JavaScript and Phaser

Jump into the world of code!

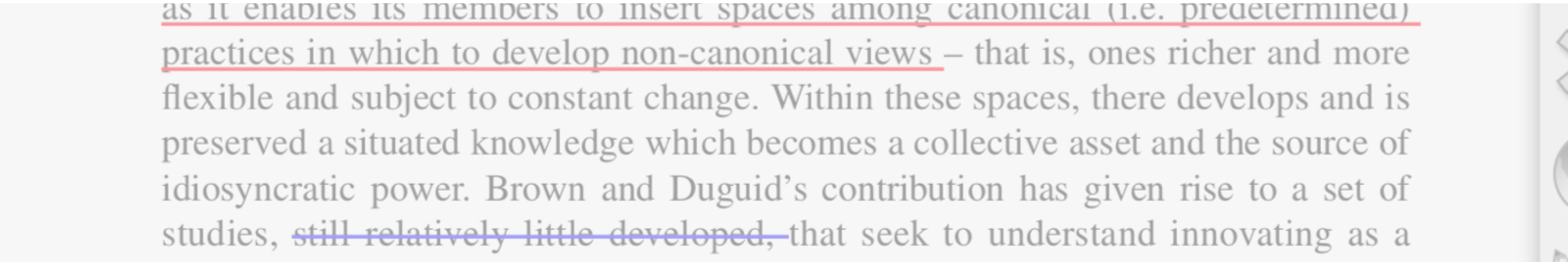
Today we’ll learn:

- The origins of HTML and JavaScript
- How to set up an HTML and JavaScript page
- JavaScript 101 - the basics
- How to set up Phaser
- The basics of Phaser

The Origins of HTML and JavaScript

What is HTML?

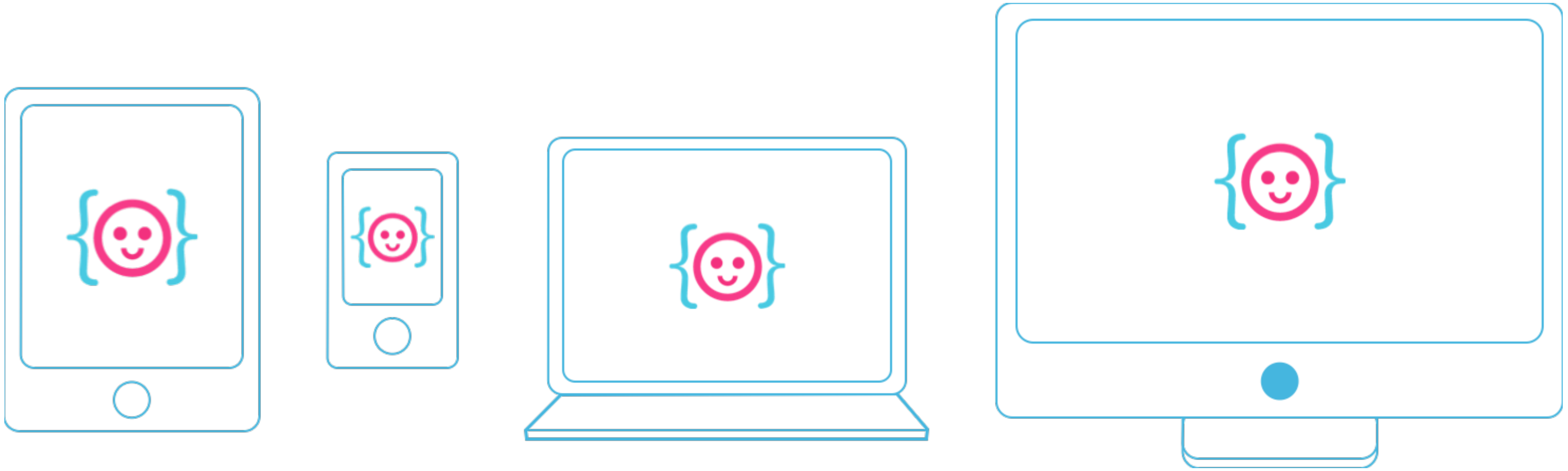
HTML is a **Markup language** (code-based annotation system)



as it enables its members to insert spaces among canonical (i.e. predetermined) practices in which to develop non-canonical views – that is, ones richer and more flexible and subject to constant change. Within these spaces, there develops and is preserved a situated knowledge which becomes a collective asset and the source of idiosyncratic power. Brown and Duguid's contribution has given rise to a set of studies, ~~still relatively little developed,~~ that seek to understand innovating as a

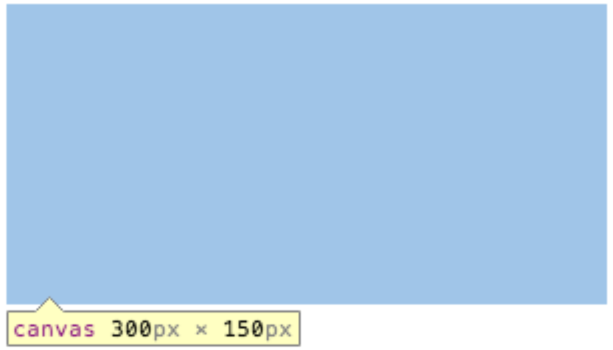
What is HTML5?

The 5th version of HTML, which was last updated in 1997. It was designed for all of our modern devices.



What is <canvas>?

An HTML5 tag that allows you to draw things in your browser using JavaScript.



It's a box that can make anything happen!

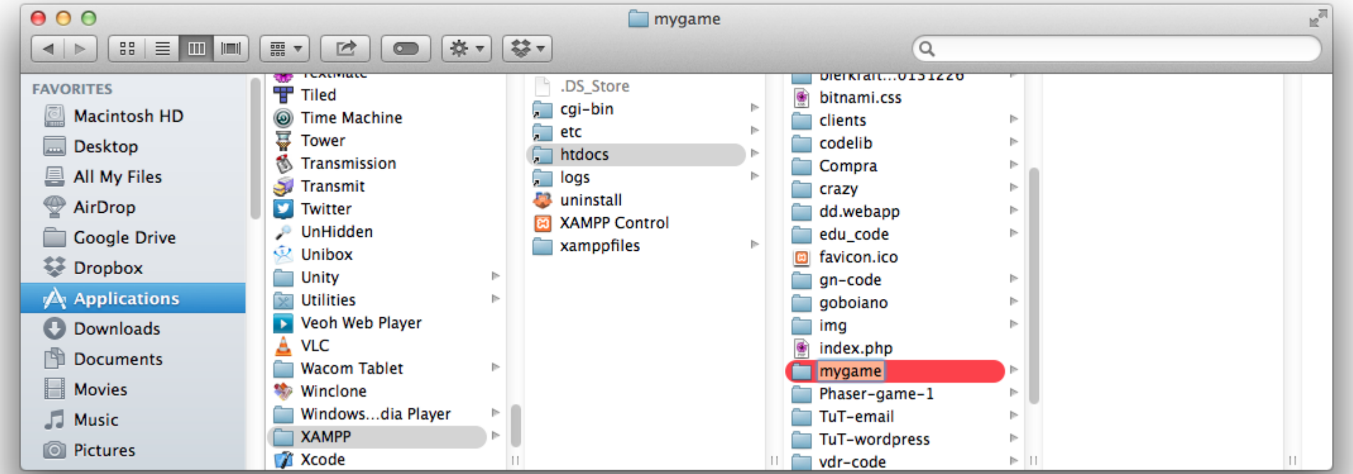
What is JavaScript?

- A 19-year-old programming language that is mainly used on the web.
- Allows dynamic interaction and effects to happen based on conditions and events.

Preparing to code in JavaScript

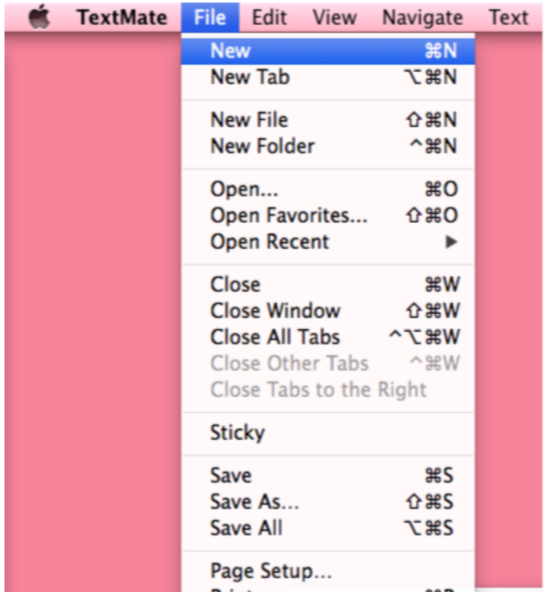
Create a new folder

Put the folder anywhere you'd like.



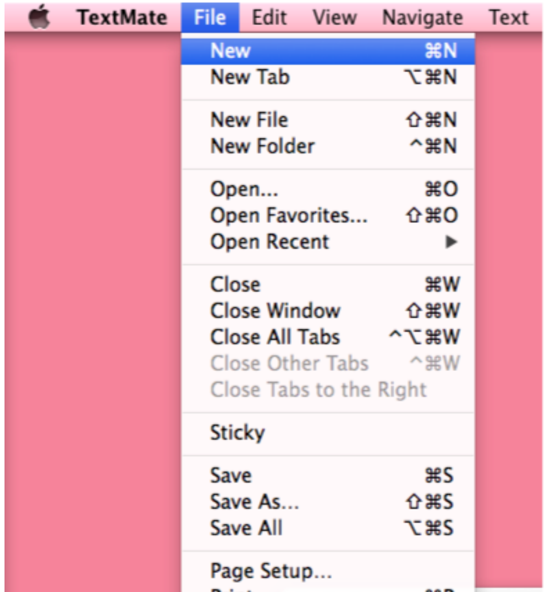
Create a new file in your text editor

Name it **index.html**.



Create another file in your text editor

Name it **scripts.js**.



Create a simple HTML5 layout

The bare minimum to get your HTML page working:

```
<!doctype html>
<html>
    <head>
        <title>My HTML Page</title>
    </head>
    <body></body>
</html>
```

Link your JavaScript file

Use the **<script>** tag to tell HTML to listen to your JavaScript file.

```
<body>
    <script src="scripts.js"></script>
</body>
```

Basic concepts of JavaScript

Structure of JavaScript

- Each command requires ; at the end.
- What happens inside {} stays inside. This rule is called the **scope**.
- You can use “ ” or ‘ ’. JavaScript doesn’t care, as long as you’re consistent!
- JavaScript can be finicky about spacing.

Comments

Use comments to leave notes in your code or troubleshoot issues.

- one-line comment: `// your comment`
- multi-line comment: `/* your comment */`

The Console

The console allows you to test your code.

Type:

```
console.log(“Hello, world!”);
```

View **Element Inspector**’s console in your browser.

Variables

Useful for storing data that may change or be referenced throughout the course of your game.

For example, your score:

```
var score = 1;
score = 2;
```

Types of Variables

Unlike some other languages that require you to state the variable data type, JavaScript does not. Keep track of your variable's type!

```
var message = "Hello, World!";
~~message = 1;~~ nope!
~~message = true;~~ nope!
message = "Welcome to the internet!"; yeah!
```

Types of Variables

Numbers

```
var score = 1;
```

Strings

```
var message = “Hello, World!”;
```

Booleans

```
var isAlive = true;
```

Functions

A group of code that performs a specific task.

```
var doMath = function (variable) {
    variable += 1;
    console.log(variable);
};

doMath(score);
```

Functions

You can declare a function in two ways:

```
var doMath = function(variable) {
};

function doMath(variable) {
};
```

Conditional Statements

Perform a task if something is true or false.

```
var testScore = function (variable) {
    if (variable != 10) {
        variable += 1;
        console.log(“Not 10 yet! You’re at ” + variable);
    }
};
testScore(score);
```

For Loops

Actions that happen until the set condition is false.

```
var addNumbers = function (variable) {
    for(i=0; i < 10; i++) {
        variable++;
    }
};

addNumbers(score);
```

Object Variables

Stores sets of data in one variable.

```
var Catt = {
    height: 164,
    age: 24,
    occupation: “Product Designer”
}
```

Object Variables

Uses **dot notation** to reference and/or define properties.

```
Catt.hairColor = “dark brown”;
Catt.hasPets = true;
```

Array Variables

Stores sets of data in numbered list form.

```
var inventory = [ “sword”, “potion” ];
```

Access and modify array items with **brackets**.

```
inventory[2] = “crescent moon wand”;
```

Math

- Addition: +
- Subtraction: -
- Multiplication: *
- Division: /

```
console.log( score + 1 );
```

Complicated Math

Use parentheses to do complicated formulas without having to remember how PEMDAS works.

```
score = ((51/43) + (61*48)) - 5;
```

Math’s Random Function

The **Math.random()** function allows you to find a random number between 0 and 1.

```
score = Math.random();
```

Random numbers above 1

Want a random number over 1? Multiply it by 100.

```
score = Math.random() * 100;
```

Random Integers

If you don't want a decimal number, use the **Math.floor()** function, which rounds down to the nearest integer.

```
score = Math.floor(Math.random());
```

Phaser

What is a framework?

- Frameworks help to reduce the amount of time spent reinventing the wheel.
- They come with a large set of tools to help you accomplish tasks faster.

What is Phaser?

Phaser is an open source JavaScript framework made for HTML5 game developers by HTML5 game developers.

WEBGL & CANVAS
PRELOADER
PHYSICS
SPRITES
GROUPS
ANIMATION
PARTICLES
CAMERA
INPUT
SOUND
TILEMAPS
DEVICE SCALING
PLUGIN SYSTEM
MOBILE BROWSER
DEVELOPER SUPPORT
BATTLE TESTED

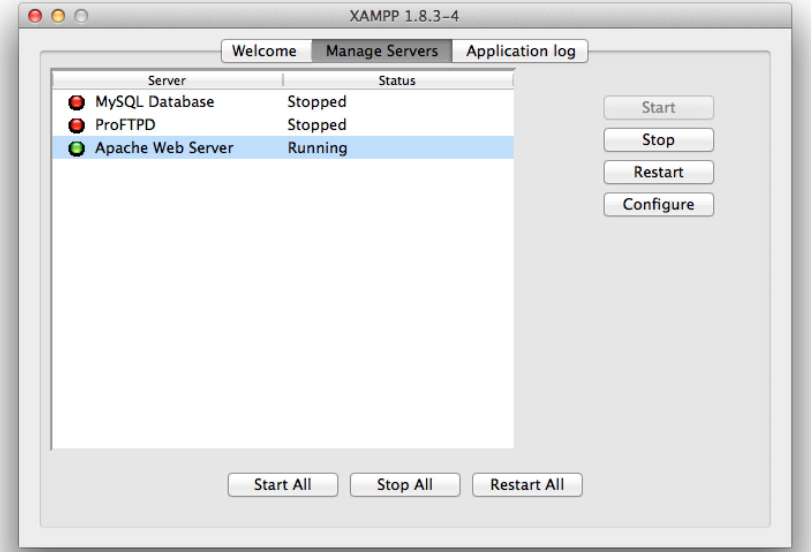
What is Phaser?

Phaser requires a server to run for security reasons. Local servers allow you create this experience without an internet connection.

Setting up Phaser

Turn on your web server

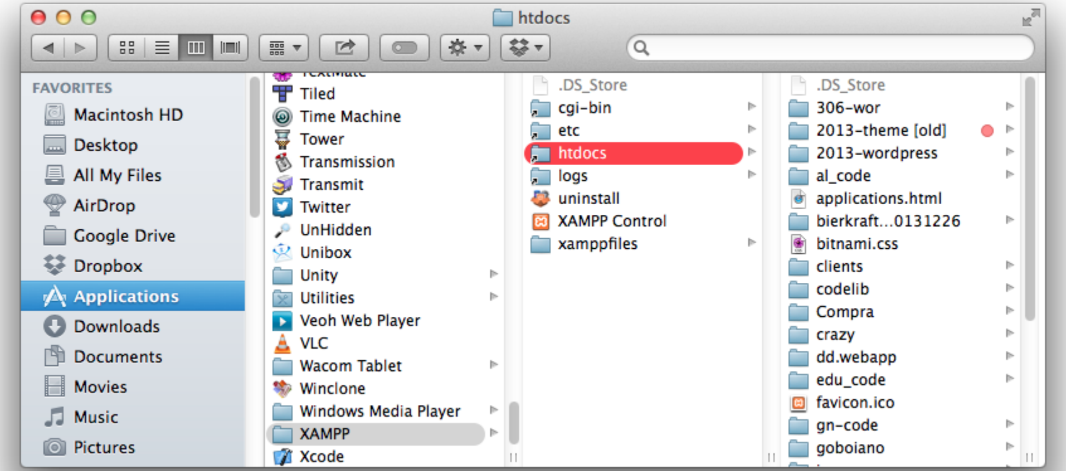
Open XAMPP and start the **Apache Web Server**.


XAMPP 1.8.3-4

Server	Status
🟥 MySQL Database	Stopped
🟥 ProFTPD	Stopped
🟩 Apache Web Server	Running

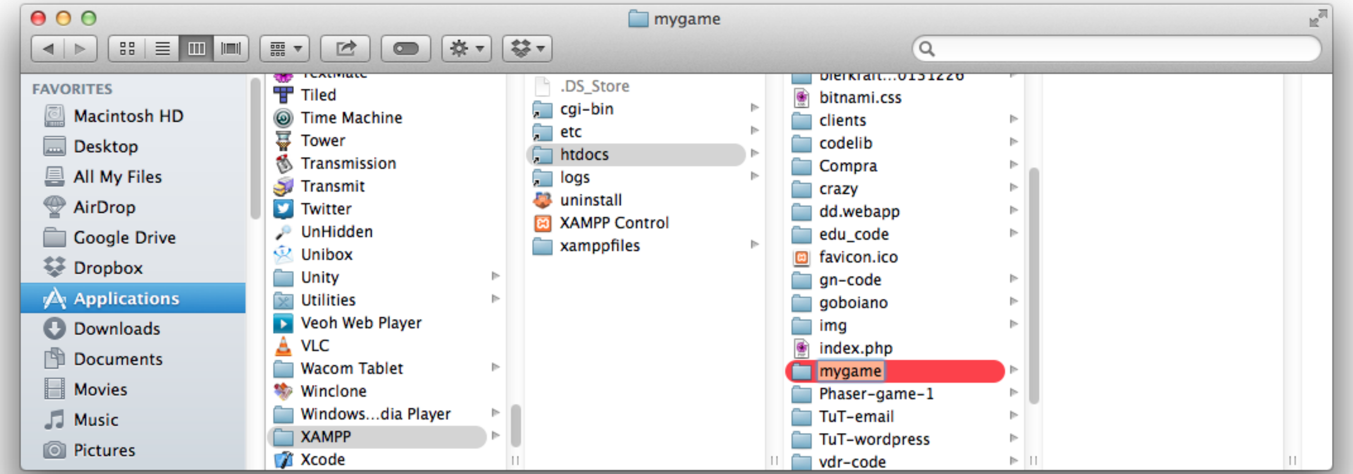
Find the XAMMP folder

Open your XAMPP folder, then find htdocs



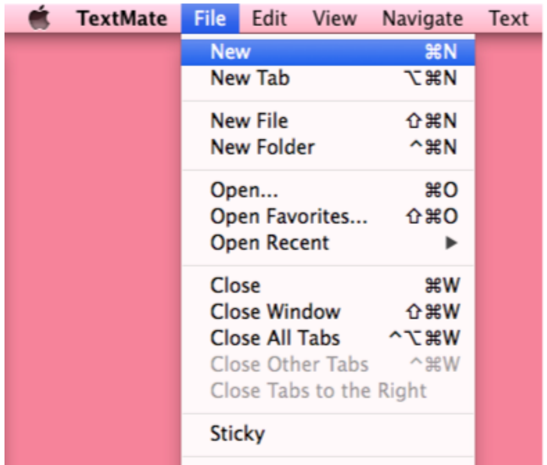
Create a new folder

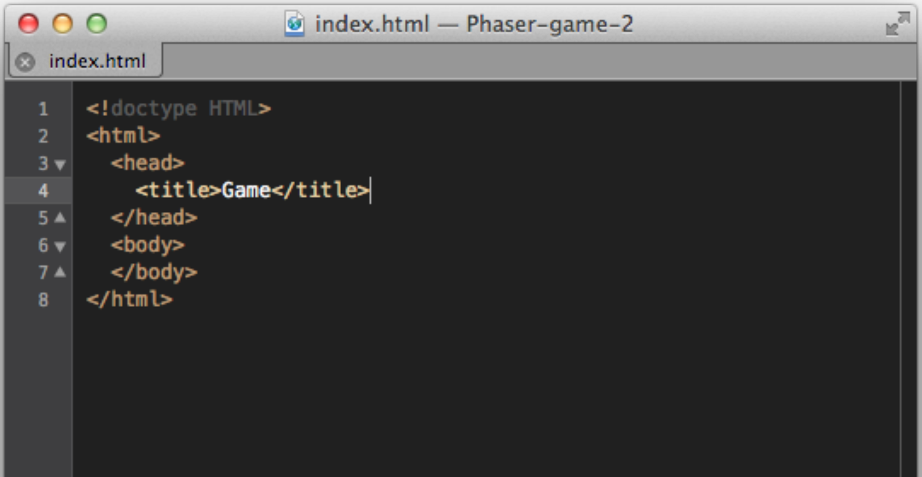
Put the folder inside htdocs.



Create a new file in your text editor

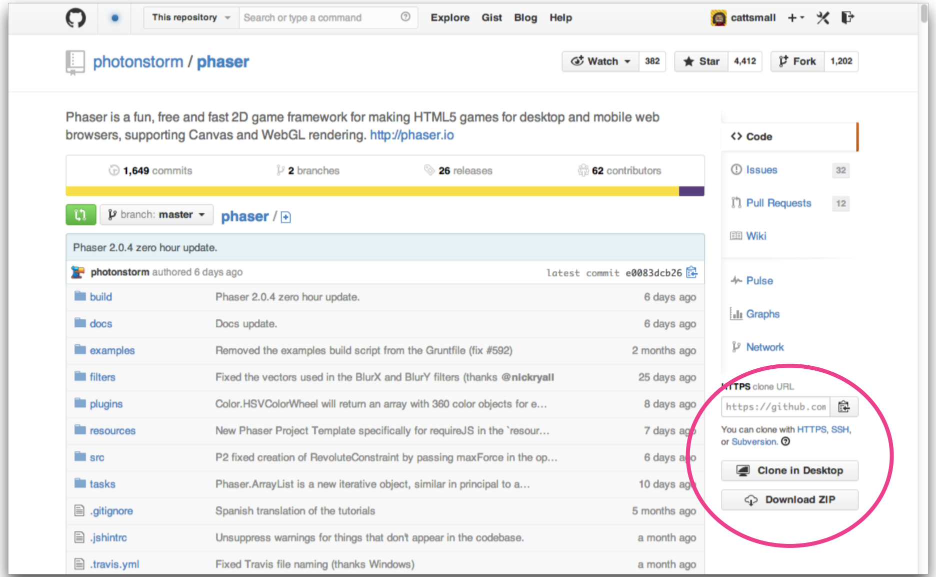
Save the new file as **index.html** in your folder. Use the same HTML5 code as before.





```
<!doctype HTML>
<html>
  <head>
    <title>Game</title>
  </head>
  <body>
  </body>
</html>
```

Download the latest version of Phaser



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photonstorm / phaser — Watch 382 — Star 4,412 — Fork 1,202

Phaser is a fun, free and fast 2D game framework for making HTML5 games for desktop and mobile web browsers, supporting Canvas and WebGL rendering. http://phaser.io

1,649 commits | 2 branches | 26 releases | 62 contributors

branch: master — phaser / +

Phaser 2.0.4 zero hour update.
photonstorm authored 6 days ago — latest commit e0083dcb26

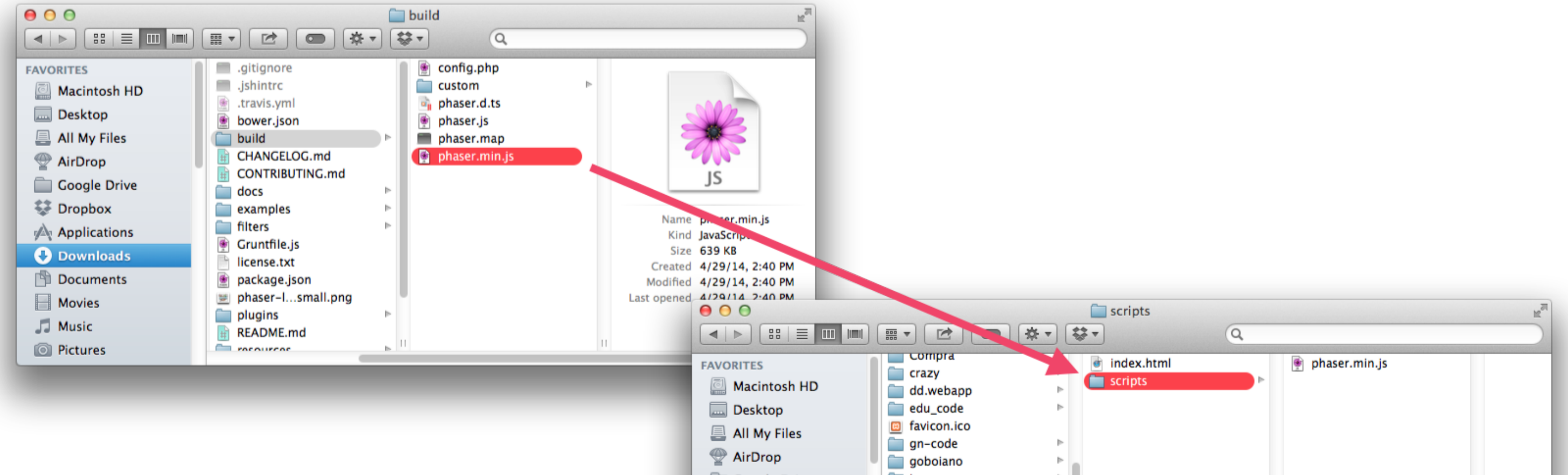
build	Phaser 2.0.4 zero hour update.	6 days ago
docs	Docs update.	6 days ago
examples	Removed the examples build script from the Gruntfile (fix #592)	2 months ago
filters	Fixed the vectors used in the BlurX and BlurY filters (thanks @nickryall	25 days ago
plugins	Color.HSVColorWheel will return an array with 360 color objects for e…	8 days ago
resources	New Phaser Project Template specifically for requireJS in the `resour…	7 days ago
src	P2 fixed creation of RevoluteConstraint by passing maxForce in the op…	6 days ago
tasks	Phaser.ArrayList is a new iterative object, similar in principal to a…	10 days ago
.gitignore	Spanish translation of the tutorials	5 months ago
.jshintrc	Unsuppress warnings for things that don't appear in the codebase.	a month ago
.travis.yml	Fixed Travis file naming (thanks Windows)	a month ago

github.com/photonstorm/phaser

Press "Download ZIP"

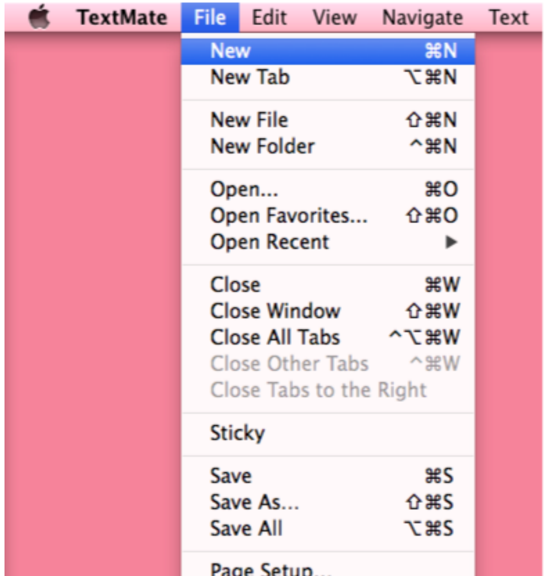
Move phaser.min.js

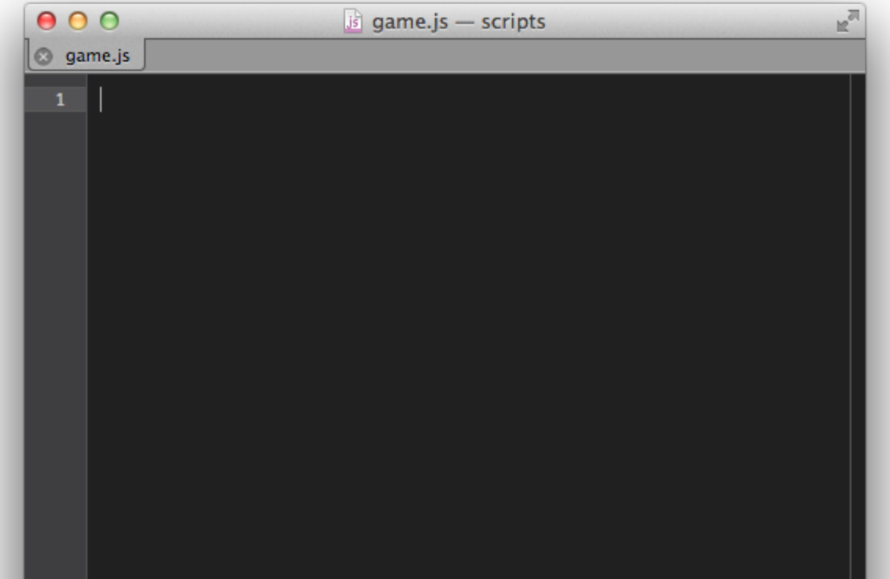
Move **phaser.min.js** from **build** to a new folder called “scripts” in your game’s directory.



Create a file for your game’s code

Save your new file as **game.js** in your **scripts** folder.





Download placeholder art

In case you don't have your own art to work with, you can use some we found:

http://tinyurl.com/CLF-html5-art-2014

Art by Robert Podgórski

Basic Phaser Concepts

Game

An object that contains properties related to gameplay including window width, window height, and graphic rendering settings.

```
var game = new Phaser.Game(640, 960, Phaser.AUTO);
```

States

Phaser allows your game to have different states. Some example of possible states are intro screens, gameplay levels, and win/lose screens.

```
game.state.add('GamePlay', myGame.GamePlay);
game.state.start('GamePlay');
```

Prototypes

Object functions need prototypes to run. In this case, prototypes outline the variables and functions within the scope of each state.

```
myGame.GamePlay.prototype = {
}
```

Preloading

Phaser needs to know what images to prepare before the game can be displayed. This phase is called **the preload()** function.

```
function preload() {
}
```

Images

There are several types of images in Phaser:

- **image** - static, no animation
- **spritesheet** - sprite with animation
- **tilemap** - environment objects

```
this.load.image(background, 'img/background.png');
```

Images

Sprites require widths and heights since they might have multiple animation frames. The last two numbers are the sprite’s width and height.

```
this.load.spritesheet('player', 'img/player.png', 32, 64);
```

Creating the Game

Once the preload function is complete, Phaser needs you to tell it how the game will start.

```
function create() {
}
```

Creating the Game

The **create()** function lets you set up variables, objects, and the look of your game.

```
function create() {
    myGame.score = 0;
}
```

Updating the Game

Unlike preload and create, which only run once each, the **update()** function runs every millisecond.

```
function update() {
}
```

Updating the Game

update() is where your player is told to move, the score is updated, etc.

```
function update() {
   myGame.score += 1;
}
```

Drawing objects

You can draw interactive objects onscreen using Phaser’s **add** function.

```
myGame.character = this.add.sprite(x, y, 'charName');
```

Adding interactivity

You can add interactivity to your game using a variety of **input** types.

- `this.input.mouse.x` finds the X location of the mouse
- `var cursors = game.input.keyboard.createCursorKeys()` creates an object that contains hotkeys for the **up**, **left**, **right**, and **down** arrows.
    - `cursors.left.isDown` checks if the left key is down.

Animating objects

You can animate objects by adding to its **animations** property and choosing the frames that should be shown in order.

```
myGame.character.animations.add('animationName', [0, 1,
2]);
```

Animating objects

To trigger an animation, use the play command. Name the animation you want to play, enter a **framerate**, and say whether the animation should loop (true) or not (false).

```
myGame.character.animations.play('animationName',30,
false);
```

Physics

Phaser has a set of systems called **Physics** that allows you to easily check when objects touch.

```
this.physics.enable(player, Phaser.Physics.ARCADE);
```

Physics

Phaser has 3 types of physics:

- **Arcade** - only checks if rectangles overlap. Quickest to load.
- **Ninja** - checks for slopes and rotation (curves)
- **P2** - allows you to make a full-fledged physics game with angles and swinging like Angry Birds

Checking collision

Using Phaser’s physics, you can trigger a function when two objects (or groups of objects) overlap:

```
this.physics.arcade.overlap(player, enemy, playerDies);
```

Groups

Have an object you want to repeat onscreen and give the same properties? Make a group.

```
myGame.myGroup = this.add.group();
```

Using Groups

Use a **for loop** or timer function to instantiate objects and add them to a group.

```
var groupItem = myGroup.create(x, y, 'spriteToUse');
```

or

```
myGame.myGroup.add(groupItem);
```

To do:

- Make a small interactive game in Phaser.
- If possible, use your game art from last week to make the game even more awesome!

Thanks! Questions?

@cattsmall
catt@codeliberation.org