ellipse( 50 + radius,      50, radius, radius );
  ellipse( 50 + radius * 2, 50, radius, radius );
  ellipse( 50 + radius * 2, 50, radius, radius );
```

```
for ( /* initialise */; /* condition */; /* increment */ ) {
    // do something
}
```

Other helpful operators

`x++`	Adds 1 to the variable (increment)
`x--`	Subtracts 1 to the variable (decrement)
`x/y`	Divide X by Y
`x*y`	Multiply X by Y

Code

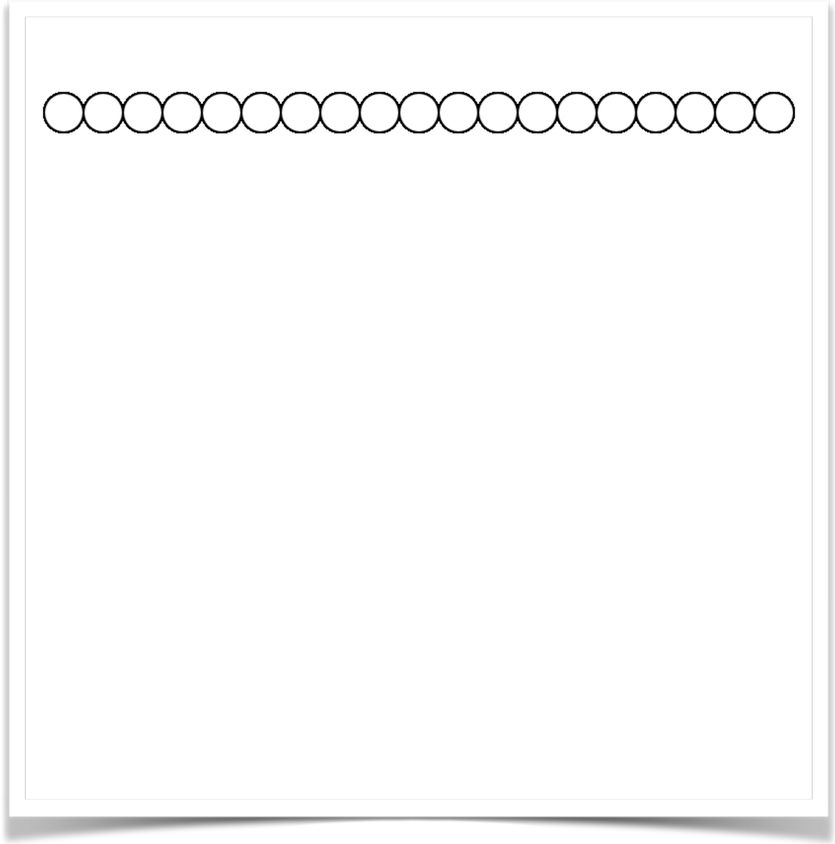
```
for ( var i = 0; i < 10; i++) {
  console.log( i );
}
```

Console

```
0
1
2
3
4
5
6
7
8
9
```

https://editor.p5js.org/unknowndomain/sketches/H13OtLM2X

```
var grid = 20;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  var cols = width / grid;

  for ( var x = 1; x < cols; x++ ) {
    var ellipse_x = x * grid;

    ellipse( ellipse_x, 50, grid, grid );
  }
}
```

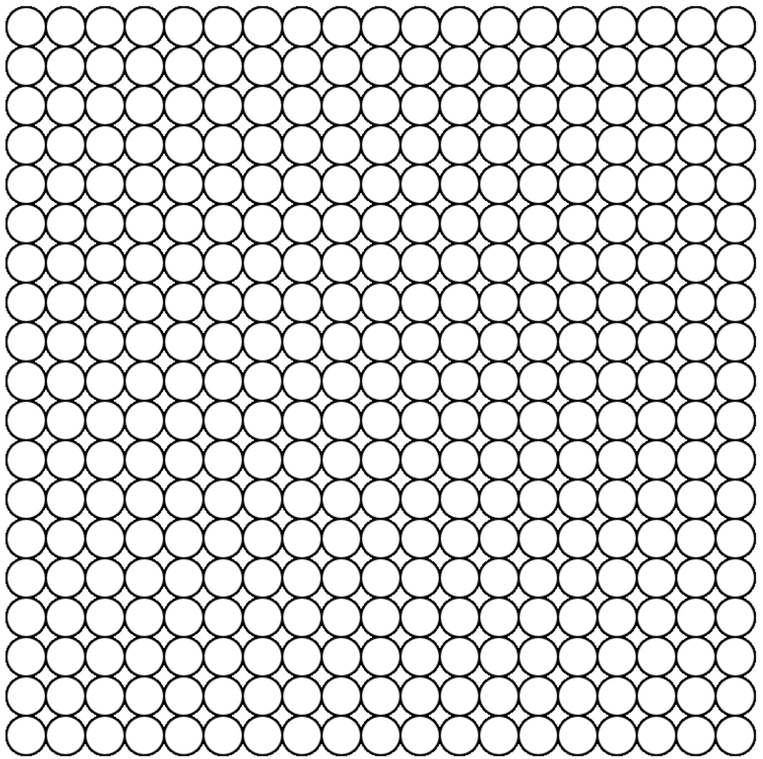


https://editor.p5js.org/unknowndomain/sketches/SyPxB4Mnm

```
var grid = 20;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  var cols = width / grid;
  var rows = height / grid;

  for ( var x = 1; x < cols; x++ ) {
    for ( var y = 1; y < rows; y++ ) {
      var ellipse_x = x * grid;
      var ellipse_y = y * grid;

      ellipse( ellipse_x, ellipse_y, grid, grid );
    }
  }
}
```

https://editor.p5js.org/unknowndomain/sketches/HyLkDHMnQ

```
var grid = 20;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  var cols = width / grid;
  var rows = height / grid;

  for ( var x = 1; x < cols; x++ ) {
    for ( var y = 1; y < rows; y++ ) {
      var ellipse_x = x * grid;
      var ellipse_y = y * grid;

      ellipse( ellipse_x, ellipse_y, grid, grid );
    }
  }
}
```

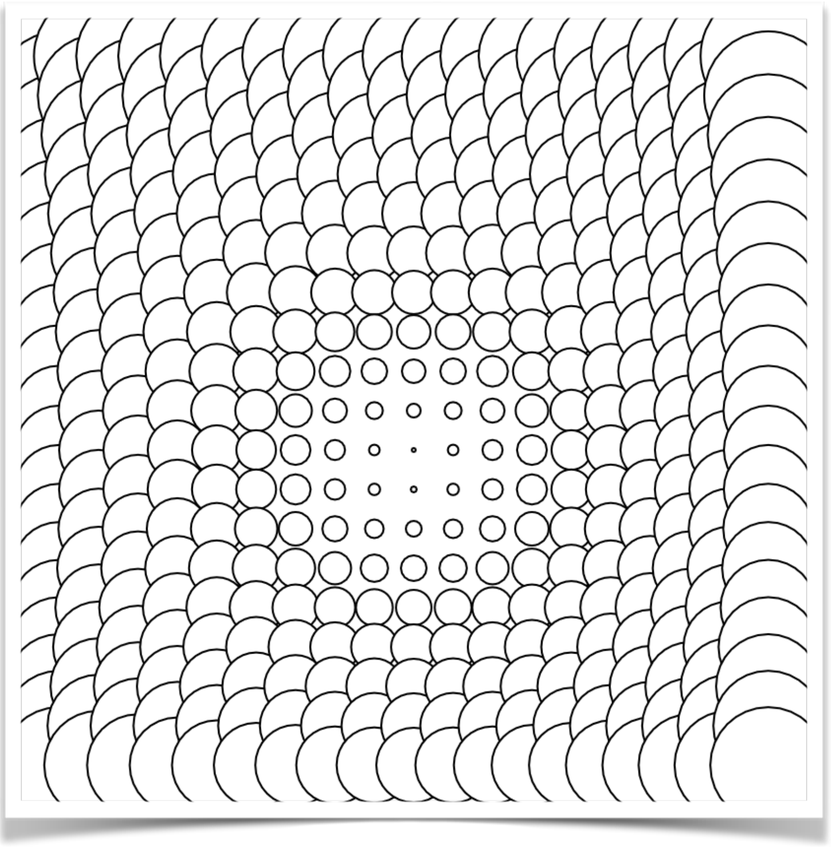


https://editor.p5js.org/unknowndomain/sketches/HyLkDHMnQ

```
var grid = 20;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  background( 255 );

  var cols = width / grid;
  var rows = height / grid;

  for ( var x = 1; x < cols; x++ ) {
    for ( var y = 1; y < rows; y++ ) {
      var ellipse_x = x * grid;
      var ellipse_y = y * grid;

      var mouseDistance = dist( ellipse_x, ellipse_y, mouseX, mouseY );
      var radius = mouseDistance * 0.25;

      ellipse( ellipse_x, ellipse_y, radius, radius );
    }
  }
}
```

https://editor.p5js.org/unknowndomain/sketches/Sy_iPHf27

```
var grid = 20;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  background( 255 );

  var cols = width / grid;
  var rows = height / grid;

  for ( var x = 1; x < cols; x++ ) {
    for ( var y = 1; y < rows; y++ ) {
      var ellipse_x = x * grid;
      var ellipse_y = y * grid;

      var mouseDistance = dist( ellipse_x, ellipse_y, mouseX, mouseY );
      var radius = mouseDistance * 0.25;

      ellipse( ellipse_x, ellipse_y, radius, radius );
    }
  }
}
```

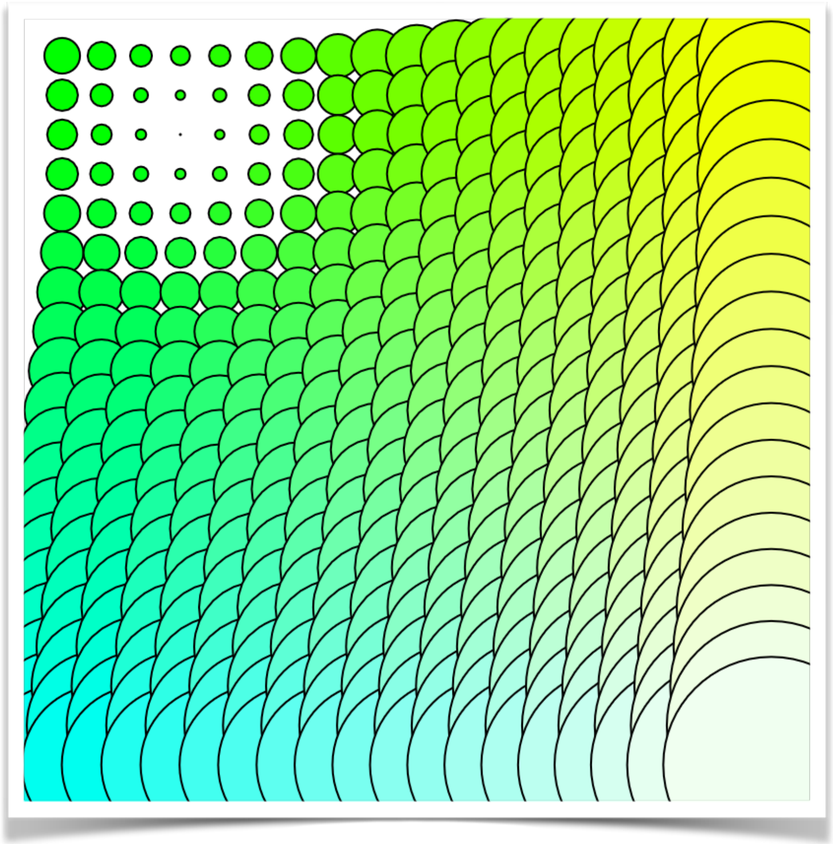


https://editor.p5js.org/unknowndomain/sketches/Sy_iPHf27

```
var grid = 20;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  background( 255 );

  var cols = width / grid;
  var rows = height / grid;

  for ( var x = 1; x < cols; x++ ) {
    for ( var y = 1; y < rows; y++ ) {

      var r = map( x, 0, cols, 0, 255 );
      var g = 255;
      var b = map( y, 0, rows, 0, 255 );
      fill( r, g, b );

      var ellipse_x = x * grid;
      var ellipse_y = y * grid;

      var mouseDistance = dist( ellipse_x, ellipse_y, mouseX, mouseY );
      var radius = mouseDistance * 0.25;

      ellipse( ellipse_x, ellipse_y, radius, radius );
    }
  }
}
```

https://editor.p5js.org/unknowndomain/sketches/SygqBSG3X

```
var grid = 20;

function setup() {
  createCanvas( 400, 400 );
}

function draw() {
  background( 255 );

  var cols = width / grid;
  var rows = height / grid;

  for ( var x = 1; x < cols; x++ ) {
    for ( var y = 1; y < rows; y++ ) {

      var r = map( x, 0, cols, 0, 255 );
      var g = 255;
      var b = map( y, 0, rows, 0, 255 );
      fill( r, g, b );

      var ellipse_x = x * grid;
      var ellipse_y = y * grid;

      var mouseDistance = dist( ellipse_x, ellipse_y, mouseX, mouseY );
      var radius = mouseDistance * 0.25;

      ellipse( ellipse_x, ellipse_y, radius, radius );
    }
  }
}
```



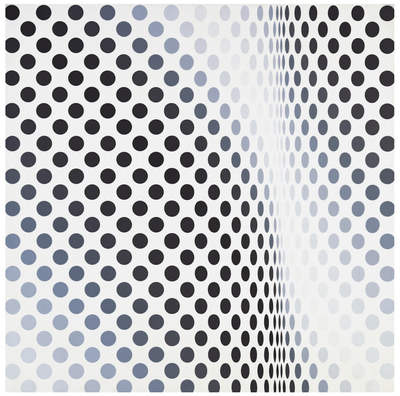
C

How would yo go about creating something like this?

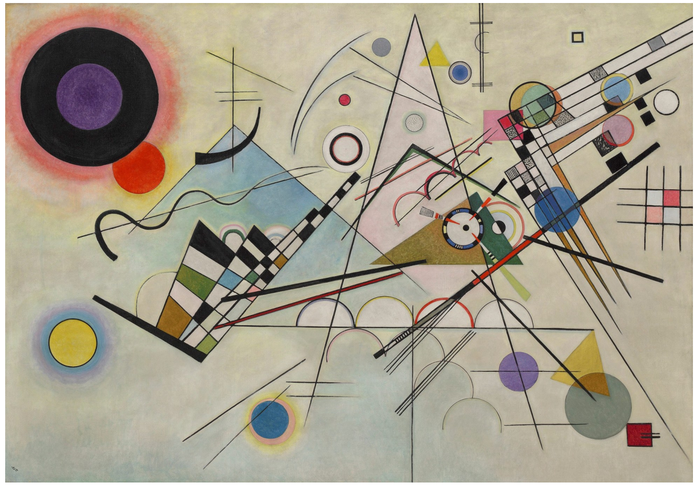
Think about shape, colour and position

Do you think these were released, composed manually or randomly generated? A combination of all three?

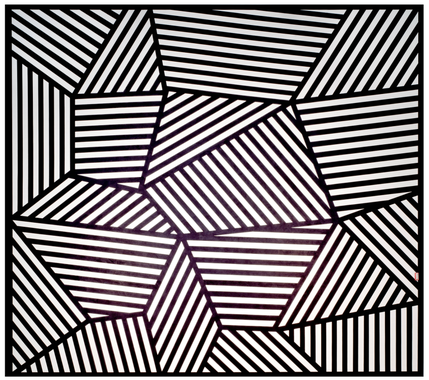
Burnt Umber - Yun Hyong-keun



Pause - Bridget Riley

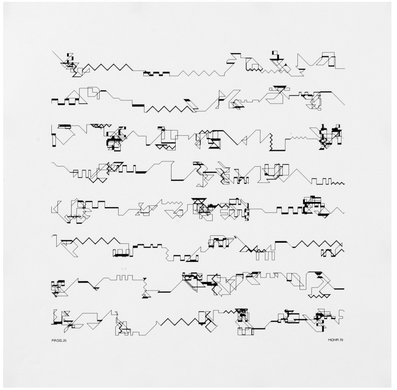


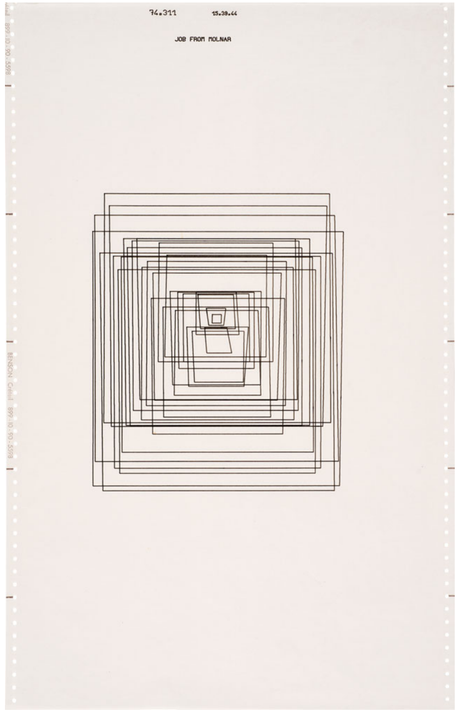
Composition 8 - Vasily Kandinsky



Wall Drawing 565 - Sol LeWitt

Program 21
- Manfred Mohr





Trapèzes inscrits 1/5
- Vera Molnár

https://lab.arts.ac.uk