Introducing

Phaser

6/27 Announcements

- We're getting a tutor
  - Sessions are tentatively scheduled for Wednesday afternoons and Friday mornings
    - Starting time depends on when Summer Session gets back to me, so stay tuned for more details
- We may be moving to a closer classroom in the future
  - But I want to make sure to give you advance notice before it happens
    - At least 24 hours in advance
    - Watch the announcements on Canvas

This Class:

Get out your laptop!
(if you have one)

Framework

A “foundation” or “support structure” around which you build an application.

Frameworks provide a relatively static, generic structure on and in which you build something specific and unique.

You build with a framework

Phaser
Three.js
P5.js
ImpactJS
LÖVE
MonoGame

Engine

Full-feature toolsets that handle core logic and implementation details upon which you build an application.

Engines provide a self-contained but externally-controllable piece of code that encapsulates powerful logic designed to perform a specific kind of work.

You build on an engine

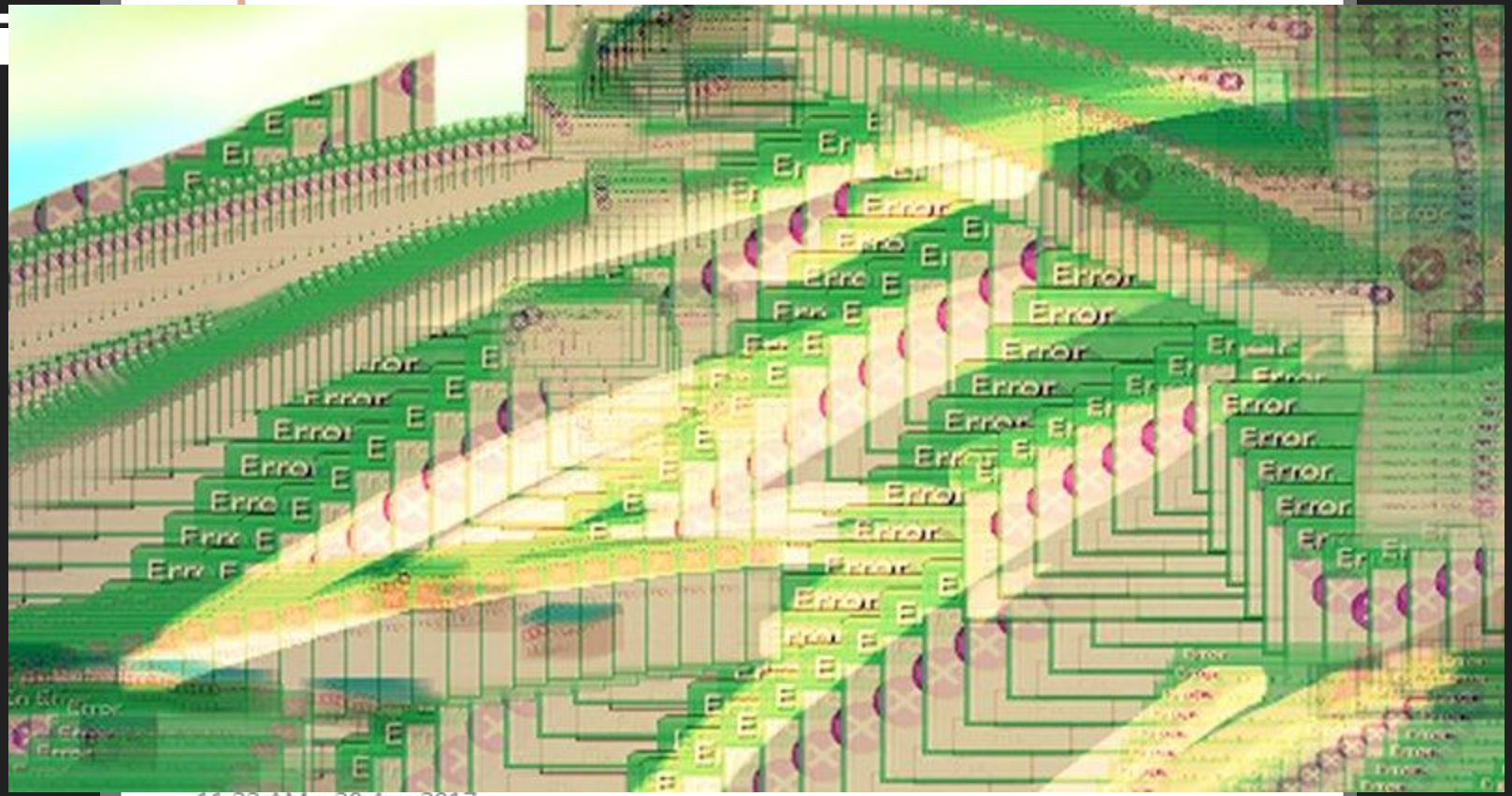
Unity
Unreal
CRYENGINE
Construct2
GameMaker
Godot
Frostbite

How do you choose a framework, anyway?

It's not the tools

I like this example...

I li



10 511 737

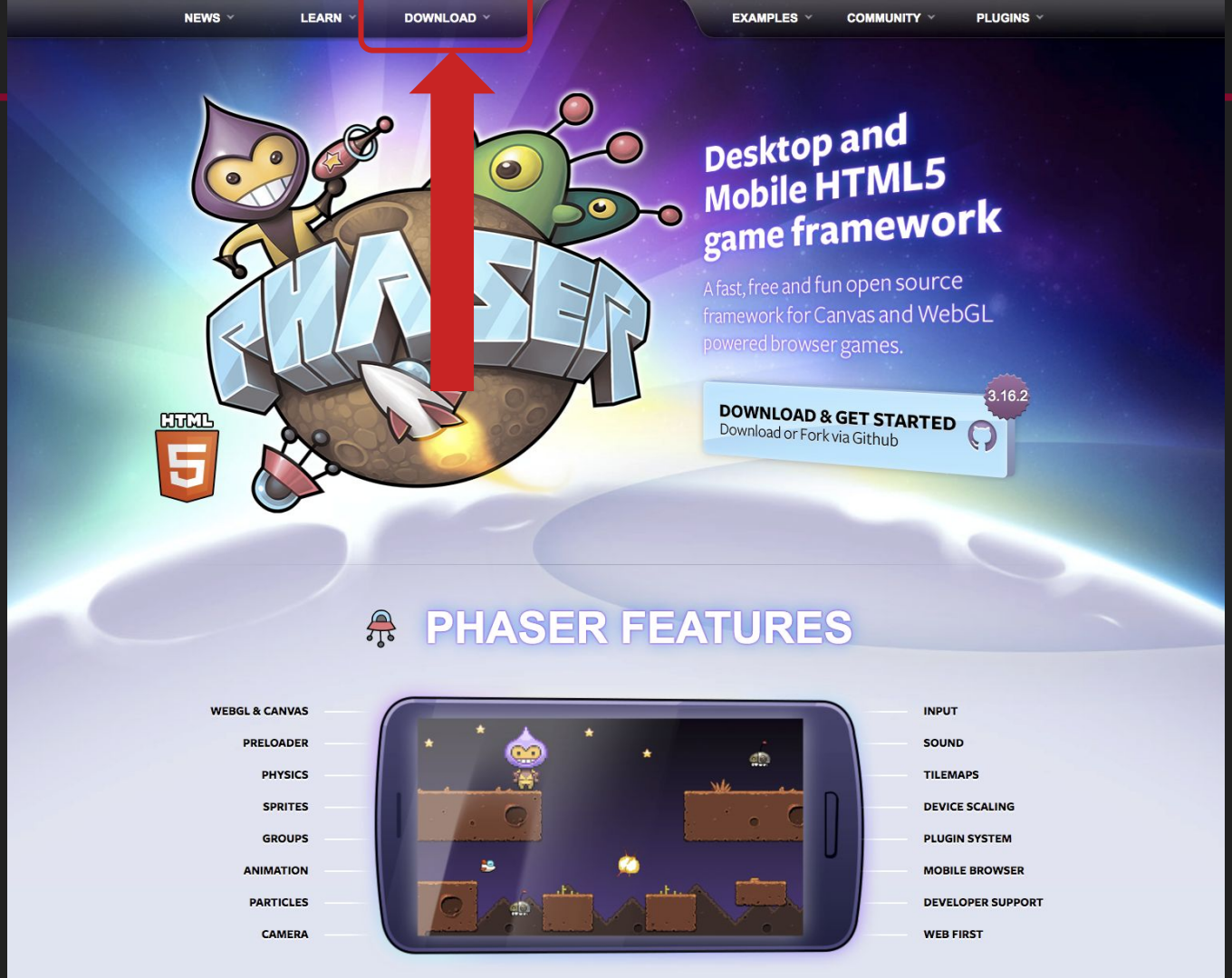
11:22 AM - 20 Apr 2017

668 Retweets 967 Likes

Some Helpful Questions

- What works best for you and/or your team?
- What fits your skill level?
- What workflow makes sense to you?
- What creates the least amount of friction?
- What fits your budget?
- What are your target platforms?
- What scales to multiple games or genres?
- Can I get help when I need it?
- What quality of help will I receive?
- What compromises am I comfortable making?
- Will I be able to achieve my target goal?

Phaser (let's get started!)


NEWS
LEARN
DOWNLOAD
EXAMPLES
COMMUNITY
PLUGINS
PHASER
HTML 5
Desktop and Mobile HTML5 game framework
A fast, free and fun open source framework for Canvas and WebGL powered browser games.
DOWNLOAD & GET STARTED
Download or Fork via Github
3.16.2
PHASER FEATURES
WEBGL & CANVAS
PRELOADER
PHYSICS
SPRITES
GROUPS
ANIMATION
PARTICLES
CAMERA
INPUT
SOUND
TILEMAPS
DEVICE SCALING
PLUGIN SYSTEM
MOBILE BROWSER
DEVELOPER SUPPORT
WEB FIRST

NEWS LEARN DOWNLOAD PHASER EXAMPLES COMMUNITY PLUGINS

1. DOWNLOAD PHASER

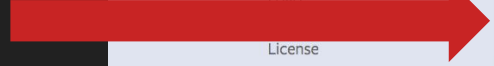
Download Phaser from GitHub
DOWNLOAD AS A ZIP - OR FORK IT!

2. GETTING STARTED

You can code your Phaser games in JavaScript or TypeScript and we've *Getting Started* guides for both. If you're coming from Flash / AS3 then we'd recommend giving TypeScript a go, otherwise stick with JavaScript.

- JavaScript Guide
- TypeScript Guide
- Cloud-based IDE Guide

Why yes, we are looking for Phaser CE!



Phaser 3.16.2 "Ishikawa"

slack
Bring your team together with Slack, the collaboration hub for work.
ADS VIA CARBON

Phaser 3.16.2 "Ishikawa" is the current stable version and was released on 11th February 2019. The previous version of Phaser was 3.16.1.

clone | js | min.js | zip | tar.gz

npm

Download this version from npm. Need more details? Follow this tutorial.

```
npm install phaser@3.16.2
```

CDN

Phaser is on the jsDelivr CDN. Include one of the following in your html:

```
<script src="//cdn.jsdelivr.net/npm/phaser@3.16.2/dist/phaser.js"></script>
<script src="//cdn.jsdelivr.net/npm/phaser@3.16.2/dist/phaser.min.js"></script>
```

⚠ Looking for Phaser 2 / CE?

The latest CE release is 2.12.0 released on 6th February 2019.

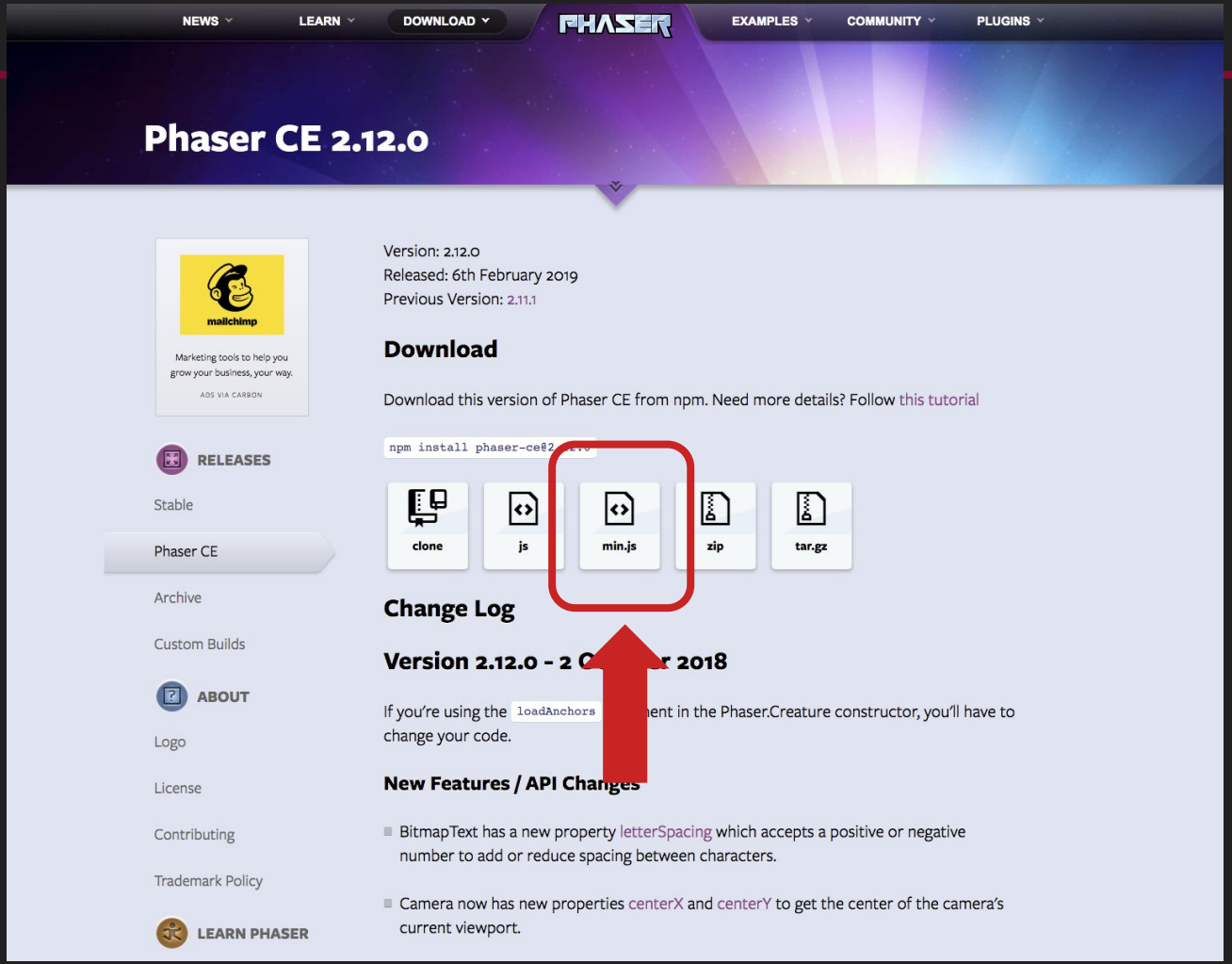
Which file should I download?

Familiar with git? Use the "clone" link to get the whole repo. The "js" and "min.js" links download pre-built versions of Phaser with all modules enabled. The zip and tar links download an archive of the repository. If you're just doing a quick test then it's safe to grab the js files, however it's always worth having the source code to hand for reference.

Please Use

Phaser CE 2.13.1

(As of June 2019)


NEWS
LEARN
DOWNLOAD
PHASER
EXAMPLES
COMMUNITY
PLUGINS
Phaser CE 2.12.0
mailchimp
Marketing tools to help you grow your business, your way.
ADS VIA CARBON
RELEASES
Stable
Phaser CE
Archive
Custom Builds
ABOUT
Logo
License
Contributing
Trademark Policy
LEARN PHASER
Version: 2.12.0
Released: 6th February 2019
Previous Version: 2.11.1
Download
Download this version of Phaser CE from npm. Need more details? Follow this tutorial
clone
js
min.js
zip
tar.gz
Change Log
Version 2.12.0 - 2
2018
If you're using the loadAnchors
in the Phaser.Creature constructor, you'll have to change your code.
New Features / API Changes
BitmapText has a new property letterSpacing which accepts a positive or negative number to add or reduce spacing between characters.
Camera now has new properties centerX and centerY to get the center of the camera's current viewport.

phaser.min.js

"Minified" JavaScript file

Minification is a bandwidth optimization technique that reduces the size of code transmitted over the web.

NEWS LEARN DOWNLOAD PHASER EXAMPLES COMMUNITY PLUGINS

1. DOWNLOAD PHASER

Download Phaser from GitHub

DOWNLOAD AS A ZIP - OR FORK IT!

2. GETTING STARTED

You can code your Phaser games in JavaScript or TypeScript and we've *Getting Started* guides for both. If you're coming from Flash / AS3 then we'd recommend giving TypeScript a go, otherwise stick with JavaScript.

JavaScript Guide

TypeScript Guide

Cloud-based IDE Guide

NEWS LEARN DOWNLOAD PHASER EXAMPLES COMMUNITY PLUGINS

Getting Started with Phaser

The power of shared understanding
miro
Experience the power of the #1 visual collaboration platform. Try Miro!
ADS VIA CARBON

Choose your own adventure

By Richard Davey on 14th February 2018 @photonstorm

Please select the guide for the version of Phaser you are using:

Getting Started with Phaser 3

or

Getting Started with Phaser 2 / Phaser CE

LEARN

API Documentation

Making your first game

Facebook Instant Games

Dev Logs

Tutorials

Online Code Editor

Star 24,220 Watch 1,301

Getting Started with Phaser 2

The new generation of project management tools is here and it's visual.
ADS VIA CARBON

Part 1 - Introduction

By Richard Davey on 14th February 2018 @photonstorm

This guide is for Phaser 2 / Phaser CE. If you're using Phaser 3 then please go here.

In this tutorial we're going to cover setting-up a development environment with which you can build your Phaser games. This will include running a local web server, picking an IDE, getting the latest version of Phaser and checking it all works together.

If you trust us that you *do* need a local web server for development, then you can skip the explanation below and head directly to part 2.

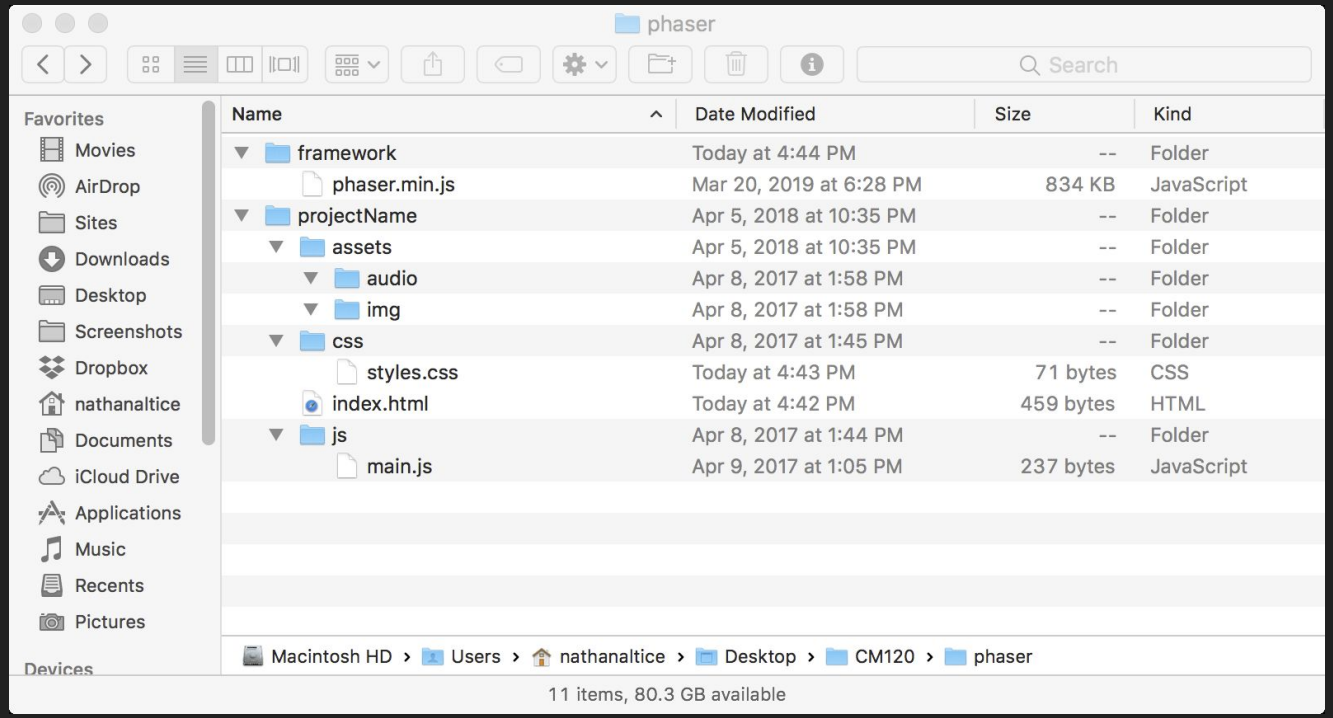
If you'd like to know the reasoning why, please read on ...

A web server? But I want to make games!

> *"Why do I need a local web server? Can't I just drag the html files onto my browser?"*
>
> **A. SANE, DEVELOPER**

Not these days, no. I appreciate that it's a bit confusing, even contradictory at times, but it all boils down to browser security. If you're making a static html web page then you can happily drag this file into your browser and see the end results. You can also "Save As" entire web pages locally and re-open them with most the contents intact. If both of these things work why can't you drag an HTML5 game into a browser and run it?

It's to do with the protocol used to access the files. When you request anything over the web you're using `http`, and the server level security is enough to ensure you can only access files you're meant to. But when you drag a file in it's loaded via the local file system (technically `file://`) and that is massively restricted, for obvious reasons. Under `file://` there's no concept of domains, no server level security, just a raw file system.

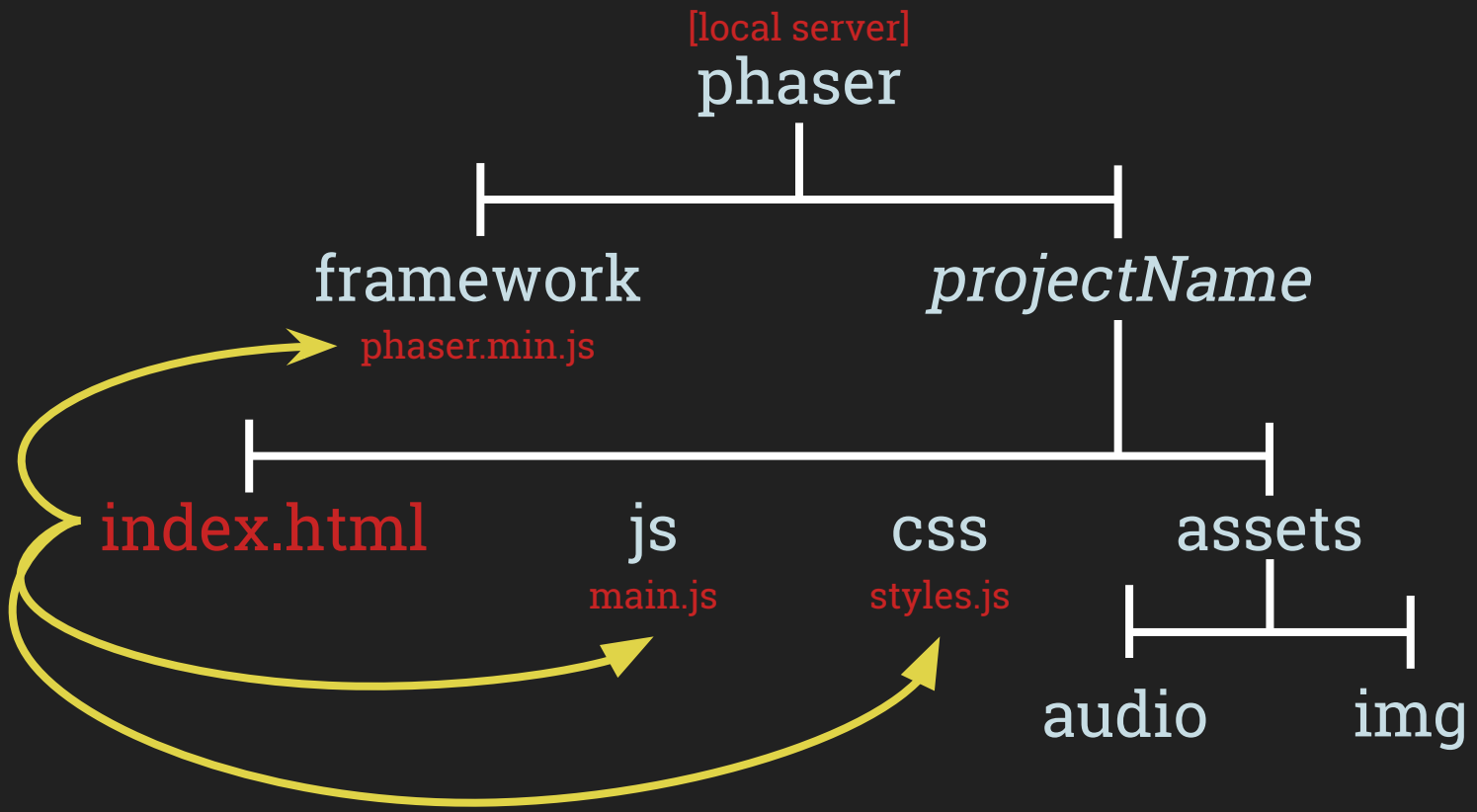


A basic Phaser "bootstrap" folder

index.html

is our "central hub"

(and the web page where your game will appear)


[local server]
phaser
framework
phaser.min.js
projectName
index.html
js
main.js
css
styles.js
assets
audio
img

My naming convention is not the only way, but merely a way

It is OK to (sensibly) rename things

It matters more to have any naming convention
than any of the details of that naming convention

index.html

Be careful with file paths

```
<!doctype html>
<html lang="en">
<head>
    <meta charset="UTF-8" />
    <title>[Your Game Title Here]</title>
    <script type="text/javascript" src="../framework/phaser.min.js"></script>
    <script type="text/javascript" src="js/main.js"></script>
    <link rel="stylesheet" type="text/css" href="css/styles.css">
</head>
<body>
    <!-- We don't need anything in the <body> -->
    <!-- Phaser will make the <canvas> element for us 👍 -->
</body>
</html>
```

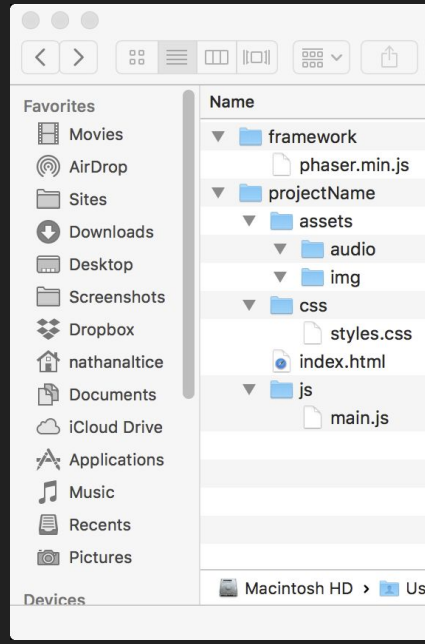
File paths:

From index.html:

To access a file/folder *relative* to our location, type its name:
src="css"

To access a file/folder *within* that *relative* path, add a slash:
src="css/style.css"

To access a parent file/folder relative to our location, add "../":
src="../framework/phaser.min.js"



Understanding these relationships helps keep everything organized.

Our Local Server

A web server? But I want to make games!

> *"Why do I need a local web server? Can't I just drag the html files onto my browser?"*
>
> **A. SANE, DEVELOPER**

Not these days, no. I appreciate that it's a bit confusing, even contradictory at times, but it all boils down to browser security. If you're making a static html web page then you can happily drag this file into your browser and see the end results. You can also "Save As" entire web pages locally and re-open them with most the contents intact. If both of these things work why can't you drag an HTML5 game into a browser and run it?

It's to do with the protocol used to access the files. When you request anything over the web you're using `http`, and the server level security is enough to ensure you can only access files you're meant to. But when you drag a file in it's loaded via the local file system (technically `file://`) and that is massively restricted, for obvious reasons. Under `file://` there's no concept of domains, no server level security, just a raw file system.

Ask yourself this: do you really want JavaScript to have the ability to load files from anywhere on your local file system?

DO YOU REALLY WANT JAVASCRIPT TO HAVE THE ABILITY TO LOAD FILES FROM ANYWHERE IN YOUR FILE SYSTEM?

Your immediate answer should of course be "not in a million years!". If JavaScript had free reign while operating under `file://` there would be nothing stopping it loading pretty much *any* file, and sending it off who knows where.

Because this is so dangerous browsers lock themselves down tighter than Alcatraz when running under `file://`. Every single page becomes treated as a unique local domain. That is why "Save Web page" works, to a degree. It opens under the same cross-site restrictions as if they were on a live server.

What's the whole point of “localhost”, hosts and ports at all?

10 Answers

active oldest votes

41

In computer networking, localhost (meaning "this computer") is the standard hostname given to the address of the loopback network interface.

Localhost always translates to the loopback IP address 127.0.0.1 in IPv4.

It is also used instead of the hostname of a computer. For example, directing a web browser installed on a system running an HTTP server to http://localhost will display the home page of the local web site.

Source: Wikipedia - Localhost.

The `:80` part is the TCP port. You can consider these ports as communications endpoints on a particular IP address (in the case of localhost - 127.0.0.1). The IANA is responsible for maintaining the official assignments of standard port numbers for specific services. Port 80 happens to be the standard port for HTTP.

share improve this answer

edited Dec 22 '09 at 12:57

answered Dec 22 '09 at 12:50

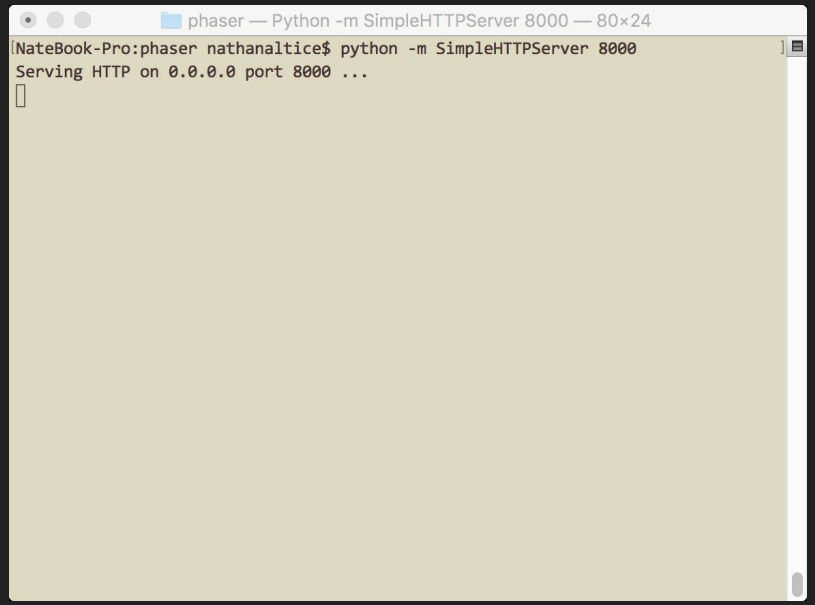
Daniel Vassallo

273k • 60 • 450 • 407

On Mac: In Terminal, navigate to your phaser folder and type:

python 3: python3 -m http.server

python 2: python -m SimpleHTTPServer 8000

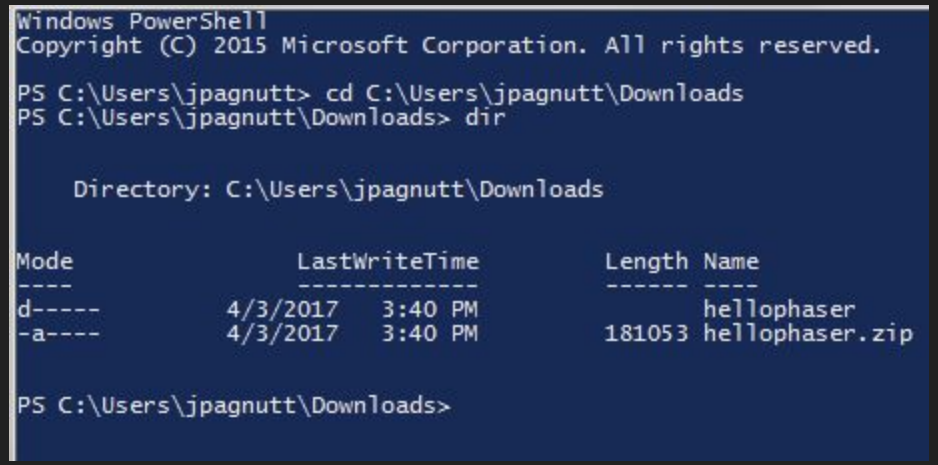


Then, in your browser, go to: http://localhost:8000

On Windows: use cmd.exe or PowerShell

python 2: C:\pathToIndexfile\python -m SimpleHTTPServer

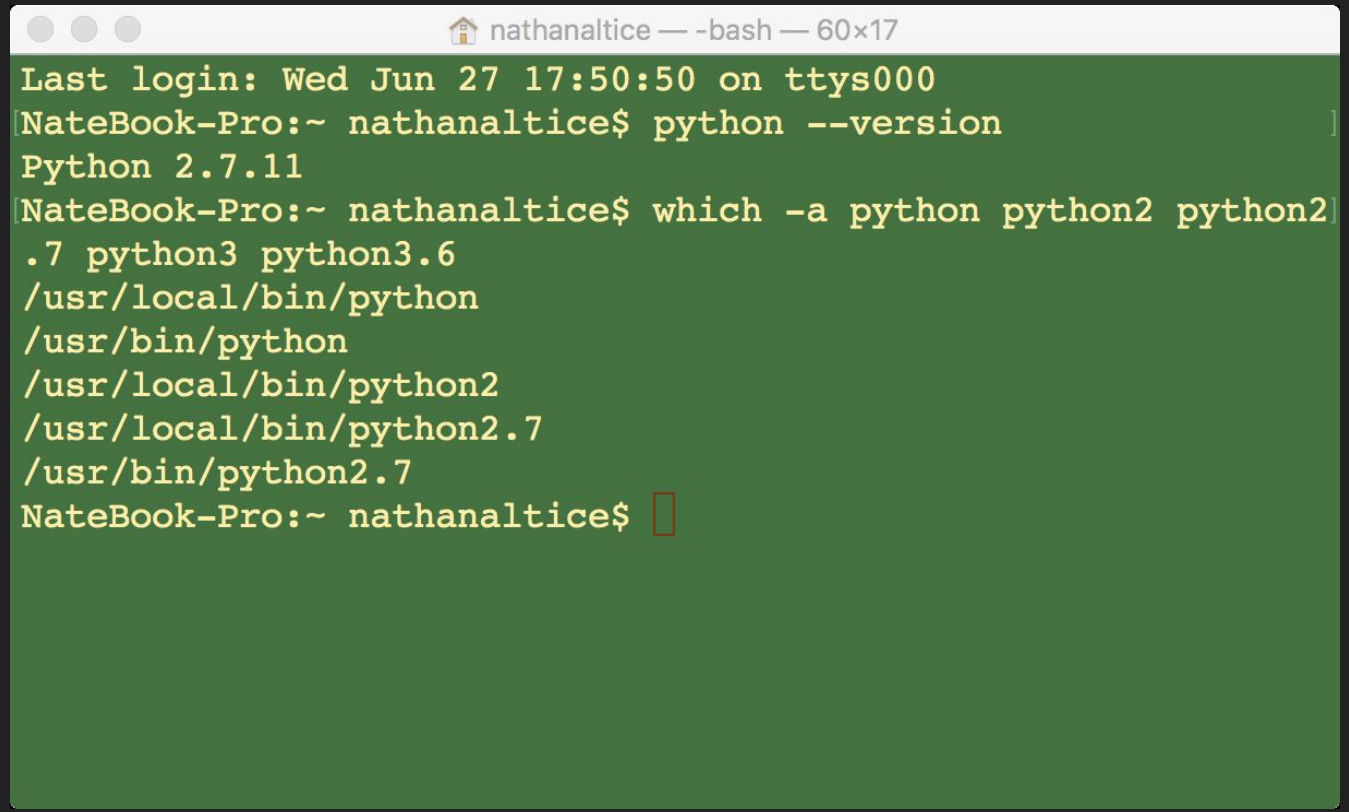
python 3: C:\pathToIndexfile\py -m http.server




```
PS C:\Users\jpagnutt\Downloads> C:\Programs\Python35\python.exe -m http.server
Serving HTTP on 0.0.0.0 port 8000 ...
```

Then, in your browser, go to: http://localhost:8000

Which version of Python do I have?



Python 2:

python -m SimpleHTTPServer

Python 3:

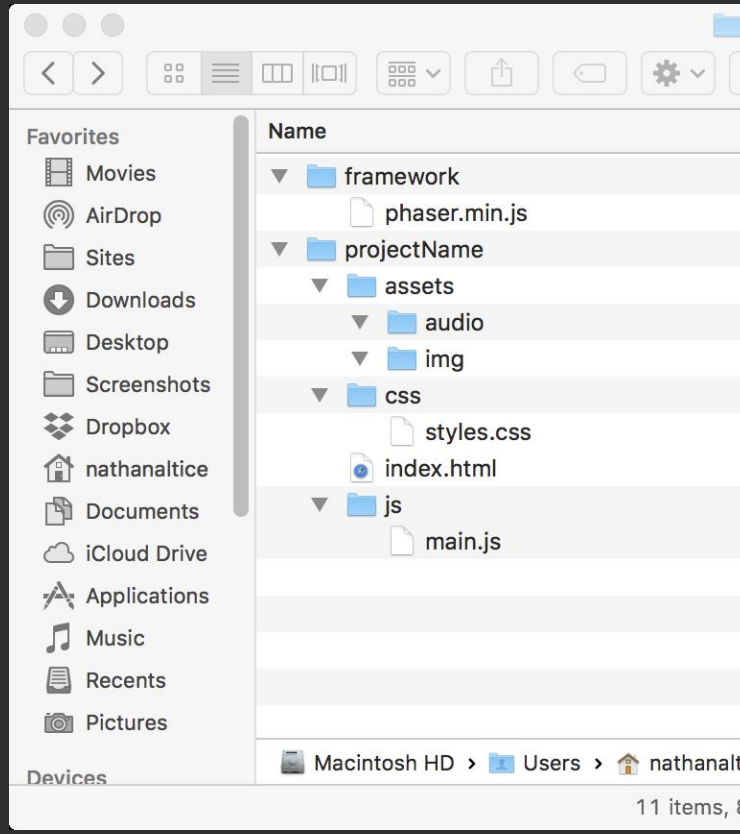
python -m http.server

If you don't have Python on your machine, install it.
https://www.python.org/downloads/
https://www.anaconda.com/distribution/

The easiest way to run a local server is with Python

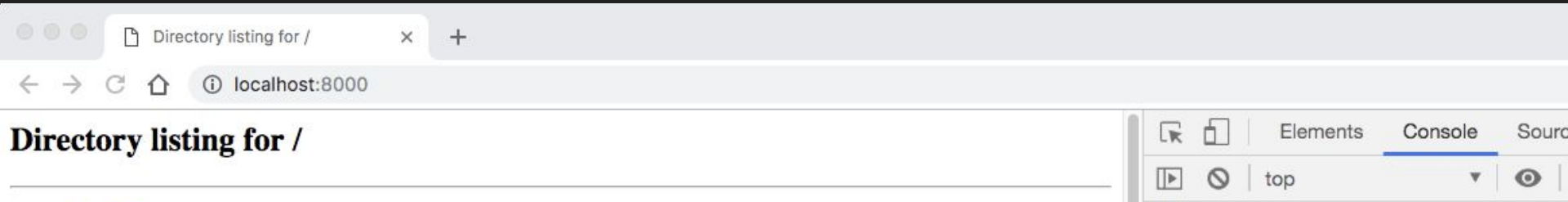
Do not double-click the `index.html` file

You need to open it with http:// instead of file://



Use the local server!

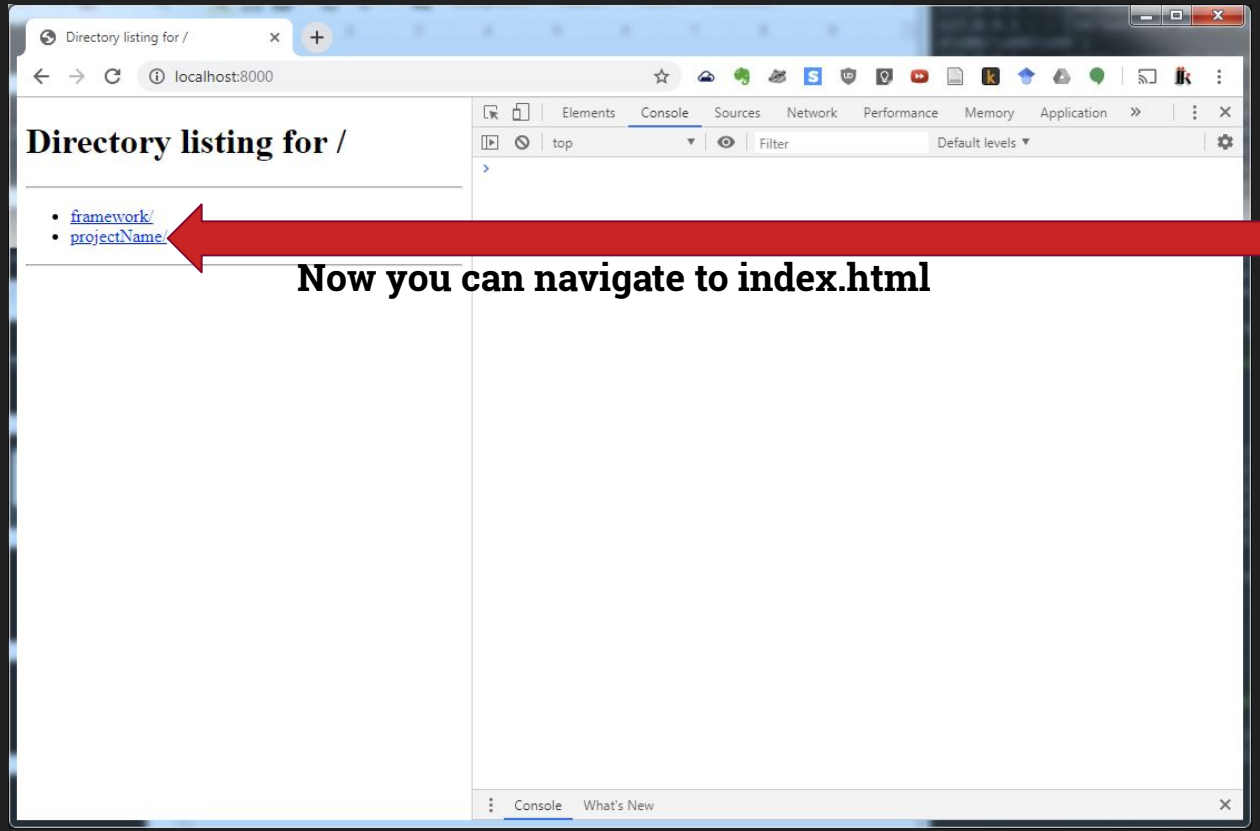
Type localhost:*portnumber* into the browser address bar

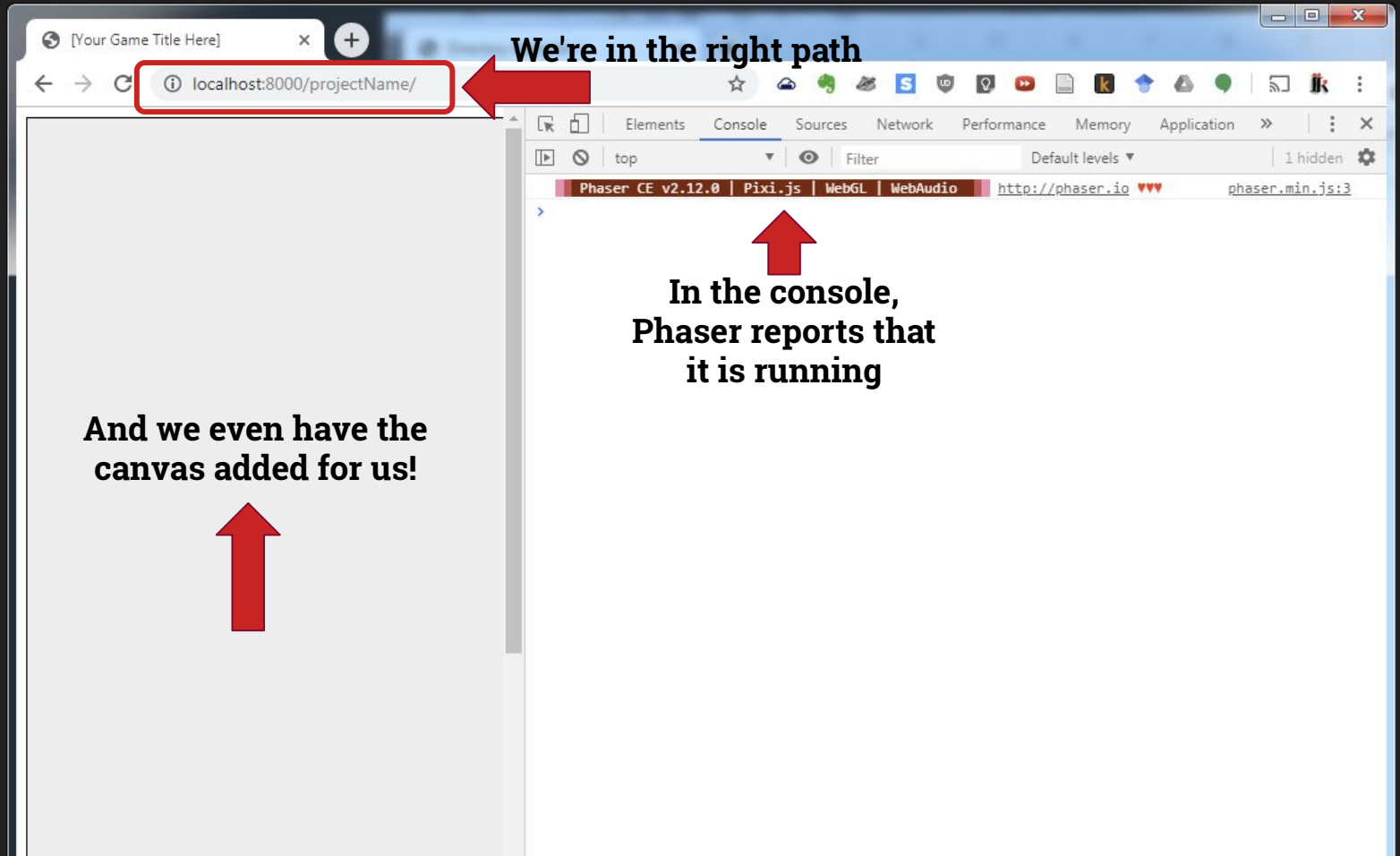


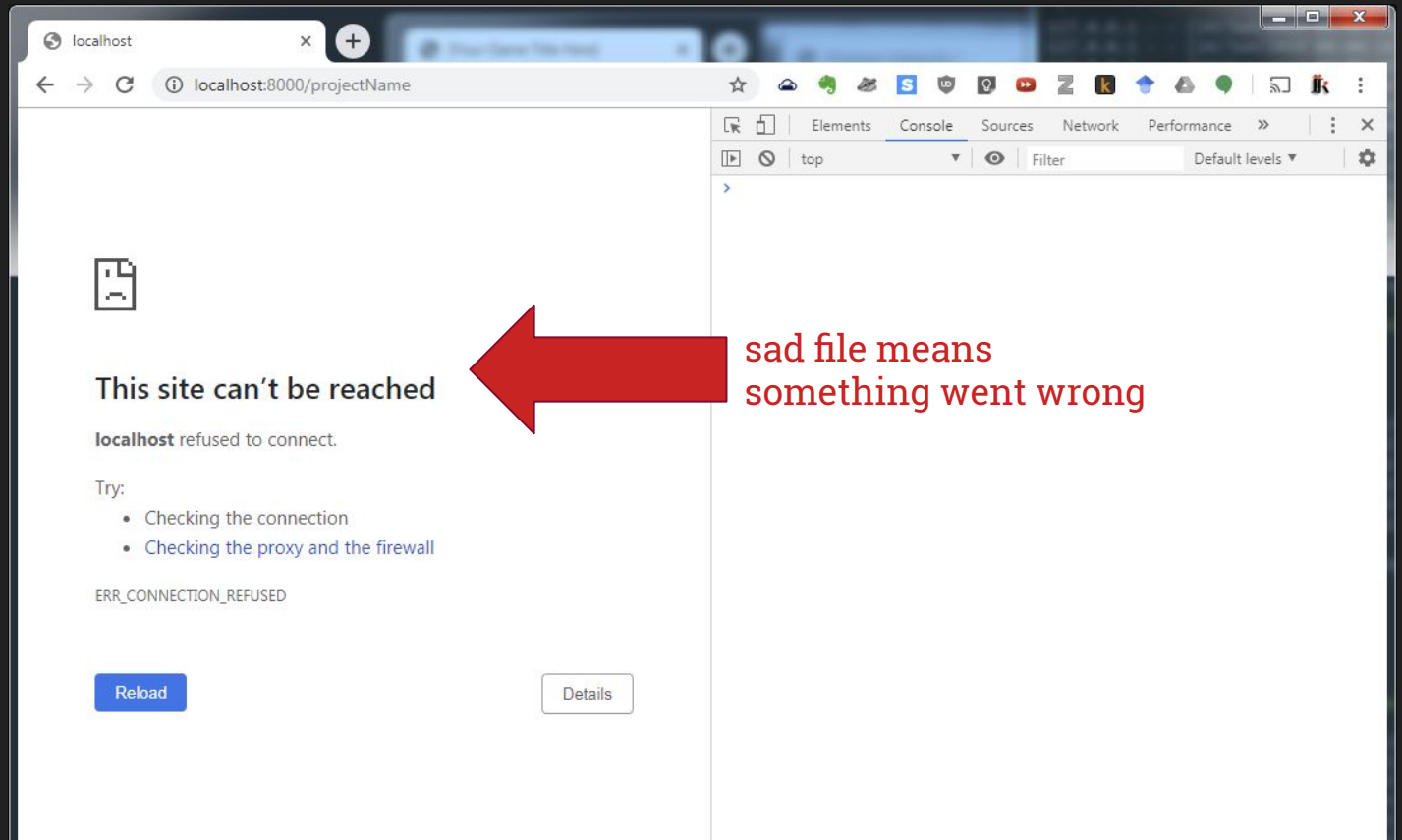
protocol://subdomain.127.0.0.1:port-number/path?parameters

Though it is a fully functioning web server

https://ipchicken.com/


Directory listing for /
localhost:8000
Directory listing for /
framework/
projectName/
Elements
Console
Sources
Network
Performance
Memory
Application
top
Filter
Default levels
Console
What's New
Now you can navigate to index.html


[Your Game Title Here]
localhost:8000/projectName/
We're in the right path
Elements
Console
Sources
Network
Performance
Memory
Application
top
Filter
Default levels
1 hidden
Phaser CE v2.12.0 | Pixi.js | WebGL | WebAudio
http://phaser.io
phaser.min.js:3
In the console, Phaser reports that it is running
And we even have the canvas added for us!

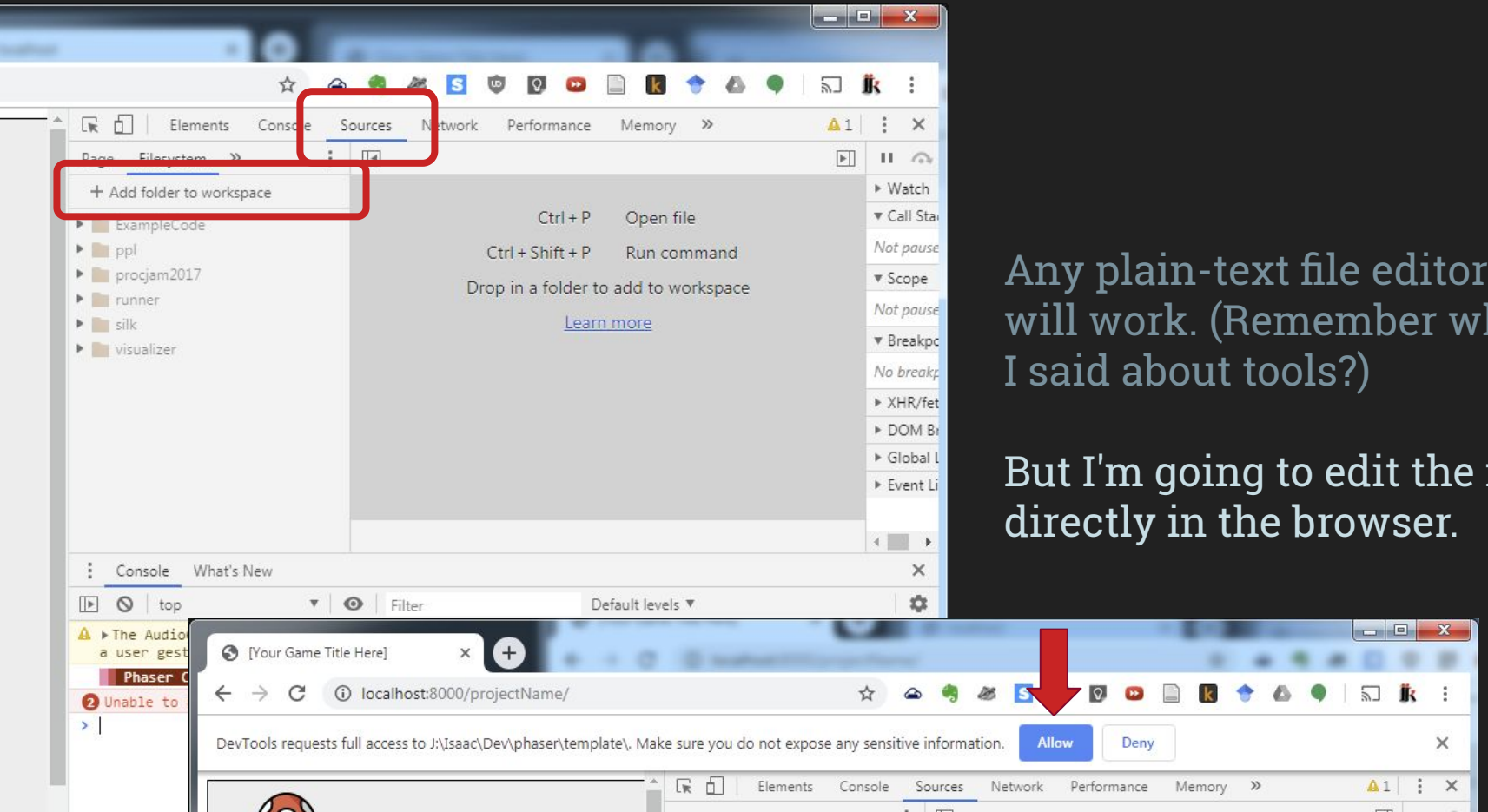

localhost
localhost:8000/projectName
Elements
Console
Sources
Network
Performance
top
Filter
Default levels
This site can't be reached
localhost refused to connect.
Try:
Checking the connection
Checking the proxy and the firewall
ERR_CONNECTION_REFUSED
Reload
Details
sad file means
something went wrong

Please don't use XAMP, MAMP, etc.

The Phaser tutorial mentions them as options, but they're overkill.
Use the Python server.

Let's check out main.js

```
// let's keep our code tidy with strict mode 👊
"use strict";

// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create,
update: update });

function preload() {
     // preload our assets
}

function create() {
     // place your assets
}

function update() {
     // run game loop
}
```



Any plain-text file editor will work. (Remember what I said about tools?)

But I'm going to edit the file directly in the browser.

Let's check out main.js

Define new game object instance

```
// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create,
update: update });

function preload() {
     // preload our assets
}

function create() {
     // place your assets
}

function update() {
     // run game loop
}
```

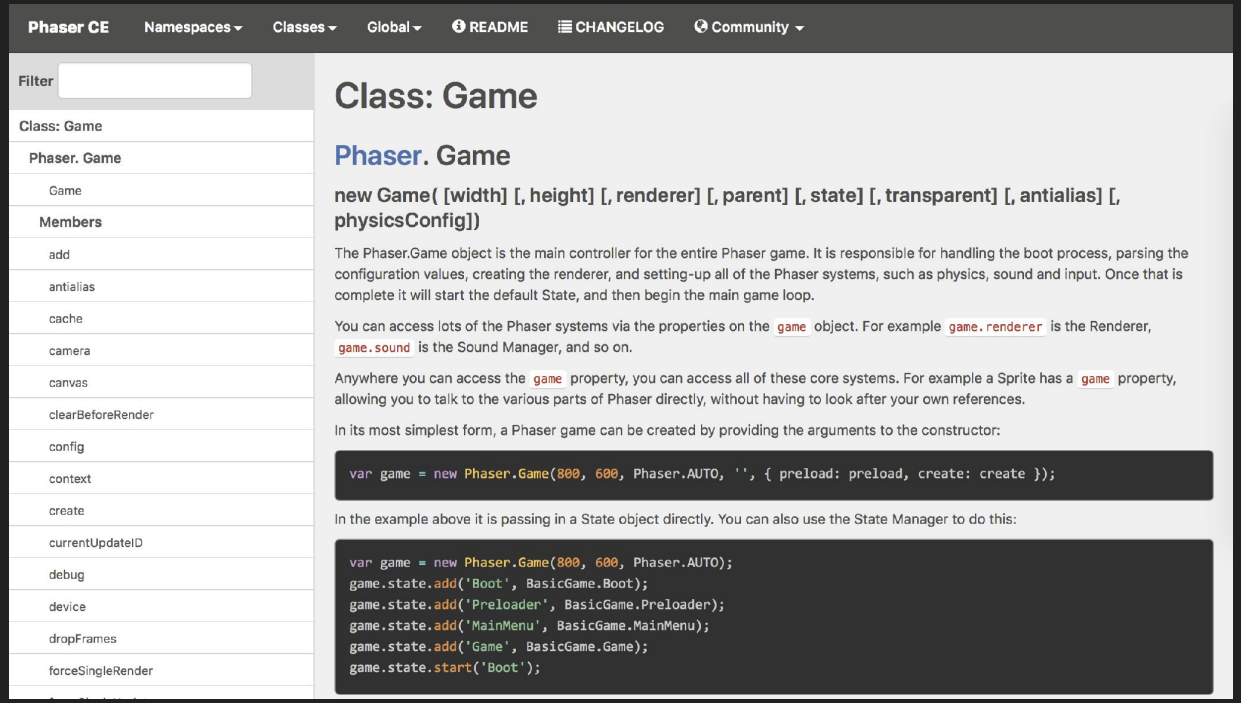
Objects are arbitrary collections of properties.

A property name can be any valid JS string.

```
var characterStats = {
    strength: 12,
    dexterity: 9,
    constitution: 15,
    intelligence: 10,
    wisdom: 7,
    charisma: 17
}
```

A Phaser.Game object is a special type of object that Phaser provides

```
// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create,
update: update });

function preload() {
     // preload our assets
}

function create() {
     // place your assets
}

function update() {
     // run game loop
}
```



Phaser CE Documentation:
https://photonstorm.github.io/phaser-ce/index.html
(bookmark this!)

Calling Phaser.Game object constructor

```
// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create,
update: update });

function preload() {
     // preload our assets
}

function create() {
     // place your assets
}

function update() {
     // run game loop
}
```

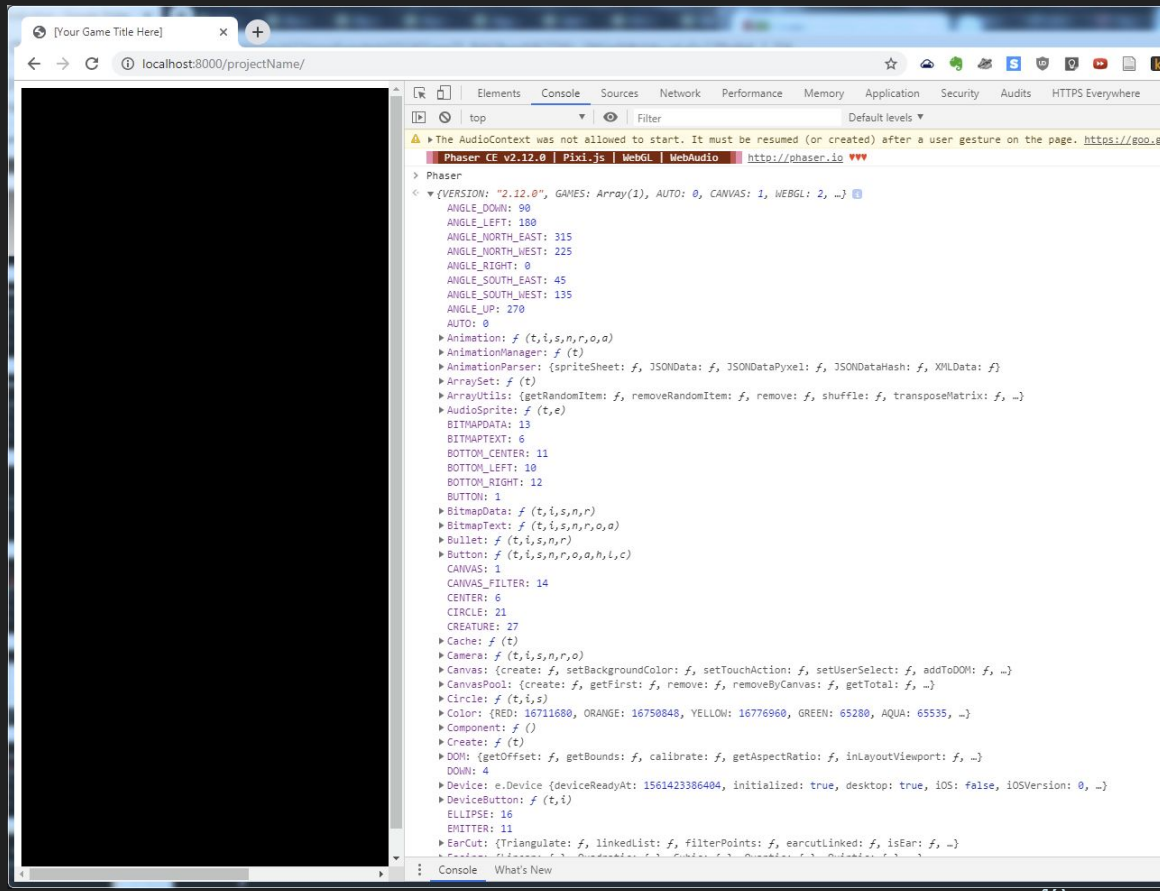
Passing parameters to the
Phaser.Game constructor method

```
// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create,
update: update });

function preload() {
     // preload our assets
}

function create() {
     // place your assets
}

function update() {
     // run game loop
}
```

The browser console lets us look inside the Phaser object!

To do so, type the object name (Phaser) into the console text field and press Enter/Return.

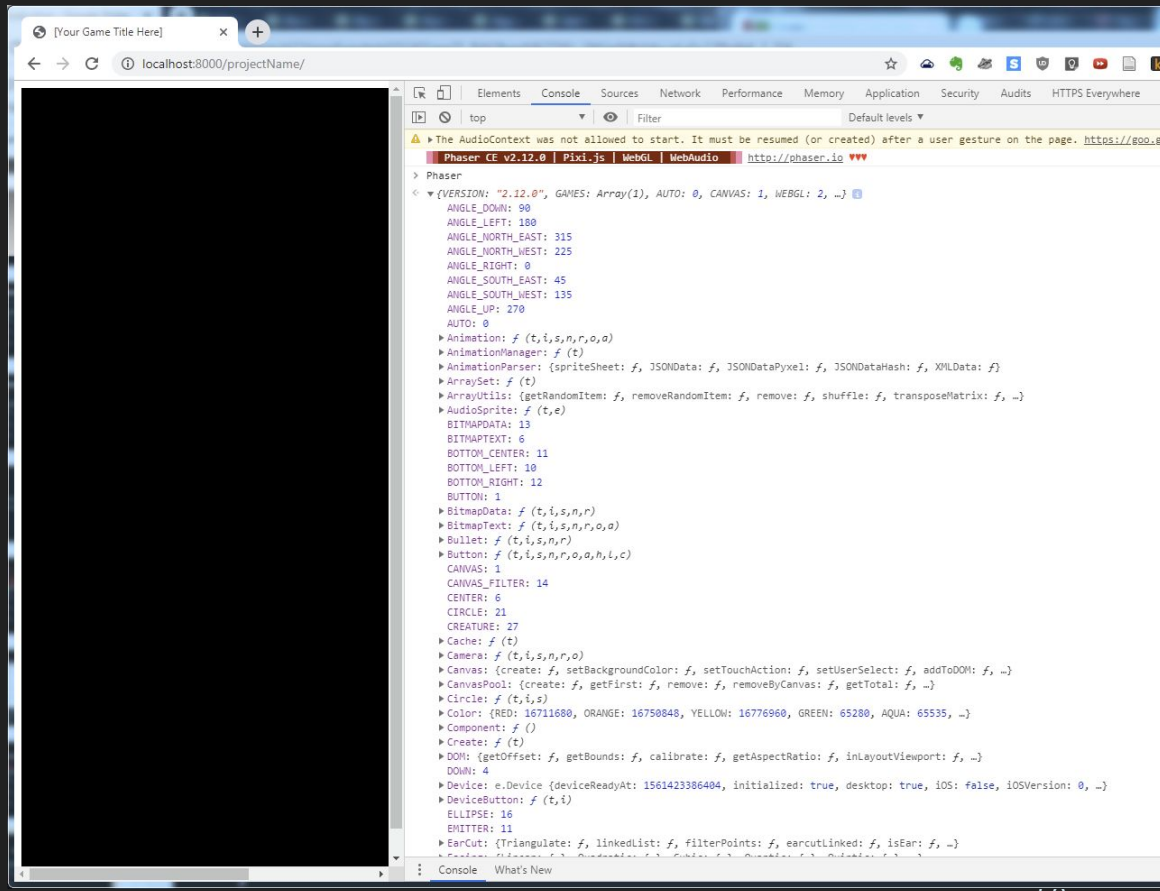
Being able to access all this information from the browser console is super-powerful!



To use this superpower, let's type in the game instance that we just created.

(Anyone want to guess what will happen?)

Remember this when you are debugging! You can use the console to see what is going on with any variable.



Game width & height
(in pixels)

```
// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create,
update: update });

function preload() {
     // preload our assets
}

function create() {
     // place your assets
}

function update() {
     // run game loop
}
```

let Phaser pick the rendering context

```
// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create,
update: update });

function preload() {
     // preload our assets
}

function create() {
     // place your assets
}

function update() {
     // run game loop
}
```

Canvas API

The **Canvas API** provides a means for drawing graphics via JavaScript and the HTML `<canvas>` element. Among other things, it can be used for animation, game graphics, data visualization, photo manipulation, and real-time video processing.

The Canvas API largely focuses on 2D graphics. The WebGL API, which also uses the `<canvas>` element, draws hardware-accelerated 2D and 3D graphics.

Basic example

This simple example draws a green rectangle onto a canvas.

HTML

```
1 <canvas id="canvas"></canvas>
```

JavaScript

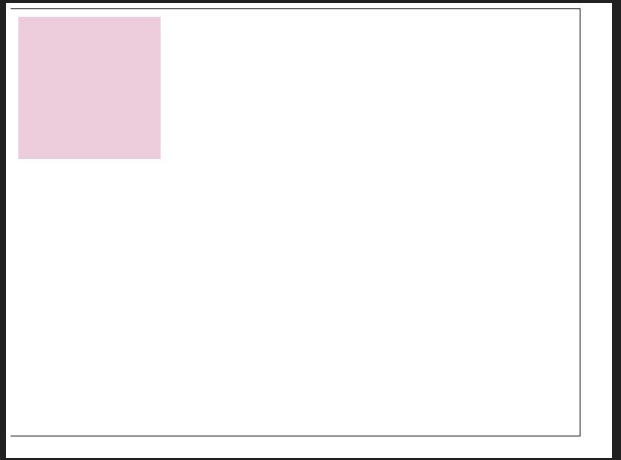
The `Document.getElementById()` method gets a reference to the HTML `<canvas>` element. Next, the `HTMLCanvasElement.getContext()` method gets that element's context —the thing onto which the drawing will be rendered.

The actual drawing is done using the `CanvasRenderingContext2D` interface. The `fillStyle` property makes the rectangle green. The `fillRect()` method places its top-left corner at (10, 10), and gives it a size of 150 units wide by 100 tall.

```
1 const canvas = document.getElementById('canvas');
2 const ctx = canvas.getContext('2d');
3
4 ctx.fillStyle = 'green';
5 ctx.fillRect(10, 10, 150, 100);
```

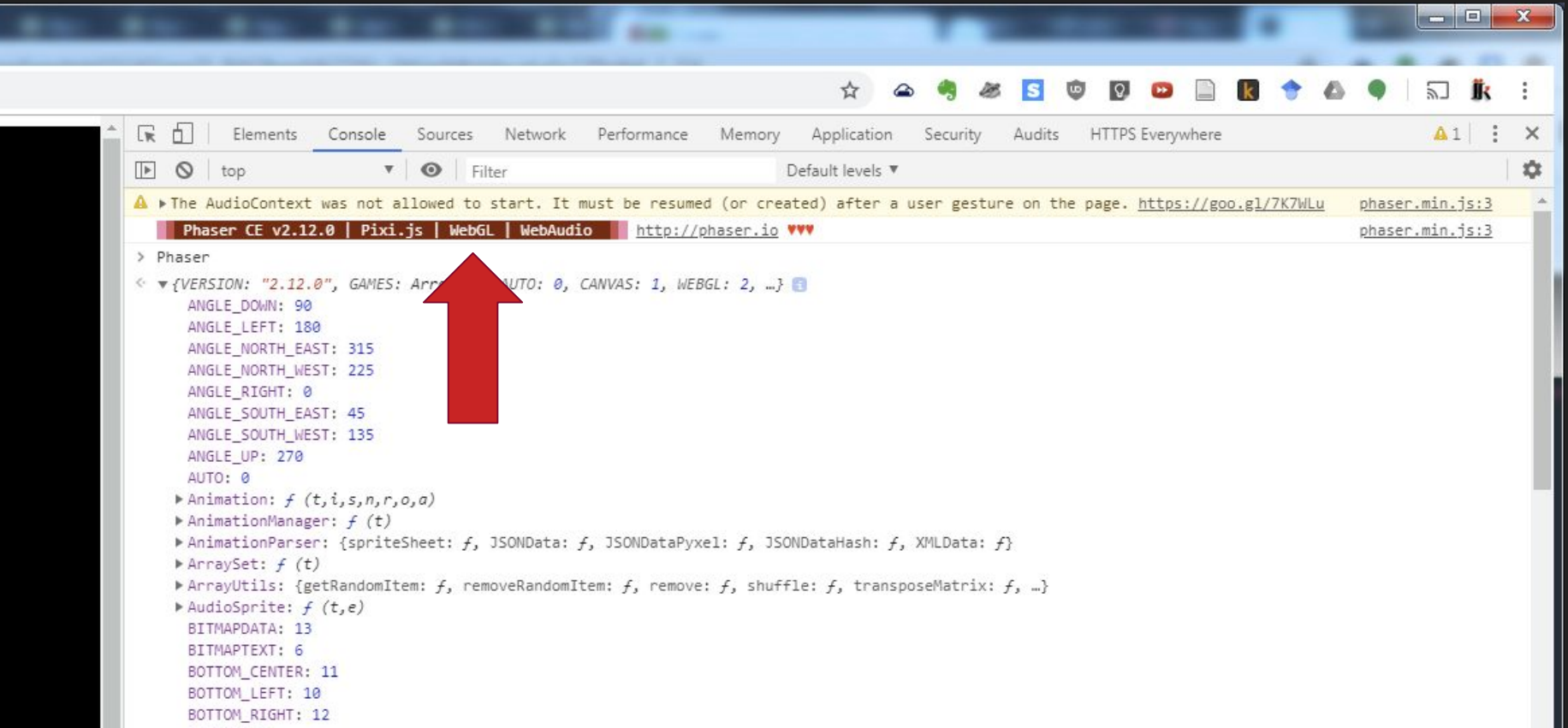
```
<!DOCTYPE html>
<html>
<head>
    <title></title>
    <style type="text/css">
        #canvas {
            border: 1px solid black;
        }
    </style>
</head>
<body>

<canvas id="canvas" width="800" height="600"></canvas>

<script type="text/javascript">
    // wait for window to load
    window.onload = function() {
        var canvas = document.getElementById('canvas');
        var ctx = canvas.getContext('2d');

        ctx.fillStyle = '#facade';
        ctx.fillRect(10, 10, 200, 200);
    }
</script>
</body>
</html>
```

output



context: 2D (Canvas API)

Thanks, Phaser!



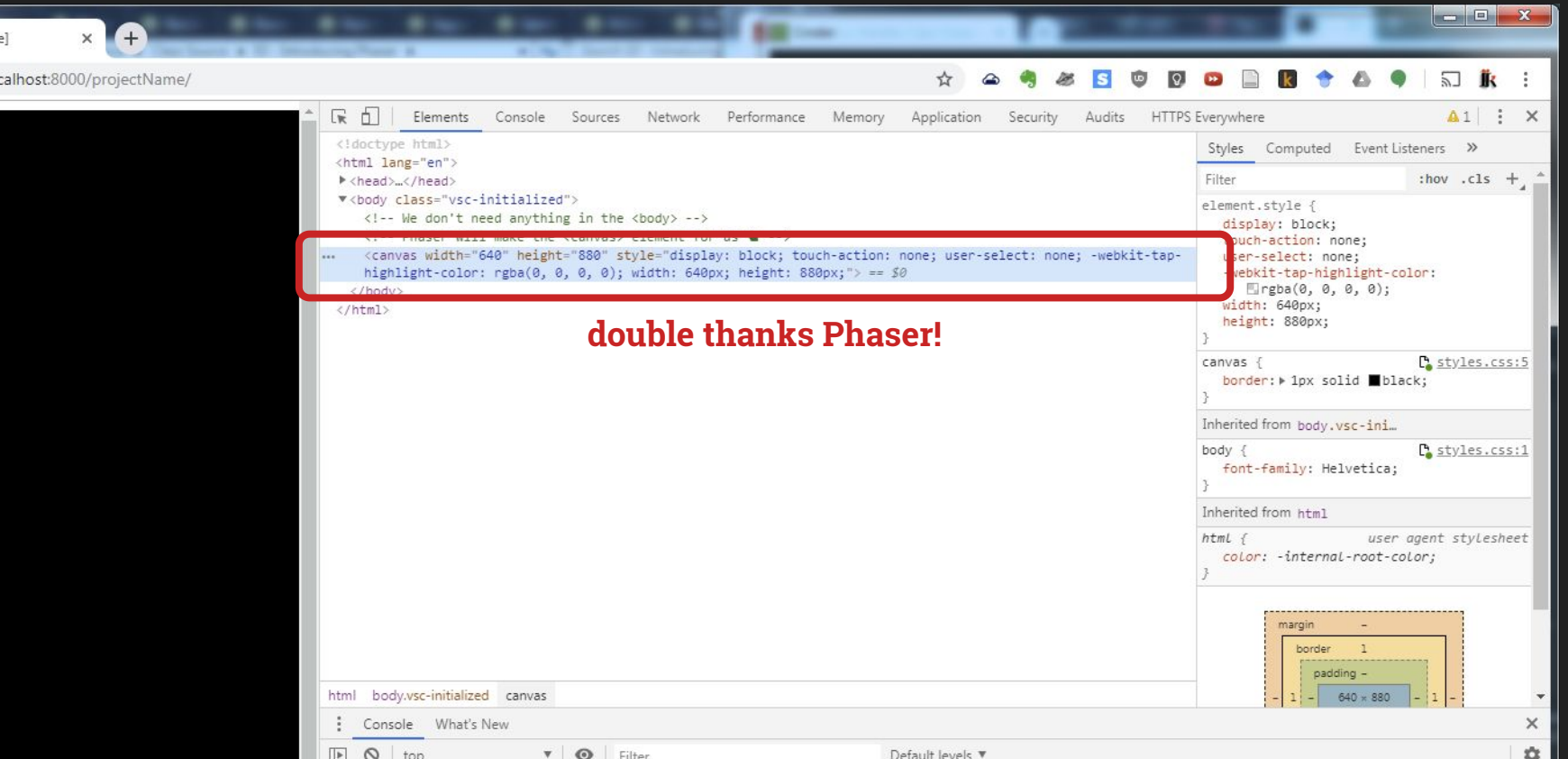
id of DOM target
for the <canvas> tag

```
// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create,
update: update });

function preload() {
     // preload our assets
}

function create() {
     // place your assets
}

function update() {
     // run game loop
}
```

index.html

```
<!doctype html>
<html lang="en">
<head>
    <meta charset="UTF-8" />
    <title>[Your Game Title Here]</title>
    <script type="text/javascript" src="../framework/phaser.min.js"></script>
    <script type="text/javascript" src="js/main.js"></script>
    <link rel="stylesheet" type="text/css" href="css/styles.css">
</head>
<body>
    <!-- We don't need anything in the <body> -->
    <!-- Phaser will make the <canvas> element for us 👍 -->
</body>
</html>
```

Wait a minute, there's nothing here!


calhost:8000/projectName/
Elements
Console
Sources
Network
Performance
Memory
Application
Security
Audits
HTTPS Everywhere
<!doctype html>
<html lang="en">
<head>…</head>
<body class="vsc-initialized">
<!-- We don't need anything in the <body> -->
<canvas width="640" height="880" style="display: block; touch-action: none; user-select: none; -webkit-tap-highlight-color: rgba(0, 0, 0, 0); width: 640px; height: 880px;"> == $0
</body>
</html>
double thanks Phaser!
Styles
Computed
Event Listeners
Filter
:hov .cls
element.style {
display: block;
touch-action: none;
user-select: none;
-webkit-tap-highlight-color:
rgba(0, 0, 0, 0);
width: 640px;
height: 880px;
}
canvas {
styles.css:5
border: 1px solid black;
}
Inherited from body.vsc-ini…
body {
styles.css:1
font-family: Helvetica;
}
Inherited from html
html {
user agent stylesheet
color: -internal-root-color;
}
margin
border 1
padding –
640 × 880
html
body.vsc-initialized
canvas
Console
What's New
top
Filter
Default levels

object with references to three State methods

```
// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create,
update: update });

function preload() {
     // preload our assets
}

function create() {
     // place your assets
}

function update() {
     // run game loop
}
```

```
// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create,
update: update });

function preload() {
     // preload our assets
}

function create() {
     // place your assets
}

function update() {
     // run game loop
}
```

preload runs first and loads assets...

```
// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create,
update: update });

function preload() {
     // preload our assets
}

function create() {
     // place your assets
}

function update() {
     // run game loop
}
```

then you actually place your assets...

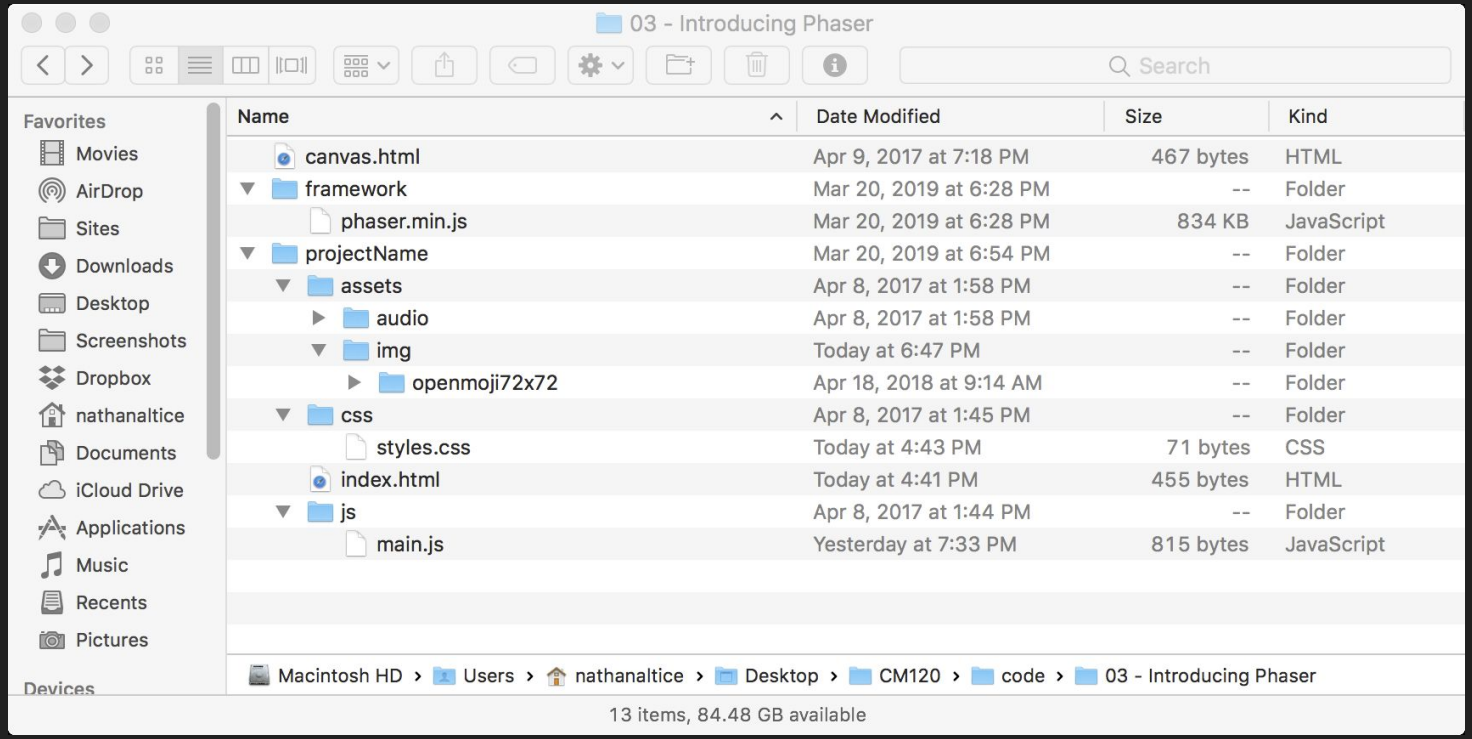
```
// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create,
update: update });

function preload() {
     // preload our assets
}

function create() {
     // place your assets
}

function update() {
     // run game loop
}
```

...then your primary game loop begins!

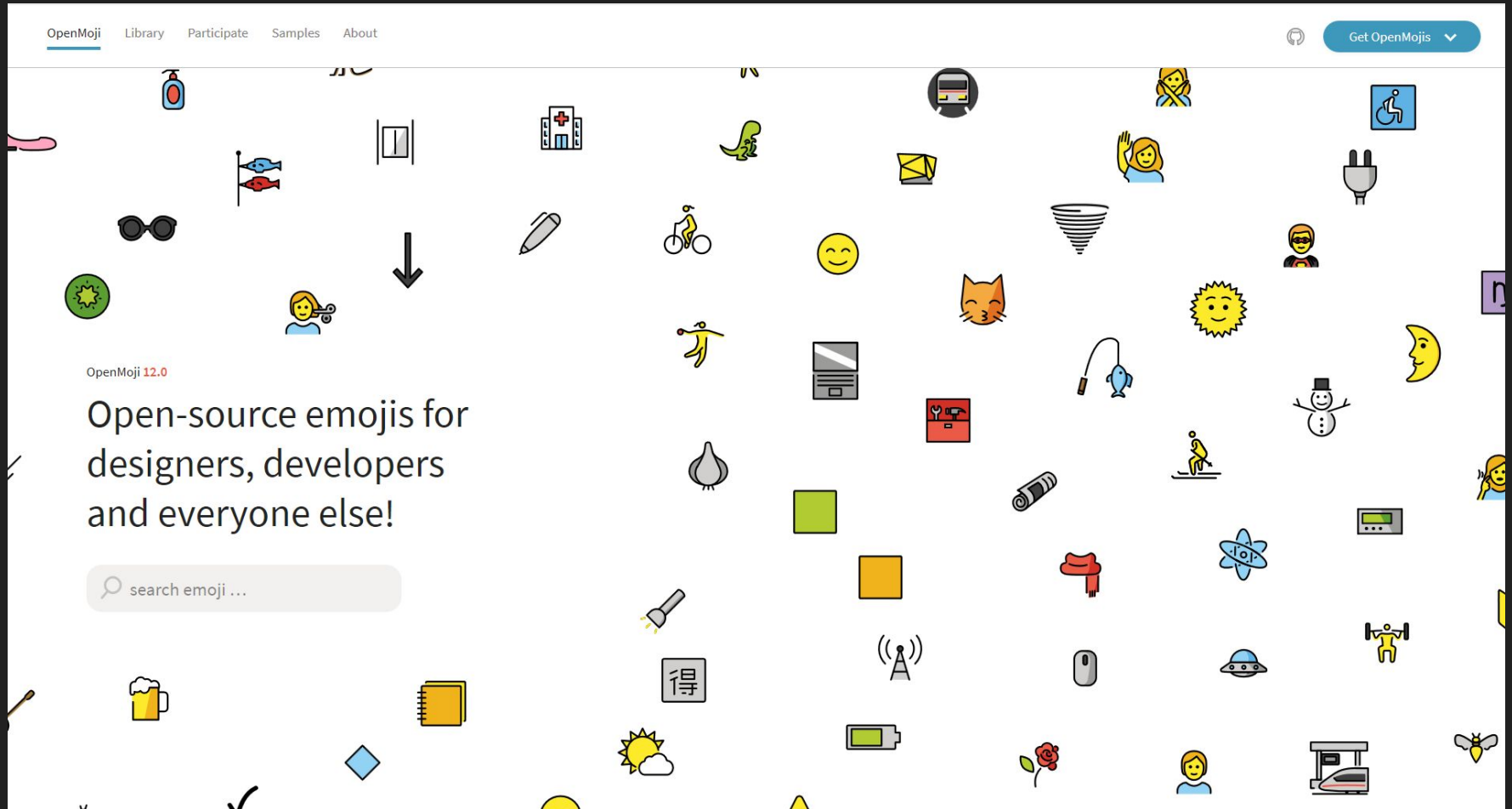
```
// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create,
update: update });

function preload() {
     // preload our assets
}

function create() {
     // place your assets
}

function update() {
     // run game loop
}
```

This is a "single-state" Phaser game with three state *methods*

Let's make some changes!



But first, some assets...


OpenMoji
Library
Participate
Samples
About
Get OpenMojis
OpenMoji 12.0
Open-source emojis for designers, developers and everyone else!
search emoji ...

OpenMoji Library Participate Samples About

author, category or emoji …

Get OpenMojis

SVG Color
SVG Black
PNG Color 72×72
PNG Black 72×72
PNG Color 618×618
PNG Black 618×618
OpenMoji-Black.otf
alpha-version
OpenMoji-Color.otf
alpha-version
OpenMoji Stickers
for Messages, iOS
Download Source

show color

all OpenMojis
symbols
animals-nature
activities
smileys-people
objects
food-drink
flags
travel-places
hfg

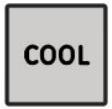
all OpenMojis

information
2139

P button
1F17F

Japanese “congrat…
3297

Japanese “secret” …
3299

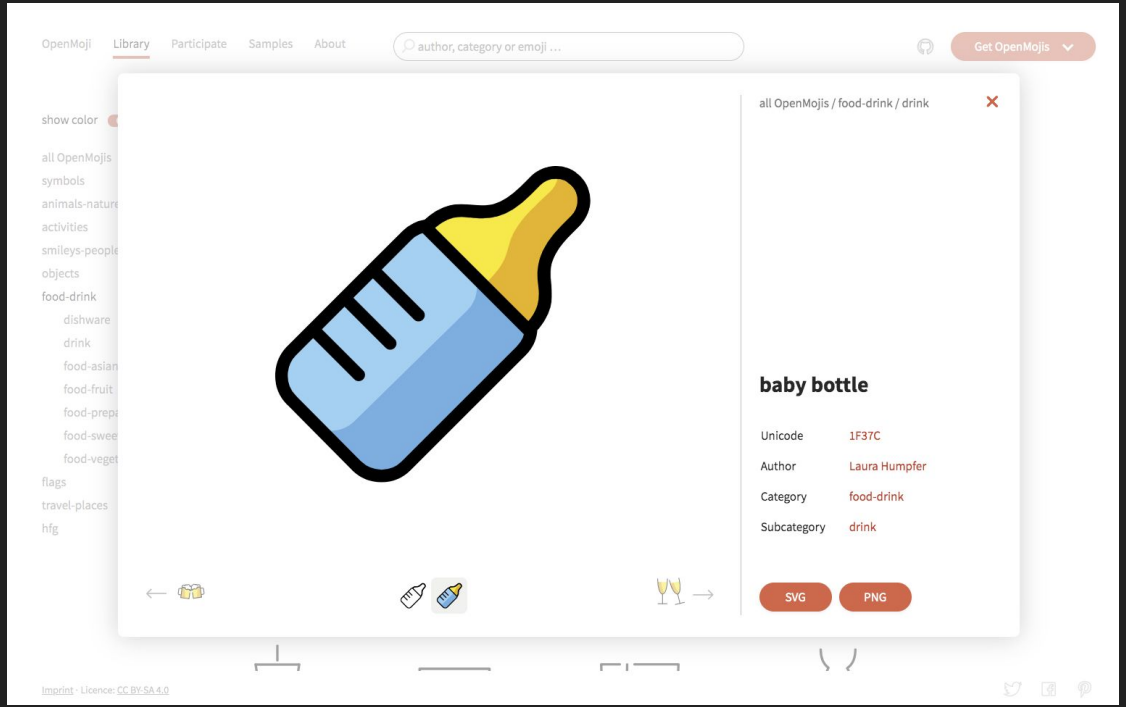


COOL button
1F192

ID button
1F194

NEW button
1F195

OK button
1F197



You can reference the images by their unicode value

```
// let's keep our code tidy with strict mode 👊
"use strict";

// initialize game variables
var velocity = 4;
var emoji;

// initialize game object
var game = new Phaser.Game(640, 880, Phaser.AUTO, '', { preload: preload, create: create, update: update });

function preload() {
      // preload our assets
     game.stage.backgroundColor = "#EEE";
     game.load.image('emoji_img', 'assets/img/openmoji72x72/1F469-200D-1F3A8.png');
}

function create() {
      // place your assets
     emoji = game.add.sprite(0,0, 'emoji_img');
}

function update() {
      // run game loop
      emoji.x += velocity;
      if (emoji.x >= game.world.width - emoji.width || emoji.x <= 0) {
            velocity = -velocity;
      }
}
```

Your first Phaser game

And also your first programming assignment

Follow the Phaser 2 tutorial...

http://phaser.io/tutorials/making-your-first-phaser-2-game

But use the organization that we talked about in class.

And skip setting up a web server.

Your objective is to get the Phaser environment running, get the tutorial game working, and make some small tweaks.

Grading Criteria

Organization (3 points)

- Comment the code
- Assets in proper folder
- Code in the right place
- Game runs from localhost with no errors

Submit your project to Canvas as a zip with the filename *LastNameFirstNameTutorial*.zip

Code Changes (7 points)

- Vertical resolution
- Add platforms
- New collectable object
- Add enemies