

HTML5 Canvas

Canvas

- A container for graphics
- Bitmap graphics (as opposed to [SVG](#))
- HTML5 Canvas Resources:
 - [Dive Into HTML5 – Canvas](#)
 - [MDN Canvas Tutorial](#)
- Using canvas directly is tedious
 - [Fabric.js](#)
 - [CreateJS](#)

p5.js

Processing, Reinterpreted for JavaScript



What is p5?

- Creative coding for the web
- It provides:
 - An easy way to use HTML5 Canvas
 - Makes life easier for: mouse tracking, colors, events, images, math, shapes, typography, sounds, etc.
 - [Extra libraries](#)
- Resources
 - [Tutorials](#)
 - [Examples](#)
 - [Reference](#)

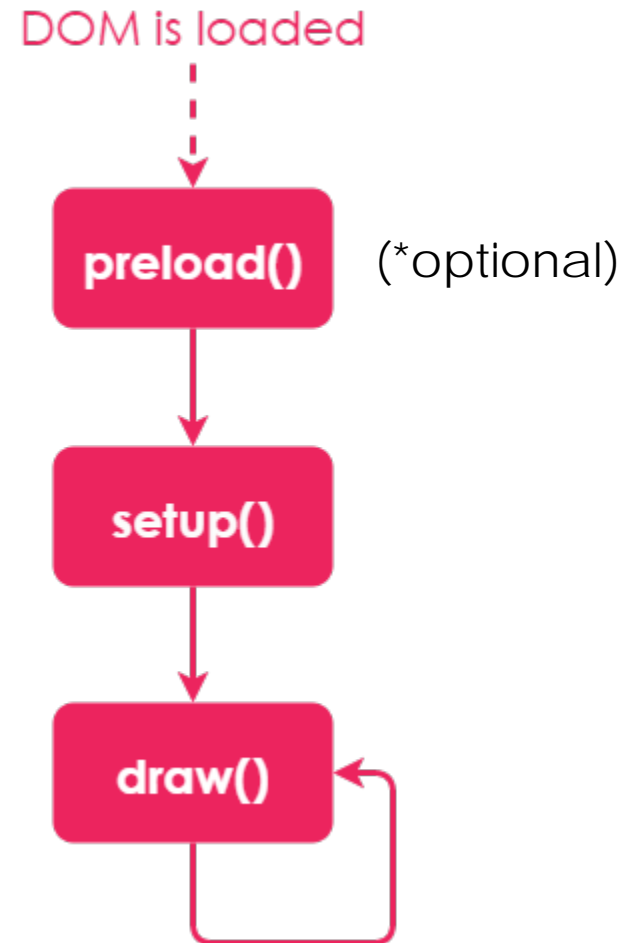
What is p5?

It is just JavaScript code

(that other people wrote)



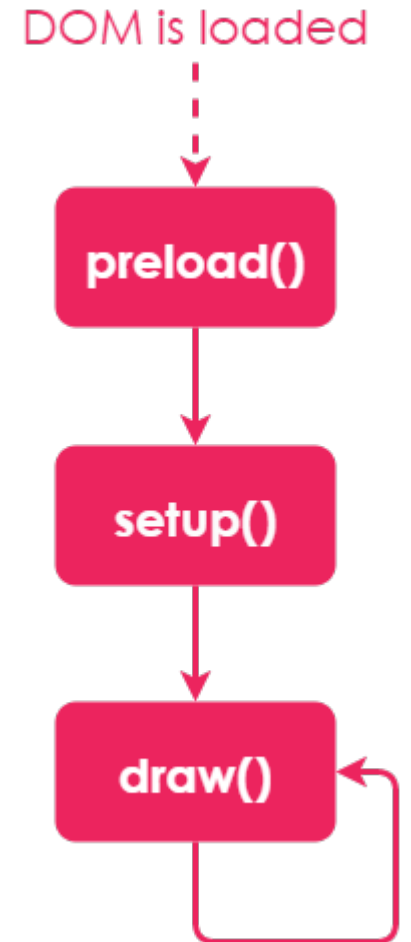
p5 is a framework



p5 is a framework

p5 hooks into three main functions that you write:

- **preload()** – optional, runs once and is used for loading sounds, images, etc.
- **setup()** – runs after `preload()`, runs once and is used for initialization tasks like creating a canvas
- **draw()** – runs after `setup()`, runs 60 times a second and is used for updating the screen (and running logic)



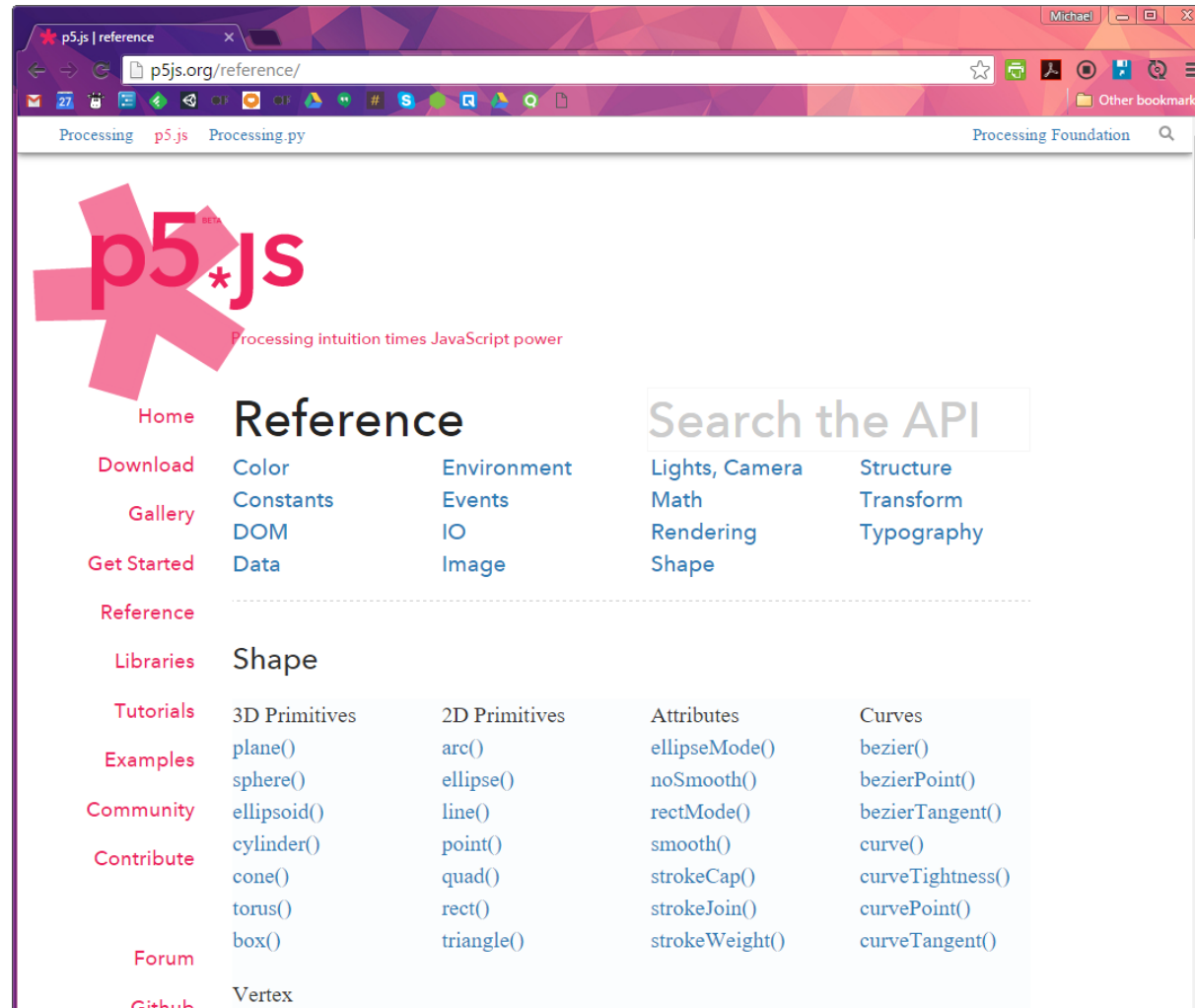
Useful Built-in Variables

These variables are created and updated by p5 behind the scenes:


- [width](#), [height](#)
- [windowWidth](#), [windowHeight](#)
- [keysPressed](#), [key](#), [keyCode](#)
- [mouseX](#), [mouseY](#)
- [mouseIsPressed](#), [mouseButton](#)

Reference

(keep this tab open)



Loading an Image



```
// Global variable
var img;

function preload() {
  // Load the image before the sketch runs
  img = loadImage("images/catball.png");
}

function setup() {
  createCanvas(windowWidth, windowHeight);
}

function draw() {
  // Draw the image at (0, 0) on the canvas
  image(img, 0, 0);
}
```

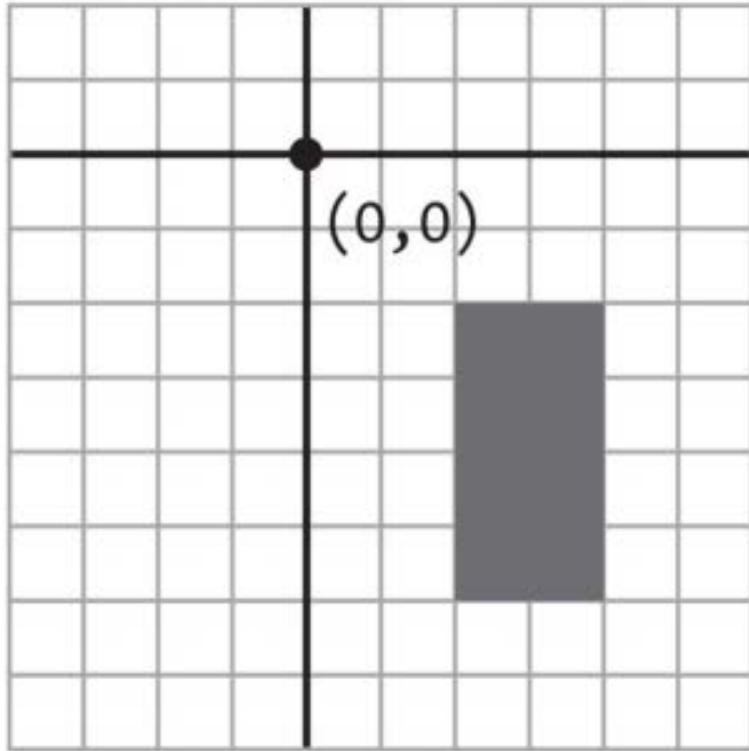
p5 Transformations



Translate, Rotate, Scale

- Push and pop - [Reference](#)
- Gene Kogan's Tutorial: [p5.js Transformations](#)
- Allison Parrish's Tutorial: [Transformation and Functions](#)
- Processing Tutorial: [Transform 2D](#)

```
translate(40, 20);  
rect(20, 20, 20, 40);
```



```
translate(60, 70);  
rect(20, 20, 20, 40);
```

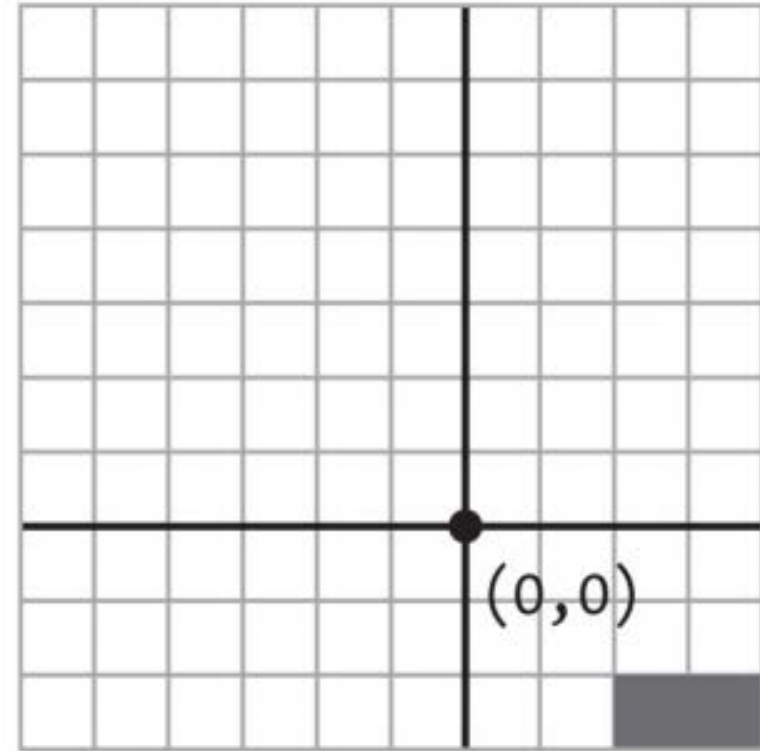
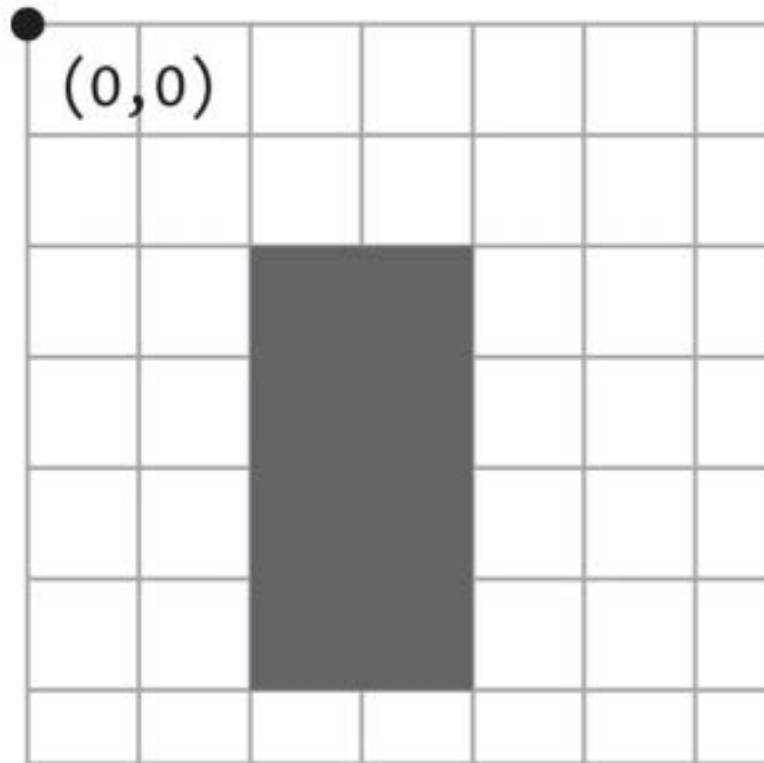


Figure 6-1. Translating the coordinates

```
scale(1.5);  
rect(20, 20, 20, 40);
```



```
scale(3);  
rect(20, 20, 20, 40);
```

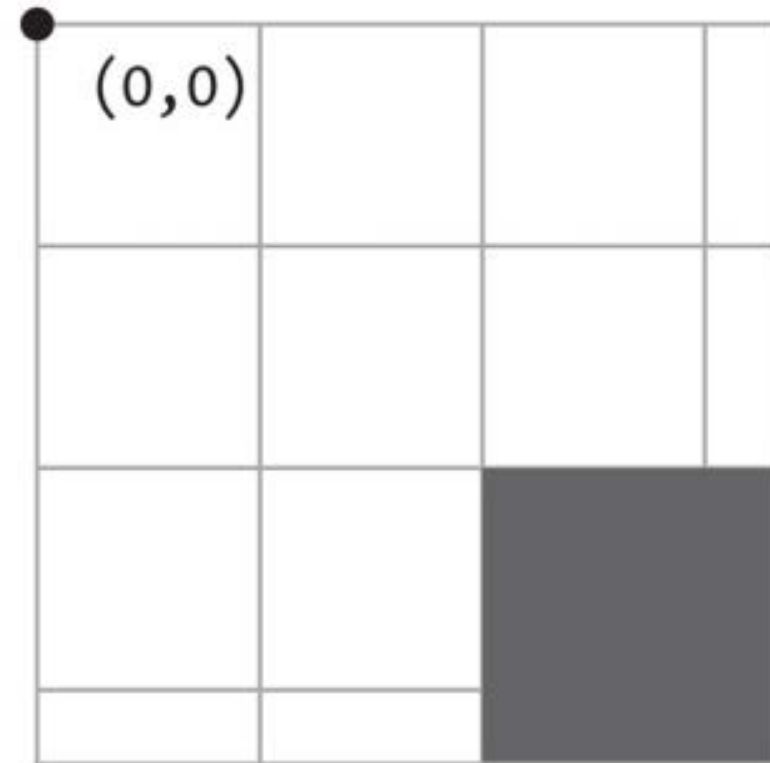
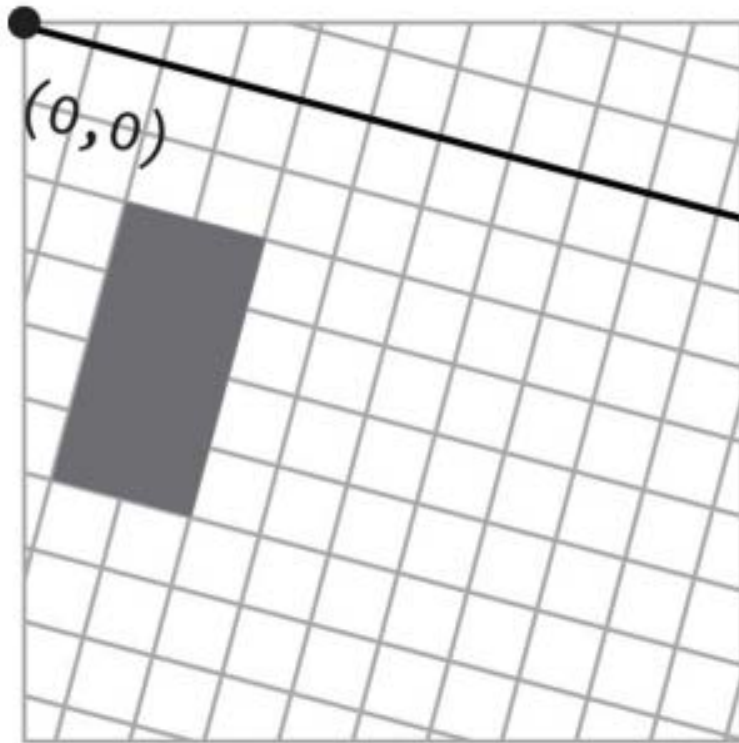


Figure 6-3. Scaling the coordinates

```
rotate(PI/12.0);  
rect(20, 20, 20, 40);
```



```
rotate(-PI/3);  
rect(20, 20, 20, 40);
```

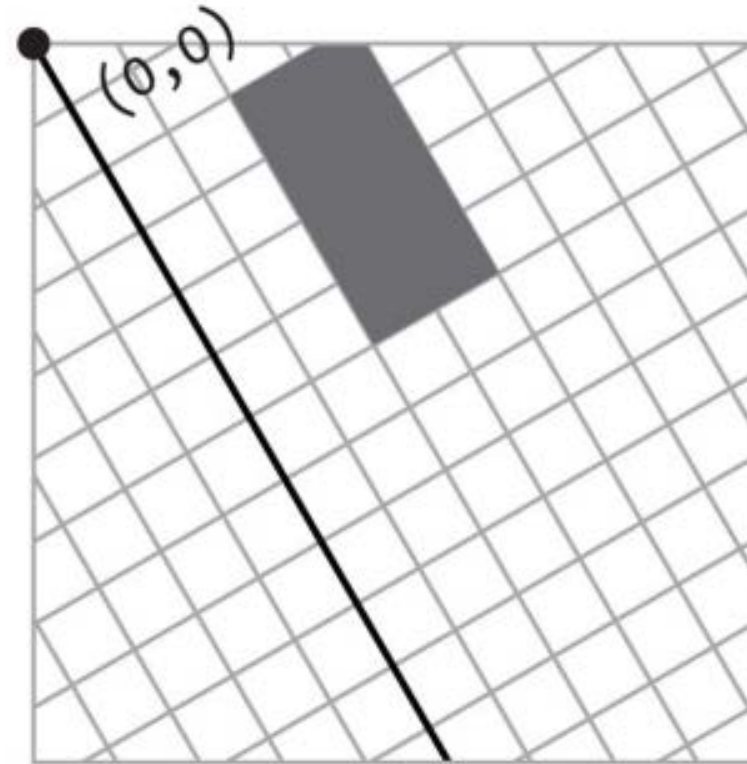


Figure 6-2. Rotating the coordinates



```
// Drawing an image rotated around its center
push();
  imageMode(CENTER);           // Draw from the center
  translate(400, 400);         // Move to where you want to draw
  rotate(45);                  // Apply any rotation
  scale(3);                    // Apply any scale
  image(img, 0, 0);            // Draw at (0, 0)
pop();
```

Loading Audio



p5.sound

- Sound library that is an optional part of p5.js
 - Must be included in index.html if you plan to use sound
- Built around the [Web Audio API](#) in JavaScript
- p5.sound's [reference page](#)



Playing an Audio File

```
// Global variable
var musicTrack;

function preload() {
    // Load the sound file (mp3 format is your best bet)
    musicTrack = loadSound("audio/baths-aminals.mp3");
}

function setup() {
    createCanvas(windowWidth, windowHeight);
    // Start playing the audio file
    musicTrack.play();
}
```

Getting the Volume

```
var musicTrack;
var amplitude;

function preload() {
  musicTrack = loadSound("audio/baths-animals.mp3");
}

function setup() {
  createCanvas(windowWidth, windowHeight);
  background(0);

  // Start the music playing
  musicTrack.play();
  // Get the amplitude of all p5 sounds
  amplitude = new p5.Amplitude();
}

function draw() {
  // Get the volume of the sounds at this moment
  var level = amplitude.getLevel(); // Number between 0 and 1
}
```

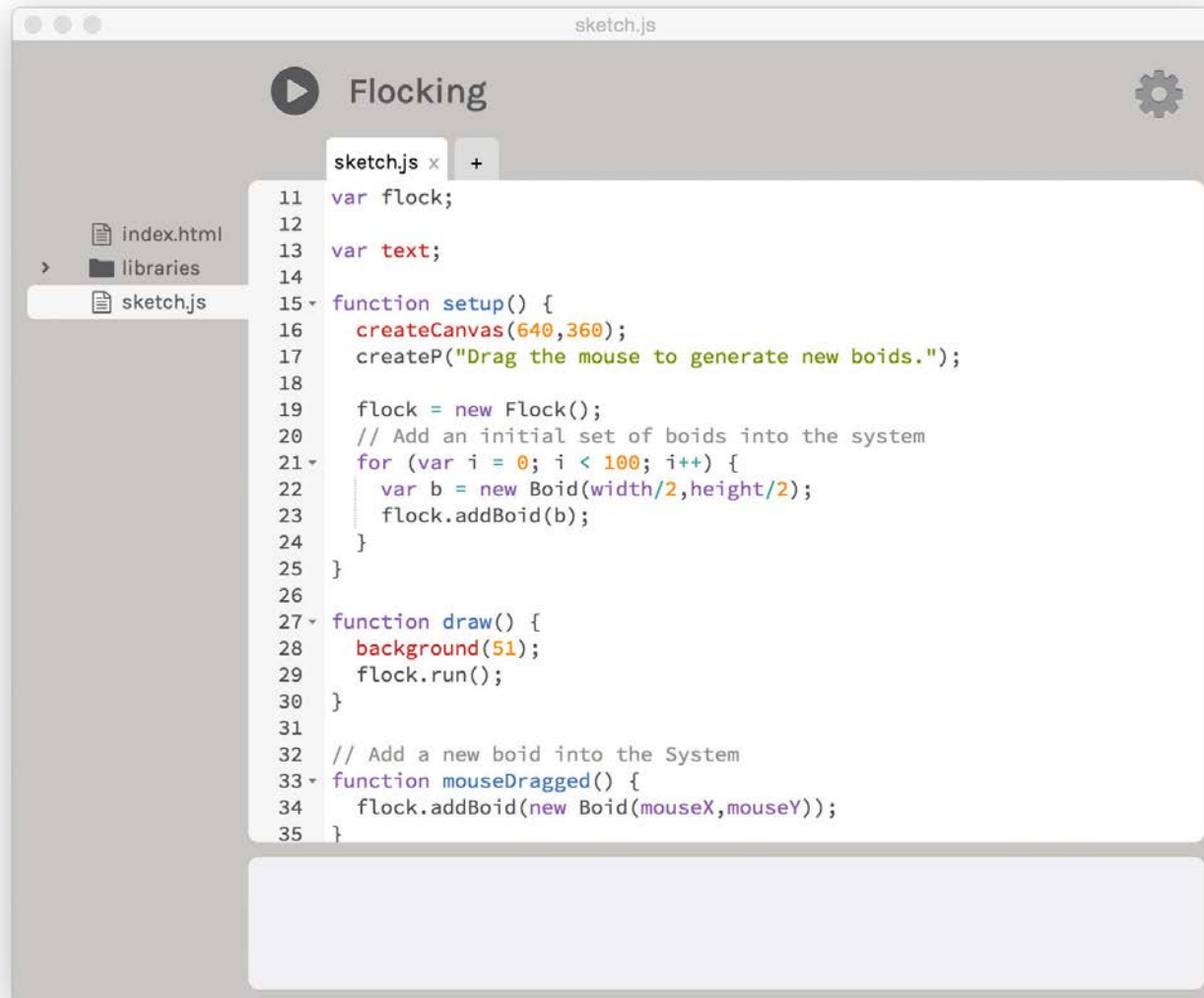
Local Server

Local Server?

- Browser don't let us access files on a computer, so if we want to load some sounds or images, we need something called a local server.
- A local server serves files from your hard drive to your browser as if they were coming from a website.
- Explanation and some local server options for various operating systems [here](#) or [here](#)
- We'll be using [SublimeServer](#)

Additional Resources

p5 Editor (beta)



This [editor](#) makes your life easier. It provides:

- Development environment with p5.js syntax highlighting
- Easy testing with built-in local server
- We won't use this 😊

Need Help?

- p5.js [reference](#) page
 - This should be your first stop. Check out the examples.
- p5.js has forums: [general](#), [programming](#), [libraries](#)
- Online [materials](#) from p5.js courses
 - [RISD – p5.js Code As Medium](#) – lots of examples
 - [Visualizing Music with p5.js](#) – slides & examples
- General [processing](#) forums
 - Remember, p5.js is a spin-off of processing. People won't necessarily know p5.js, but they will be generally knowledgeable.

Useful Tutorials for Core Concepts

- These are processing tutorials, but the concepts translate to p5.js. The syntax is not an exact match though...
- Noise
 - <http://natureofcode.com/book/introduction/>
 - Section 1.6
- Trig
 - <https://processing.org/tutorials/trig/>
- Transformations
 - <https://processing.org/tutorials/transform2d/>