Creative Coding with p5.js

Workshop: Introduction to p5.js

Linnéuniversitetet
Institutionen för medieteknik

Today

- What is this workshop all about?

  What will I learn in this workshop?

  Prerequisites

- p5.js overview

- Basics of JavaScript

  Tutorial: Live coding + commented source code

- Your first p5.js project

  Live coding + commented source code

What will I learn in this workshop?

- How to build apps with p5.js

  Basics of the

  p5.js project structure

  reading the p5.js documentation

  using the p5.js editor

  p5.js basic drawing and interaction capabilities

- Basic knowledge about JavaScript

  Prior to starting our first p5.js project, we have a look at the essentials of the JavaScript programming language. Afterwards, JavaScript is introduced as we go along in the p5.js application.

Prerequisites

- None

  We start from scratch with the basics, step-by-step.

- +

  Familiar with JavaScript

  Concept of Object-Oriented Programming (OOP)

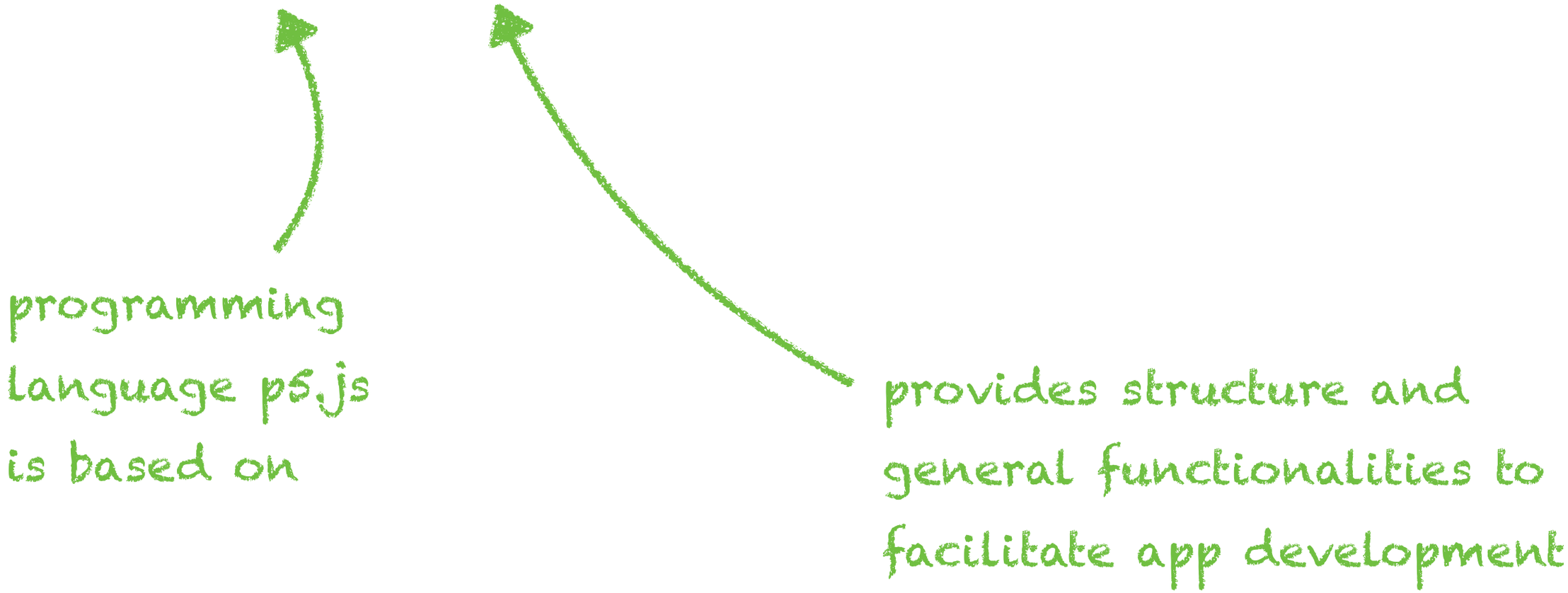
  Concept of Document Object Model (DOM) in HTML5

  Basic understanding of the World Wide Web (WWW, “web”)

  Be creative, vast imagination of what you want to do

What exactly is p5.js?

- JavaScript library



What exactly is p5.js?

- designed to make coding accessible

created with keeping a number of goals in mind

the process of writing an application on your computer

meant for those who want to do something with (interactive) digital media, but not necessarily have a strong computer science or programming background

What exactly is p5.js?

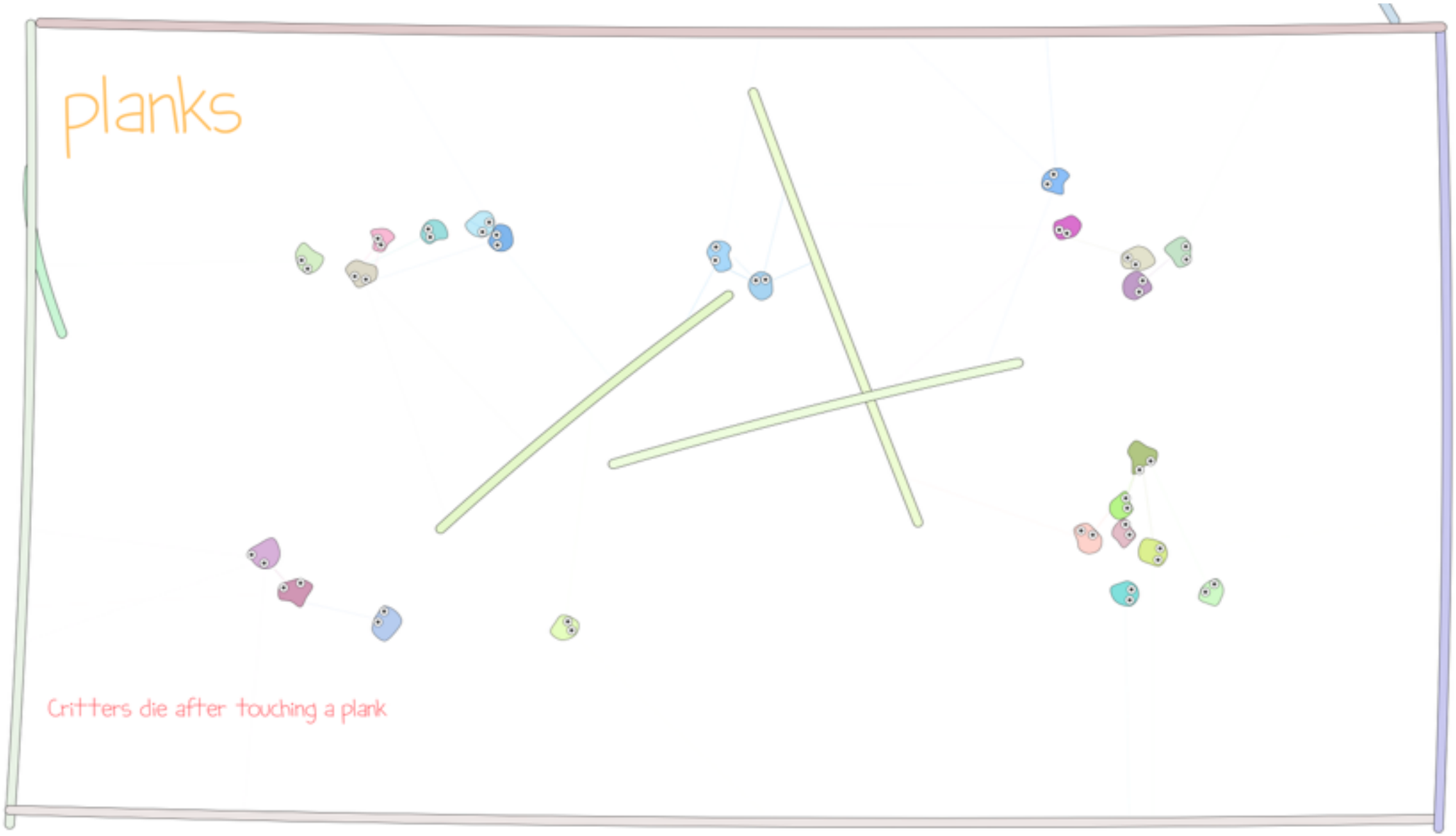
- lives in the web… in your browser

JavaScript is an essential technology of modern web pages / applications

use your internet browser to view and interact with your p5.js application...

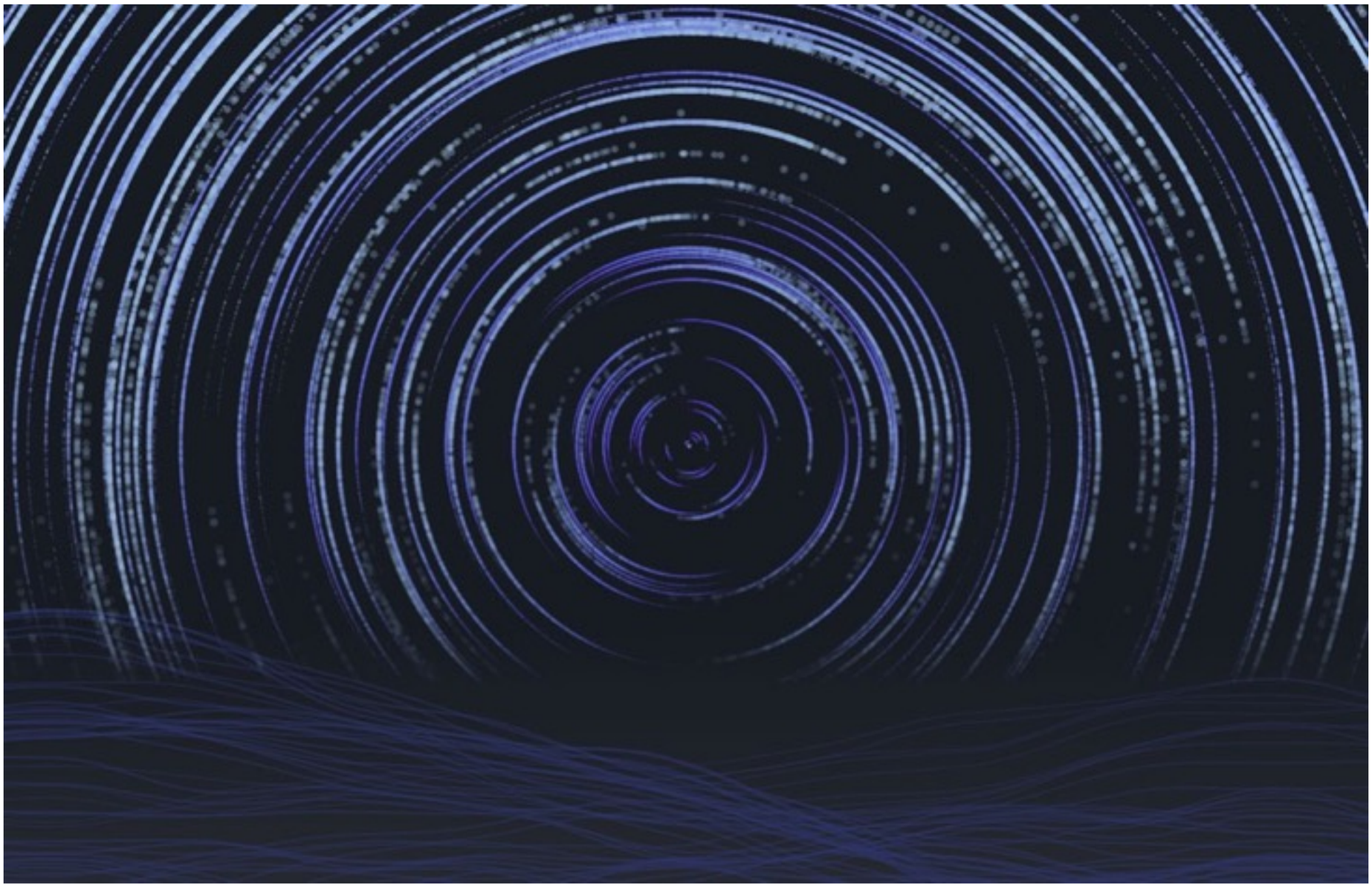
interpreted in real-time, no compilation needed

Creatures Avoiding Planks



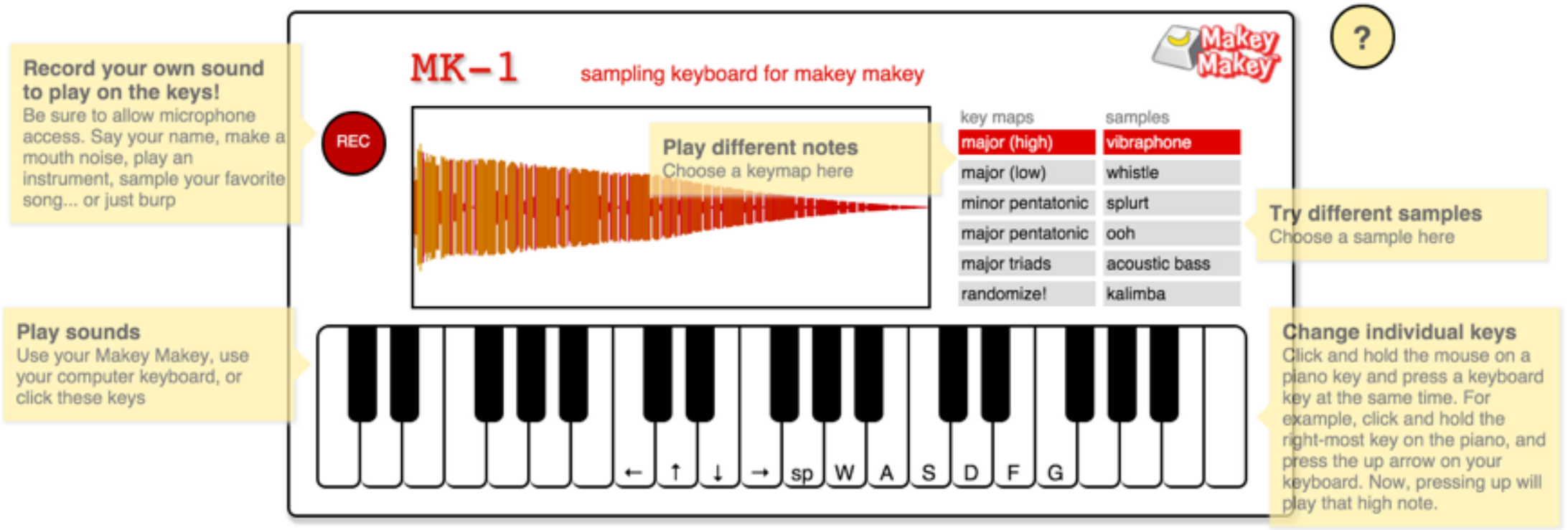
by David Ha, 2015, via otoro.net/planks/

Star Trails



by Michelle Chandra and Jason Sigal, 2014, via www.michellechandra.com/portfolio/star-trails/

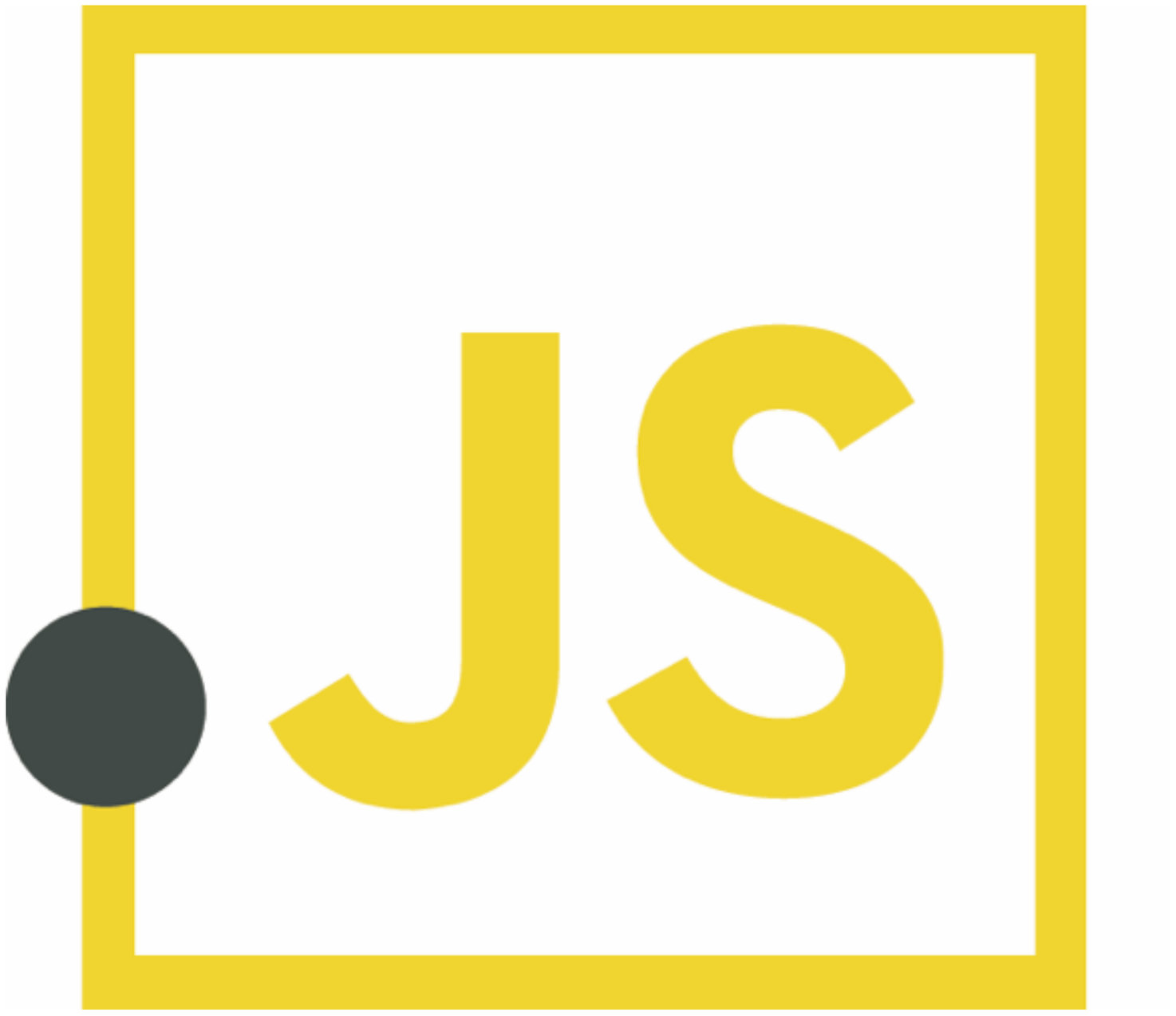
SketchSynth - Drawable user interface



by Eric Rosenbaum, 2014, via ericrosenbaum.github.io/MK-1/

Strengths of p5.js

- code gets interpreted directly in your browser
- no installation of additional software packages and compilers needed
- easy to setup, pick up and learn (JavaScript)
- very visual outcome, therefore very satisfactory within the coding/creation process
- additional libraries for more features and interaction, e.g. with text, input, video and audio



Let’s start with the basics of JavaScript

- Hands-on tutorial with 8 stages introducing the minimal basics of JavaScript to start with p5.js
- Live coding + comments in the source code

The complete source code of this tutorial is available online via GitHub:

github.com/nicoversity/cplusplus_intro

What tools do I need?

- Up-to-date browser of your choice,
  such as Chrome, Firefox, Safari
- Text editor of your your choice
  such as Atom, Sublime Text, Brackets, Light Table

During the workshop's live coding, I am going to use the **Chrome** web browser and the **Atom** text editor.

Examine the source code

- Open the downloaded contents of the git repository in your Text editor to examine the JavaScript .js files.
- Open the index.html file in your web browser and open its developer console.

Instructions on how to open the developer console in your web browser

Chrome: From the menu bar, select View - Developer - JavaScript Console.

Firefox: From the menu bar, select Tools - Web Developer - Web Console.

Safari: From the menu bar, select Develop - Show Web Inspector - and select the Console tab.

JavaScript tutorial overview

1. JavaScript function base frame
2. Statements
3. Arithmetic operations
4. More functions and local vs global variables/scope
5. Arrays and objects
6. Loops and iteration
7. Conditions and boolean values
8. Relational and logical operations

Congratulations!

- You are aware of the JavaScript basics.
- You are ready to dive into experimenting with p5.js!

Let’s start our first OF project!

p5.js tutorial overview

1. p5.js project structure
2. Reading the documentation
3. p5.js editor
4. Your first p5.js project
   featuring the p5.js application base frame, drawing and movement of a ball, keyboard and mouse interaction, random properties and more…

The complete source code of this tutorial is available online via GitHub:

github.com/nicoversity/cc_of_workshop_intro

Setup p5.js on your computer

Download p5.js (complete library) and the p5.js editor for OS X or Windows.

p5js.org/download

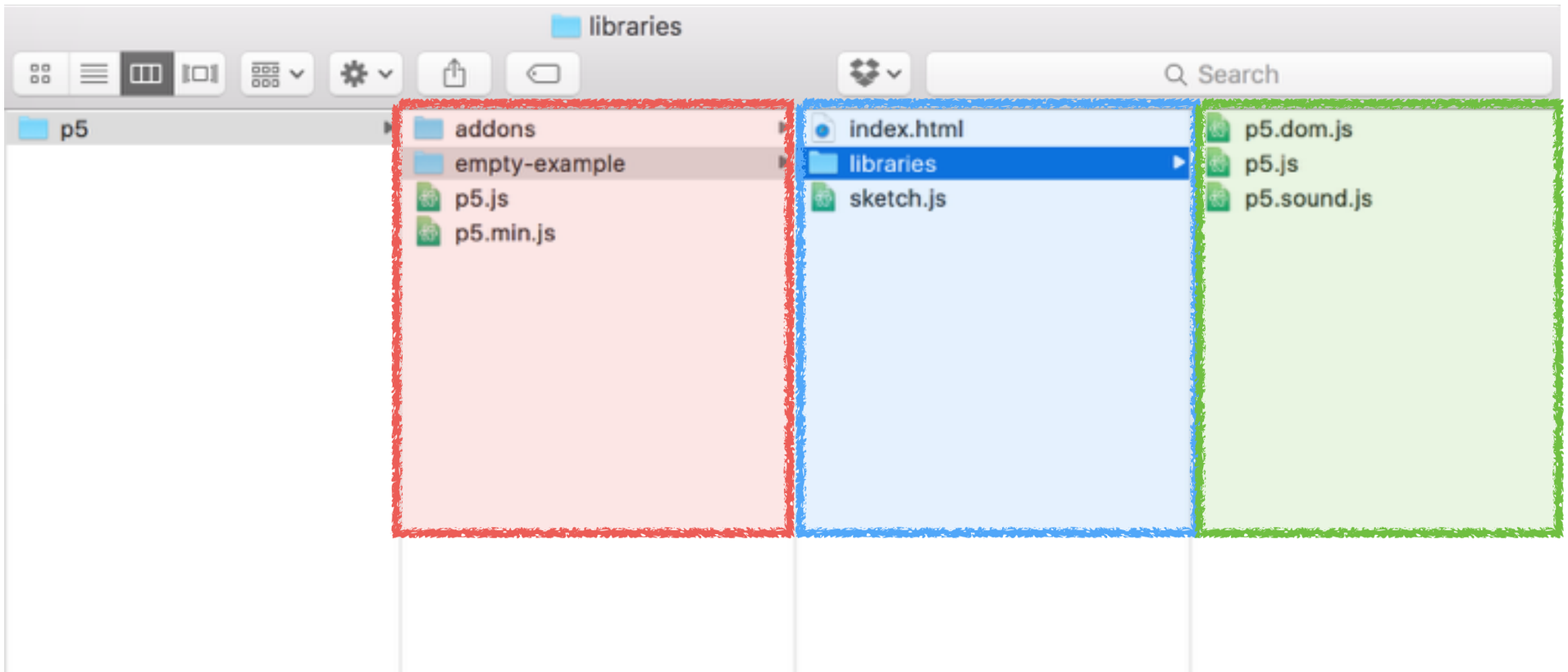
! Pre-workshop activity !

p5.js project structure

p5.js source files

project content

libraries



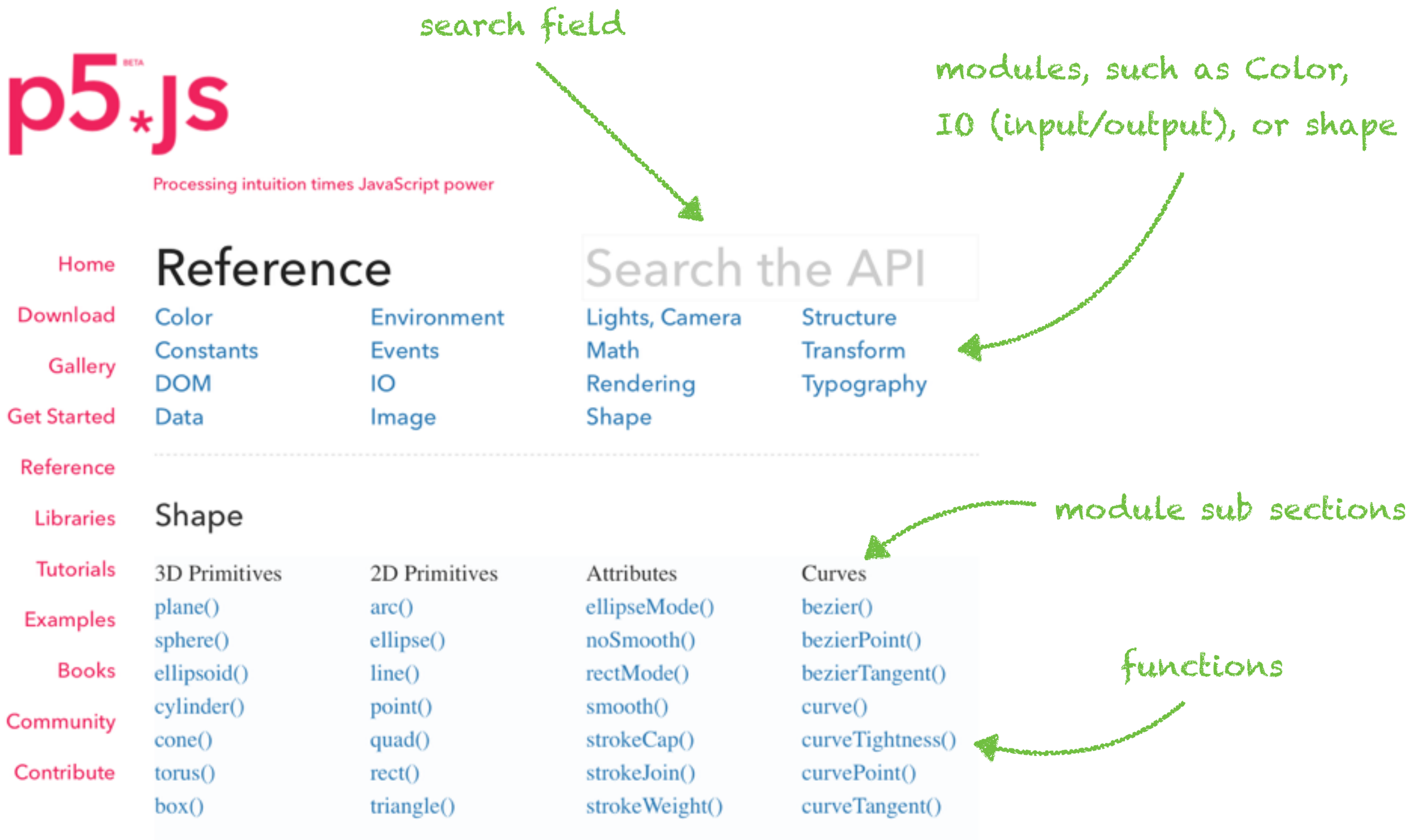
Reading the documentation

The official p5.js documentation is available online at

p5js.org/reference

Additional p5.js libraries, such as p5.sound or p5.play, including their documentation are available online at

p5js.org/libraries


search field
modules, such as Color, IO (input/output), or shape
p5.js BETA
Processing intuition times JavaScript power
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cylinder()
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torus()
box()
2D Primitives
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line()
point()
quad()
rect()
triangle()
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noSmooth()
rectMode()
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strokeCap()
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curvePoint()
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functions

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ellipse()

function name

Example

```
ellipse(56, 46, 55, 55);
```

edit reset

example (outcome + code)

Description

Draws an ellipse (oval) to the screen. An ellipse with equal width and height is a circle. By default, the first two parameters set the location, and the third and fourth parameters set the shape's width and height. The origin may be changed with the ellipseMode() function.

detailed function description

Syntax

```
ellipse(a,b,c,d)
```

syntax, parameters and return documentation

Parameters

a Number: x-coordinate of the ellipse.

b Number: y-coordinate of the ellipse.

c Number: width of the ellipse.

d Number: height of the ellipse.

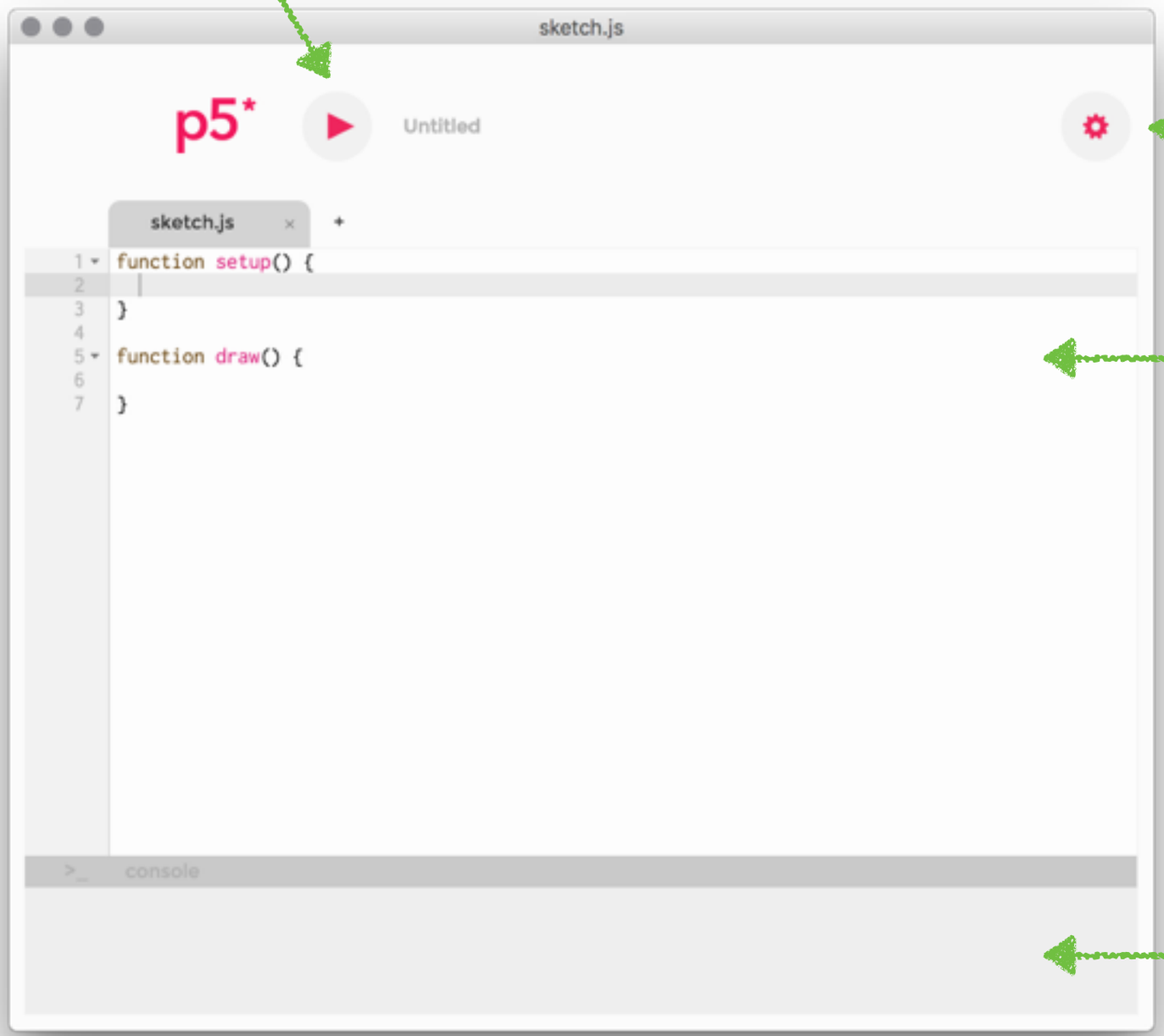
Returns

P5: the p5 object

p5.js editor

execute your code and display the outcome

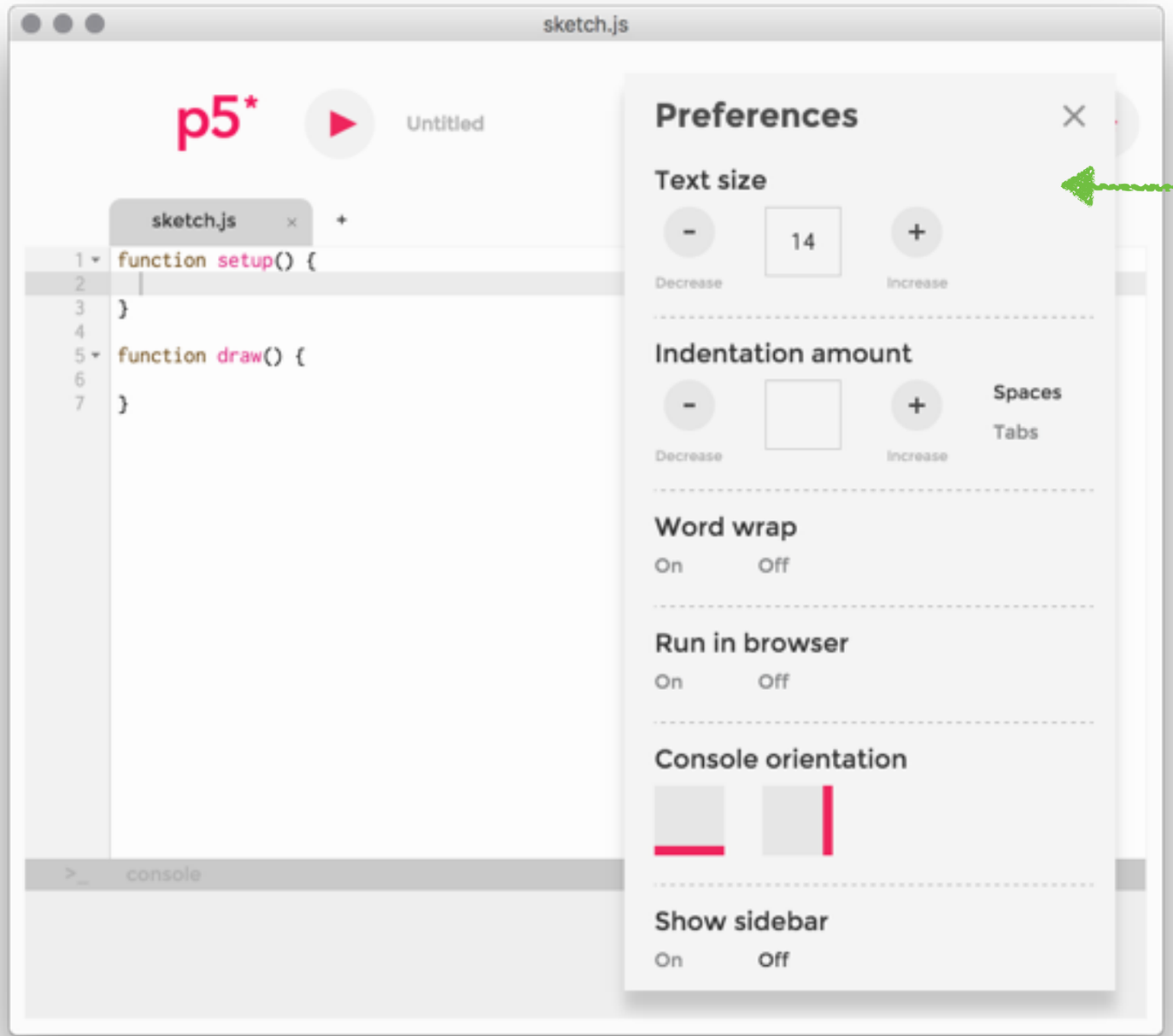
change settings for the p5.js editor



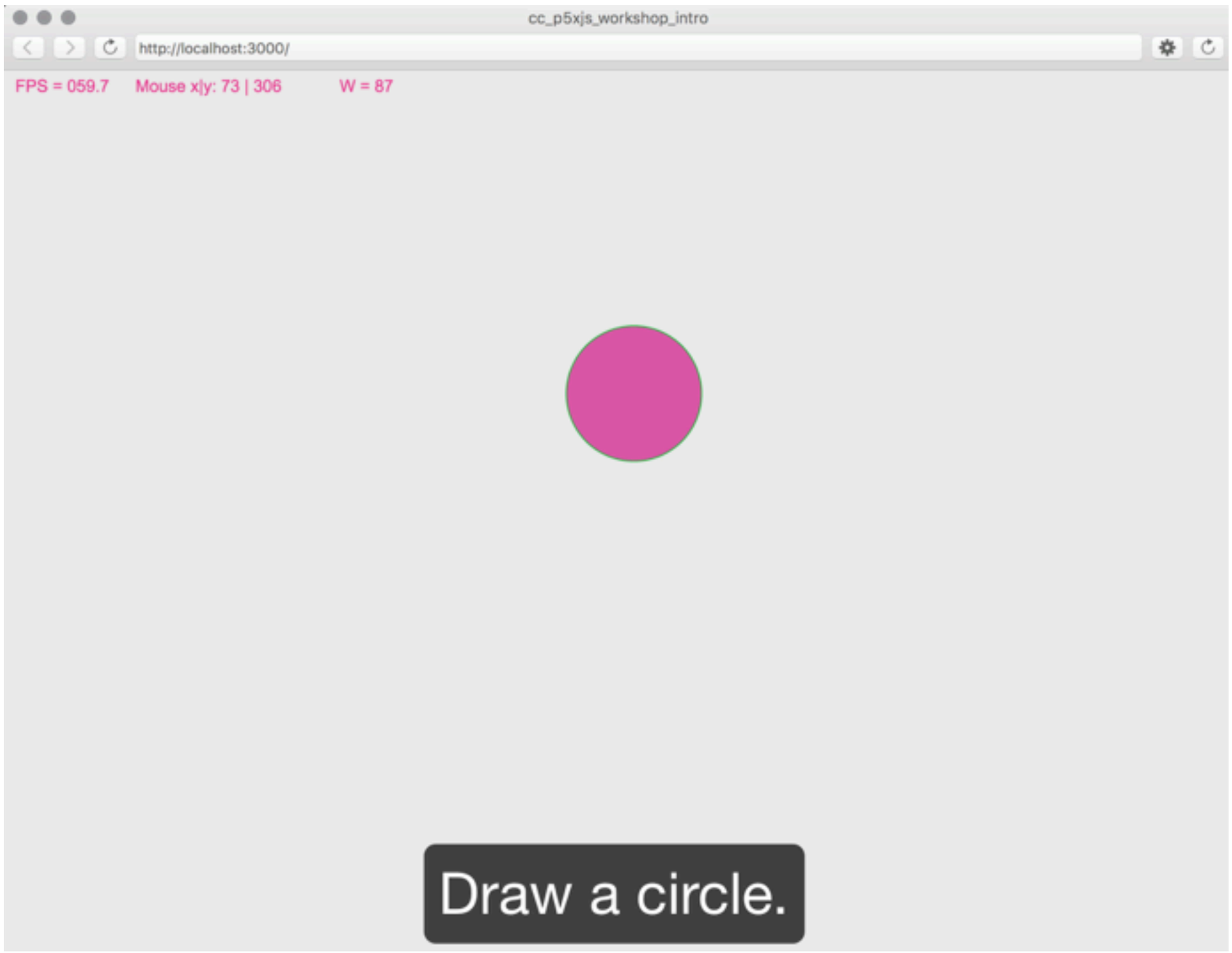
edit the source code of your sketch

developer console (displaying errors and other output messages)

p5.js editor


change settings for the p5.js editor
sketch.js
p5*
Untitled
sketch.js
1 function setup() {
2
3 }
4
5 function draw() {
6
7 }
>_ console
Preferences
Text size
-
14
+
Decrease
Increase
Indentation amount
-
+
Decrease
Increase
Spaces
Tabs
Word wrap
On Off
Run in browser
On Off
Console orientation
Show sidebar
On Off

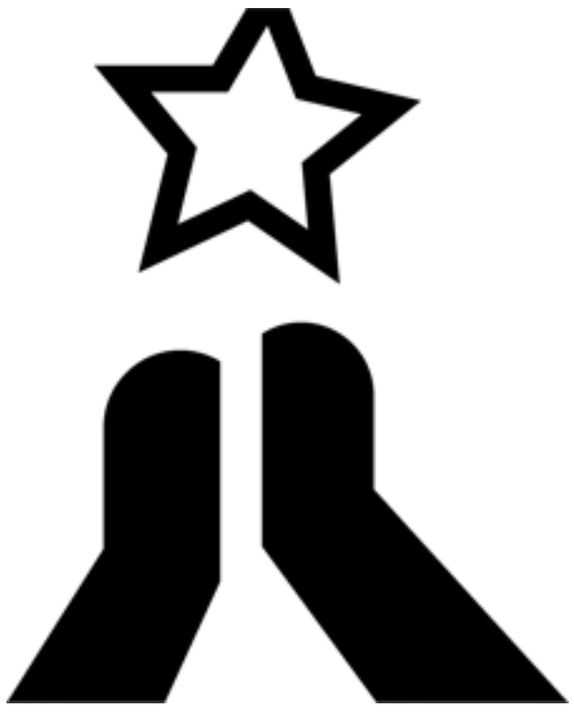
Let’s write our first p5.js app!



Examine the source code

- Open the **sketch.js** file in the downloaded contents of the git repository in the p5.js editor.
- The **sketch.js** file contains the complete source code of this project. Two earlier versions of the sketch, illustrating this introduction to p5.js, are located in the **legacy** folder of the git repository.

Congratulations!



- You completed your first creative coding project using p5.js.

So, what have we learned today?

- You obtained some basic programming skills in **Javascript**.
- You learned about the **structure** of an p5.js project and its **setup()-draw() lifecycle**.
- You acquired first experiences reading the **p5.js documentation**.
- Your gained first **practical experiences** in writing your own interactive p5.js app.

Further reading

- p5js.org/tutorials/
- p5js.org, github.com/processing/p5.js and forum.processing.org/two/
- javascript.com, eloquentjavascript.net and jsforcats.com
- creativeapplications.net
- p5js.org/books/
- shiffman.net

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CA98 308C 6772 4499 B061 D75B)

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All source code featured within this workshop is available online via GitHub

github.com/nicoversity

Additional references

The content of the openFrameworks tutorial was inspired by and adapted from
openframeworks.cc/tutorials and
p5js.org/get-started/

Portal icons in the presentation available via
bit.ly/portaliconpack