



Introduction to p5js

Creative coding platform in JavaScript

p5.js

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Hello! p5.js is a JavaScript library that starts with the original goal of [Processing](#), to make coding accessible for artists, designers, educators, and beginners, and reinterprets this for today's web.

What is p5js?

Using the original metaphor of a software sketchbook, p5.js has a full set of drawing functionality. However, you're not limited to your drawing canvas, you can think of your whole browser page as your sketch! For this, p5.js has addon [libraries](#) that make it [easy to interact](#) with other HTML5 objects, including text, input, video, webcam, and sound.

What is p5js?

- p5 is a JavaScript library
- It can be combined with other JavaScript libraries carefully but it should control the canvas.
- JavaScript is a Object Oriented (OO) scripting language used client side to add functionality, graphics, sound and more to a webpage
- JavaScript is the wild west of languages. There are as many flavors of JavaScript as there are ice cream.



Algorithmic Design

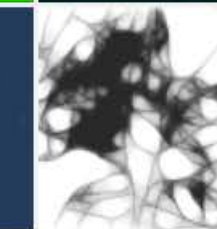
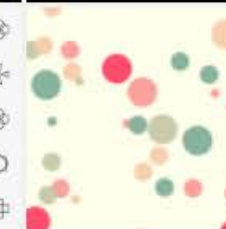
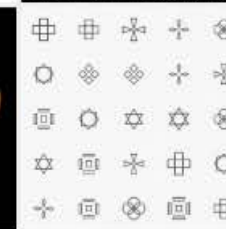
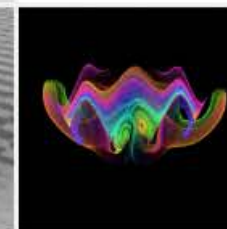
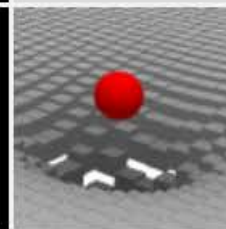
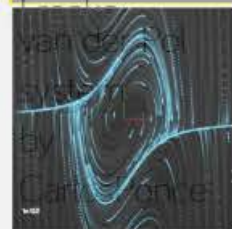
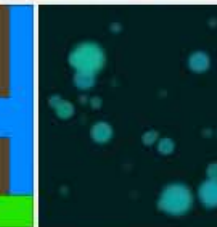
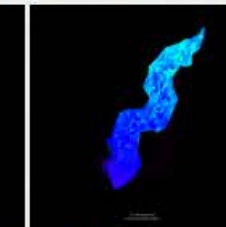
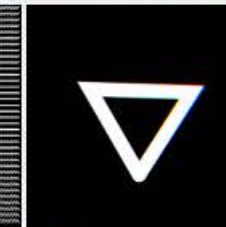
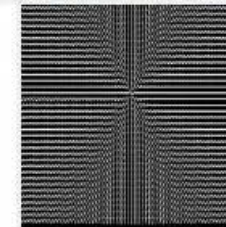
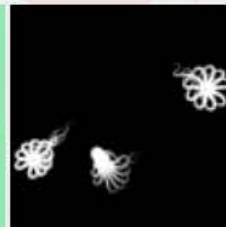
for the Creative Hive

Create, fork and explore interactive sketches in p5js?

Openprocessing.org

Sketches that received s this week

Geometric
Animations /
161016
by Saskia





A hackable text editor
for the 21st Century

Download Windows 64-bit Installer

For Windows 7 64-bit or later

[Release notes](#) - [Other platforms](#) - [Beta releases](#)

How do I make a project?

Project

JS text-editor-element.js

Settings

atom

272

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```
getComponent () {
```

Download

Start

Reference

Libraries

Tutorials

Examples

Books

Community

Forum

[Foundation](#), a nonprofit organization devoted to advancing the role of programming within the visual arts through developing p5.js.

[Donate here.](#)

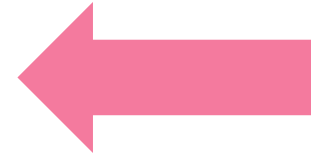
Complete Library

p5.js complete

Includes:

p5.js, p5.dom.js, p5.sound.js, and an example project

Version 0.5.4 (October 1, 2016)



Download p5js complete from
[p5js.org](#)

Single Files

p5.js

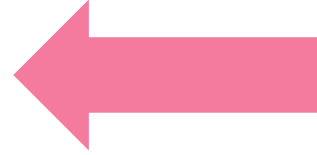
p5.min.js

CDN

› Downloads › p5 › p5-zip

Name

- addons
- empty-example
- .DS_Store
- p5.js
- p5.min.js



Copy the empty-example folder and rename it. It can live anywhere on your hard drive.

Making a project

- Download p5
- Download atom, a software integrated developing environment (IDE)
- You can add packages to Atom to extend the functionality: browser-plus, p5jxs-autocomplete, p5js-snippets are 3 good ones to get started.
- Markdown is an easy way to write syntax. Consider adding some markdown functionality for fiction and documentation writing as an added win.

Where do I write my code?

```
3 Author: Phoenix Perry
4 Code Liberation
5 Created: 22-07-17
6 */
7
8
9 var gameState = "startScreen"; //this
  • will change as we play the game
10 var isTouching = false; //checks if
  • circles are touching
11 var score = 0;
12 var speed = 5;
13 var ui_color;
14 var ui_text_color;
15 var ui_accent_color;
16 var enemySize = 100; //size of enemy
17 enemy_y_pos = 0; //for keeping track of
  • enemy location
18
19 var playerSize = 100; //size of player
```

```
3 <head>
4 <script
  • src="https://cdnjs.cloudflare.com/ajax
  • p5.min.js"></script>
5 <script
  • src="https://cdnjs.cloudflare.com/ajax
  • addons/p5.dom.min.js"></script>
6 <script
  • src="https://cdnjs.cloudflare.com/ajax
  • addons/p5.sound.min.js"></script>
7 <script src="sketch.js"></script>
8 <link rel="stylesheet" type="text/css"
9 <style> body {padding: 0; margin: 0;} <
10 </head>
11 <body>
12 </body>
13 </html>
```

Can I take notes in my code?

Yes. Do it always

```
//for a one line comment.  
/*for an entire novel that will  
take up multiple lines about your  
love for cats*/
```


The day you write your code



Two weeks later



How do I make a project?

What is going on in sketch.js?

```
1  function setup() {  
2  
3  }  
4  
5  function draw() {  
6  
7  }
```

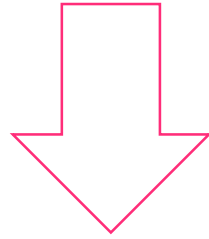



setup() is where you get everything prepared

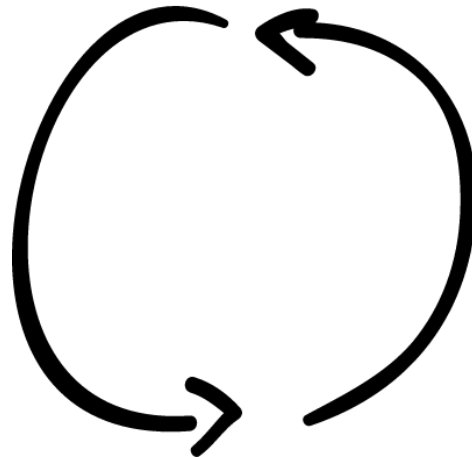


`draw()` is where you draw your art and update your mathy bits

setup()



draw()





Main functions of p5js

`setup()`: runs just once at the start of the app
Good place to set up initial player variables like
`player_health=100;`

`draw()`: runs continuously once per frame.
It's where you should put your drawings like
`player.draw();`

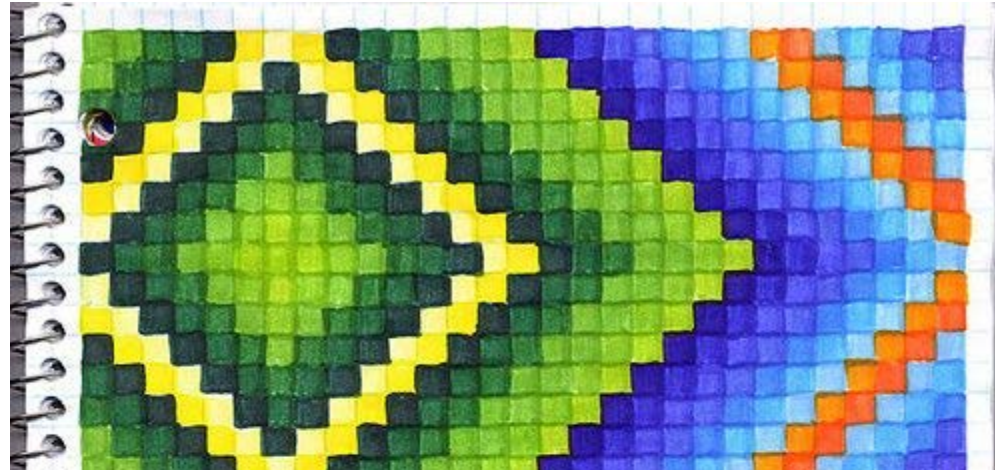


listeners

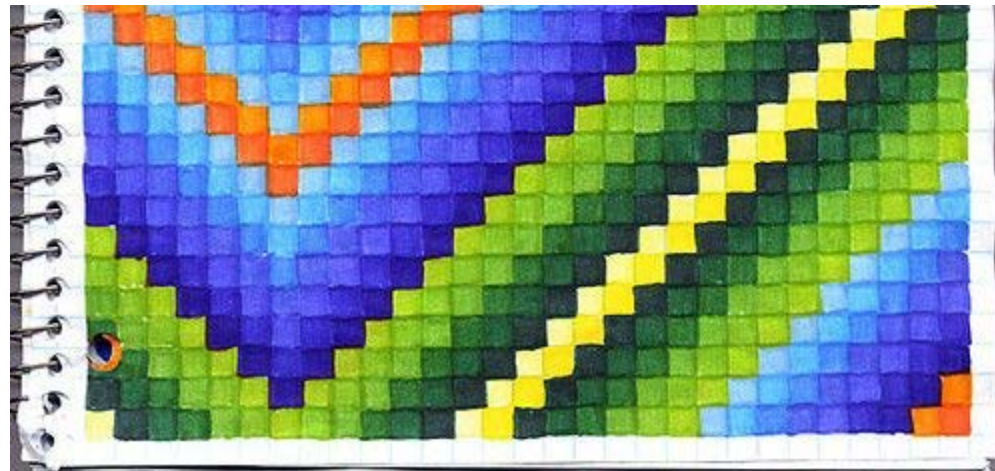


Listeners listen for events

- **Events** are often things users do, such a click a mouse, drag a mouse or press a key
- **mousePressed()** is one of these in p5. This will run the second the mouse is pressed
- **keyPressed()** is another. It will run the second a key is pressed



How do I draw stuff?



Functions

- **Function:** a named section of a program that does a specific task
 - Wraps up code in an easy to reference, repeatable way
 - Can be reused over and over
 - They are used by calling them
- **Parameter:** additional information you can give your function to change the starting state

Bake me a cake!

Baking a cake:

The action (function)

Chocolate: additional info that affects the actions
(parameters)

Wait! I still don't know how to
draw stuff.

Shape

2D Primitives

`arc()`

`ellipse()`

`line()`

`point()`

`quad()`

`rect()`

`triangle()`

Attributes

`ellipseMode()`

`noSmooth()`

`rectMode()`

`smooth()`

`strokeCap()`

`strokeJoin()`

`strokeWeight()`

Curves

`bezier()`

`bezierPoint()`

`bezierTangent()`

`curve()`

`curveTightness()`

`curvePoint()`

`curveTangent()`

Vertex

`beginContour()`

`beginShape()`

`bezierVertex()`

`curveVertex()`

`endContour()`

`endShape()`

`quadraticVertex()`

`vertex()`



Color

Creating &
Reading

`alpha()`

`blue()`

`brightness()`

`color()`

`green()`

`hue()`

`lerpColor()`

`lightness()`

`red()`

`saturation()`

Setting

`background()`

`clear()`

`colorMode()`

`fill()`

`noFill()`

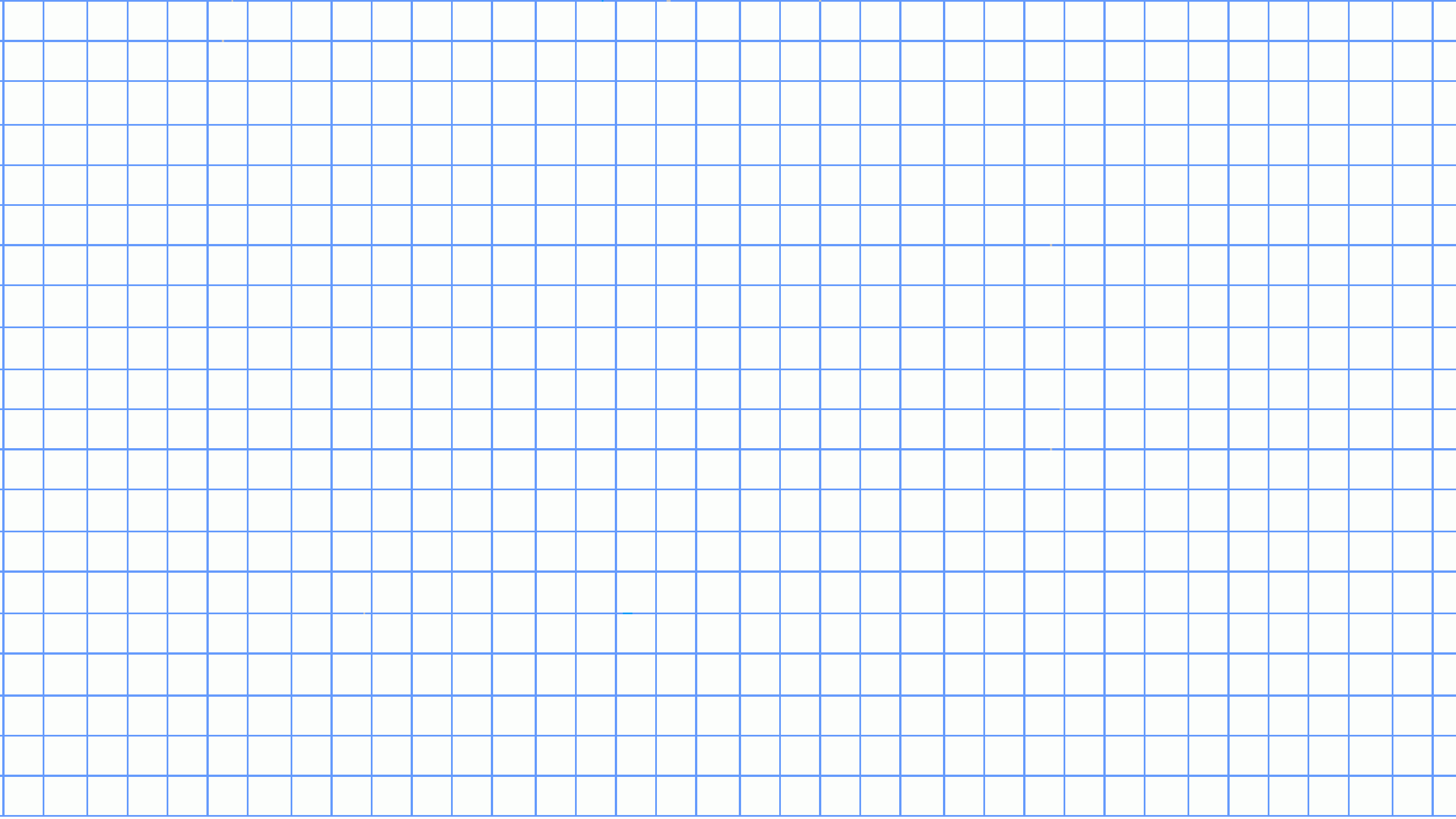
`noStroke()`

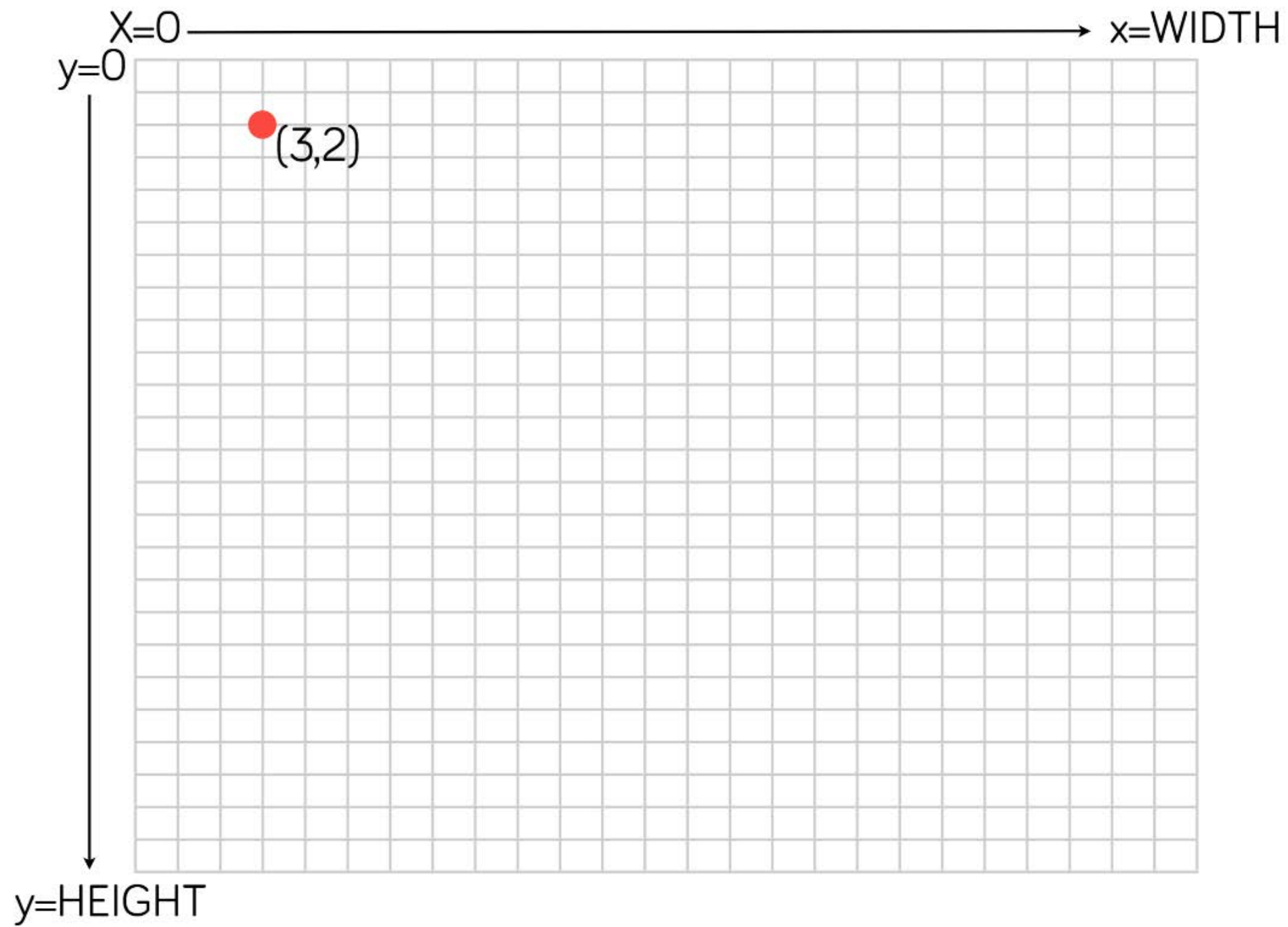
`stroke()`

Exercise: try drawing some stuff

How does positioning work?

How does positioning work?





Coordinate Plane

- **X axis:** horizontal space that gets larger to the right
- **Y axis:** vertical space that gets larger as you go down

Exercise!

- Trying drawing a circle at x:600, y:800
- If you draw a circle at y:1000 is it higher or lower?

Can I incorporate interactivity?

Function structure

```
Bake_me_a_cake(chocolate, cherry){  
    add_eggs();  
}
```

- Name of function: Bake_me_a_cake
- Parenthesis: delineates it's a function, holds arguments
- Semicolon: end of line, move to the next thing

Mouse Positions

- **Variable:** a symbol used to stand in for a value. It can vary and change over time.
- **mouseX:** returns the position of the mouse x position
- **mouseY:** returns the position of the mouse y position

Exercise!

Draw a circle at mouseX and mouseY

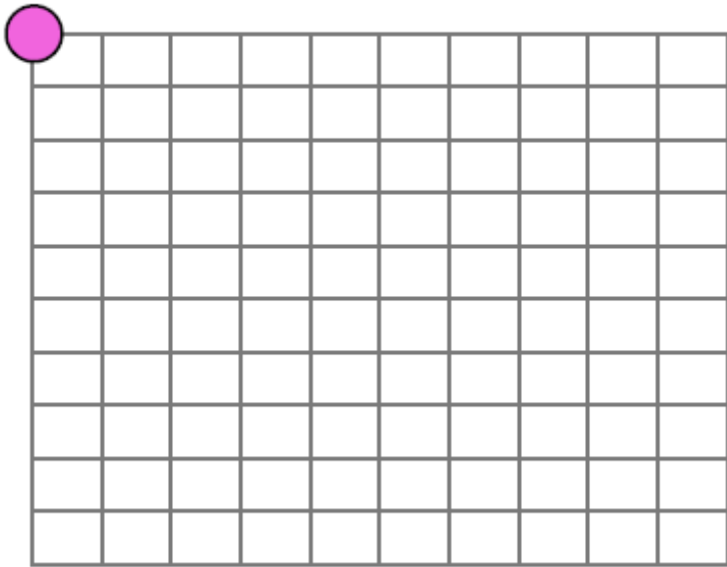
Variables

- Variables are useful for storing data that may change throughout the course of your app (e.g. your player's health)
- To create a variable, you have to tell the computer:
 1. What kind of data you're storing (a number? a word?)
 2. The name you're going to refer to it by

Some Variable Types

- **Float:** a decimal number ("I'm 5.4 feet tall.")
- **Integer:** a whole number ("I'm 25 years old.")
- **Boolean:** a true/false condition ("I'm not from California.")
- **String:** text ("My name is Jane.")
- **Char:** a single letter (A)

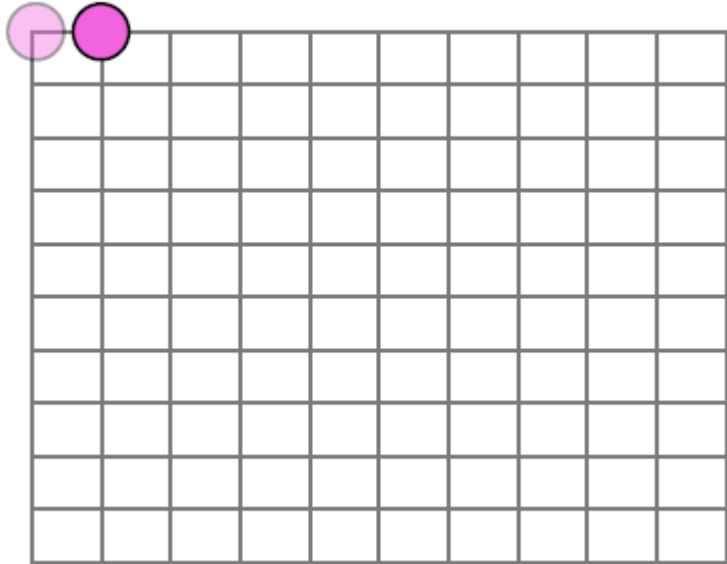
Movement



if our object starts at $x=0$,
at $\text{time}=0$, and moves at a
speed equal to 1 frame/
sec, what will x equal at
 $\text{time}=1$?

How do you know?

Movement



Movement

New position = old position + speed

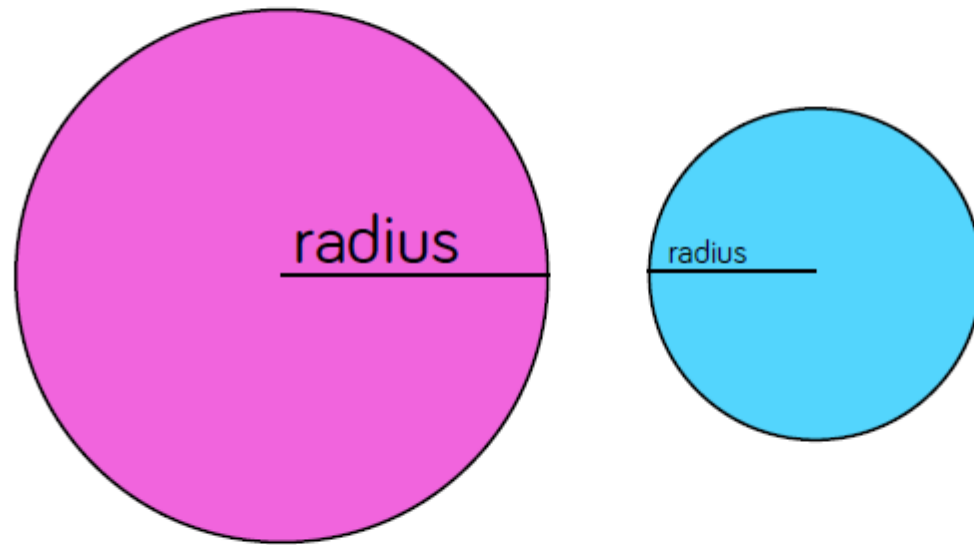
Exercise!

Try drawing a circle that moves vertically down the screen.
Hint: you'll want a variable to hold the circle's position.
(Why?)

Collision: when one point is less than a certain distance from another point.

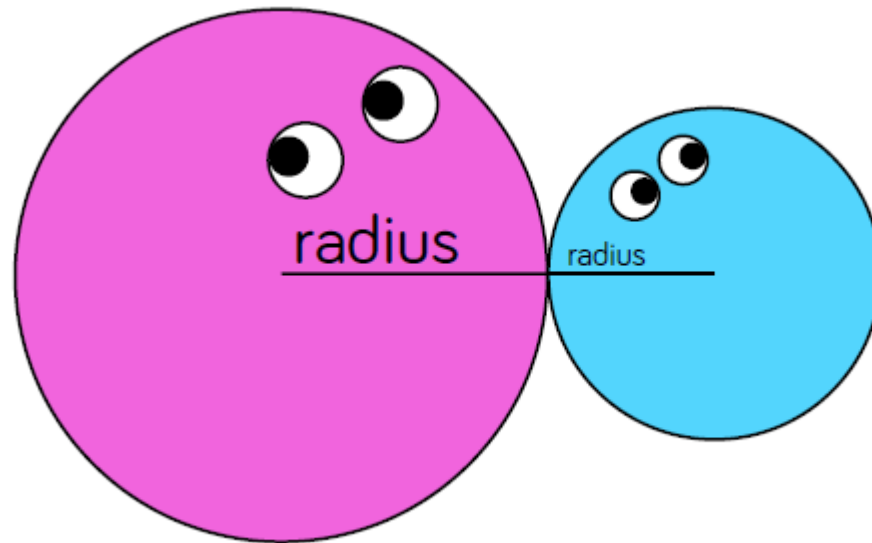


Have these circles collided yet?



Circle Collision

- If the distance between the center-points of the circles is less than or equal to the sum of their radii, they have collided!
- You can calculate distance in p5 with `dist()` function





Emergency kittens

How can I check if something is true?

If statements

- Consist of a condition and an action to take.
- Can have alternatives (if-else) and can put if statements inside of if-statements, too!

If I'm hungry, then I'll eat.

```
if (hungry) {  
  eat();  
}
```

If statements

If I'm hungry, then I'll eat.

```
if (hungry) {  
    eat();  
}
```

If I'm hungry, then I'll eat.

Otherwise, I'll dance!

```
if (hungry) {  
    eat();  
} else {  
    dance();  
}
```

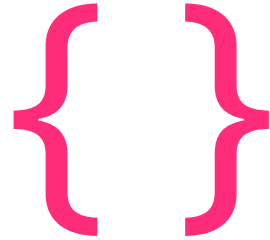
If I'm hungry, then I'll eat.

If I'm hungry and in the mood for pizza, I'll get pizza.

Otherwise, I'll dance!

```
if (hungry) {  
    if (want_pizza) {  
        eat(pizza);  
    } else {  
        eat(something_else);  
    }  
} else {  
    dance();  
}
```


Scope Operators!



- If you have one, you must have 2. They open and close.
- Variables declared inside a function scope are not visible to other scopes outside of the function.
- You can nest functions inside each other.
- There is more here but we will cover it soon...

Game States

State machine: *(simple explanation for now)*

- A state you can check to manage the state your game is in at any given point.
- A set of behaviors, UI, animations and events associated with a state
- Levels are simple states
- Examples are the start state of your game, the game playing state and the state your game is when it ends.

You can do this with a string in JavaScript simply.

```
var gameState = "start_game";
```

Homework

Use the code here as a starting place:

(https://github.com/phoenixperry/IGPED_Bootcamp/tree/master/day01_ball_drop)

Modify this game so the player's circle gets one point every time they successfully avoid a falling enemy's circle. The game ends when the enemy hits the player's circle. Slowly increase the circle speed and diameter until the player dies. Limit the max speed to a value within reason. The game must have a play button and a replay button.