

JAVASCRIPT DEVELOPMENT

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HELLO!

1. Pull changes from the `svodnik/JS-SF-16-resources` repo to your computer:
 - Open the terminal
 - `cd` to the `~/Documents/JSD/JS-SF-16-resources` directory
 - Type **`git pull`** and press **return**
2. In your code editor, open the following folder:
`Documents/JSD/JS-SF-16-resources/02-arrays-loops`

JAVASCRIPT DEVELOPMENT

ARRAYS & LOOPS

LEARNING OBJECTIVES

At the end of this class, you will be able to

- Declare, assign to, and manipulate data stored in a variable.
- Create arrays and access values in them.
- Build iterative loops using for statements.
- Iterate over and manipulate values in an array.

AGENDA

- Variables
- Arrays
- Loops
- Array iterators

ARRAYS & LOOPS

WEEKLY OVERVIEW

WEEK 2

Arrays & Loops / Conditionals & Functions

WEEK 3

Scope / Slack bot lab

WEEK 4

Objects & JSON / DOM & jQuery

EXIT TICKET QUESTIONS

1. Will we review the code academy work or the basic projects we did on the dash?
2. What is your favorite/go-to Library and Framework?
3. Would like to learn more about variables and other basic stuff before getting into more technical lessons.
4. What's the difference between a branch and a fork in GitHub?
5. As a coder how is your posture impeccable? Tips?
6. When to use Github Enterprise vs Github
7. What's object oriented programming?

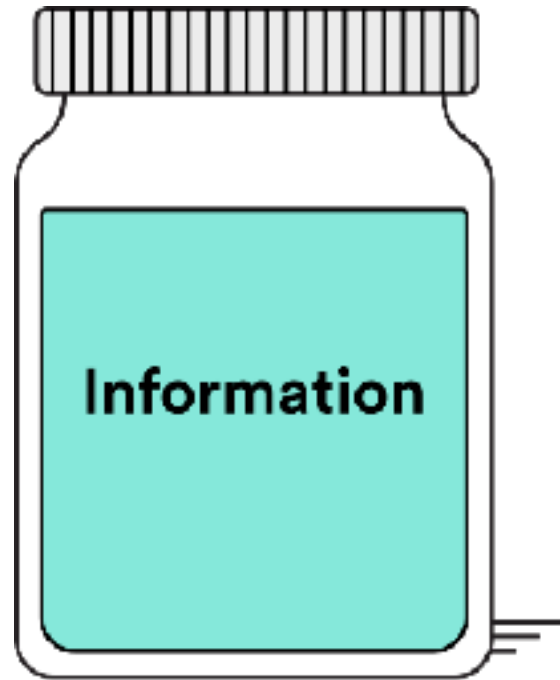
EXIT TICKET FEEDBACK

1. hands-on exercises + +
2. Feel free to throw in any ancillary terminology that might relate to the concepts learned. In this case What is a REPL and how does it relate to Node?
3. Sometimes questions feel like they take us off track and keep us from getting through everything

VARIABLES

WHAT ARE VARIABLES?

- We can tell our program to remember (store) values for us to use later on.
- The 'container' we use to store the value is called a **variable**



DECLARING A VARIABLE

```
let age = 29;
```

VARIABLE CONVENTIONS

RULES:

1. Should be "camel case" — First word starts with a lowercase letter and any following words start with an uppercase letter.
2. Names can only contain: letters, numbers, \$ and _
3. No dashes, no periods.
4. Cannot start with a number
5. Case sensitive - numberOfStudents is not the same as numberofStudents



```
let numberOfStudents = 10;
```

Guideline: Names should be descriptive:



```
let lastName = "Vodnik";
```



```
let x = "Vodnik";
```

CAMEL CASE

- › Use when creating a name based on multiple words
- › Remove spaces, then capitalize the first letter of the second and subsequent words



JAVASCRIPT — UPDATING THE VALUE OF A VARIABLE

Declaring a variable:

```
let host = "Sasha";
```

Update the value of the variable:

```
host = "Ray";
```

KEYWORDS FOR DECLARING VARIABLES

keyword	when will we learn it?
let	We will use let today
var	We will learn about var and const next week
const	

Printing text out for our own inspection

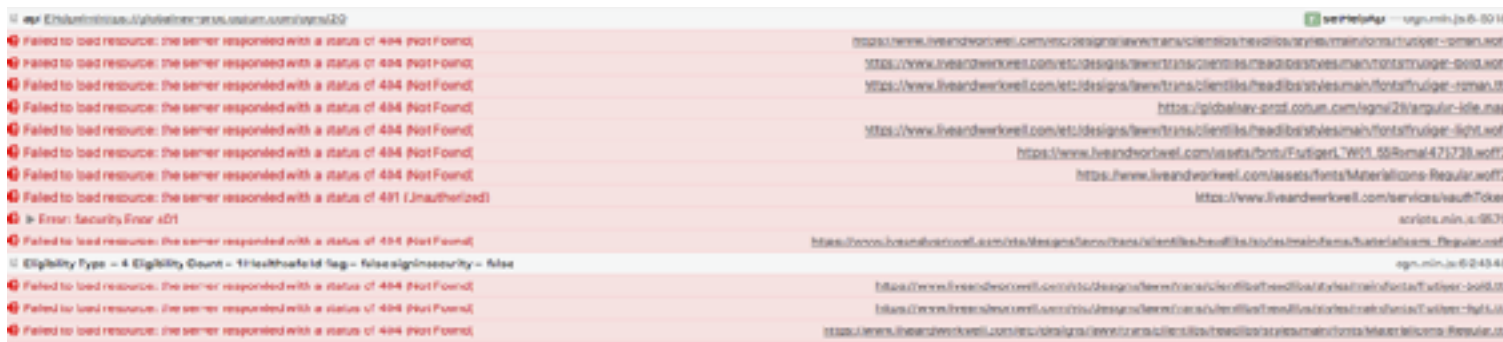
```
console.log("Hello!");
```


Printing a variable value out for our own inspection

```
console.log(age);
```

When do you use `console.log`?

- ▶ When you are developing a program and need help figuring out what's going on (aka debugging)
- ▶ When you want to print things to the command line



browser developer tools



command line

KNOW YOUR EQUAL SIGNS

=	assigns value on right to object on left
===	evaluates whether values on left and right are the same

```
let minutes = 17;
```

```
> minutes === 10  
< false
```

COMPOUND OPERATORS

+=	adds a number to a variable and assigns the new value to the same variable
-=	subtracts a number from a variable and assigns the new value to the same variable
++	adds 1 to a value
--	subtracts 1 from a value

TRANSFORMING A VALUE INTO A STRING

- `String()` function
- Returns the original value as a string
- Syntax:
 - `String(data)`, where *data* is the name of a variable

```
let minutes = 17;
```

```
String(minutes);
```

'17'

```
let colors = ['red', 'green', 'blue'];
```

```
String(colors);
```

'red,green,blue'

ARRAYS & LOOPS

QUIZ

COMMON MISTAKES

"Bill" = let name;

COMMON MISTAKES

```
let name = "Bill";
```

COMMON MISTAKES

```
let total score = 20;
```

COMMON MISTAKES

```
let totalScore = 20;
```

COMMON MISTAKES

```
let fullName = Suzie Smith;
```

COMMON MISTAKES

```
let fullName = "Suzie Smith";
```

COMMON MISTAKES

```
Let fullName = "Bill Smith";
```

COMMON MISTAKES

```
let fullName = "Bill Smith";
```

COMMON MISTAKES

```
let score = "5";  
    score += "6";
```

COMMON MISTAKES

```
let score = 5;  
score += 6;
```


ACTIVITY — VARIABLES & DATA TYPES



ACTIVITY

KEY OBJECTIVE

- Describe the concept of a "data type" and how it relates to variables.

TYPE OF EXERCISE

- Turn & Talk

EXECUTION

2 min

1. Describe variables. Explain why we would want to use variables in our programs.
2. What are the three data types in JS? Can you think of an example of each?

ARRAYS

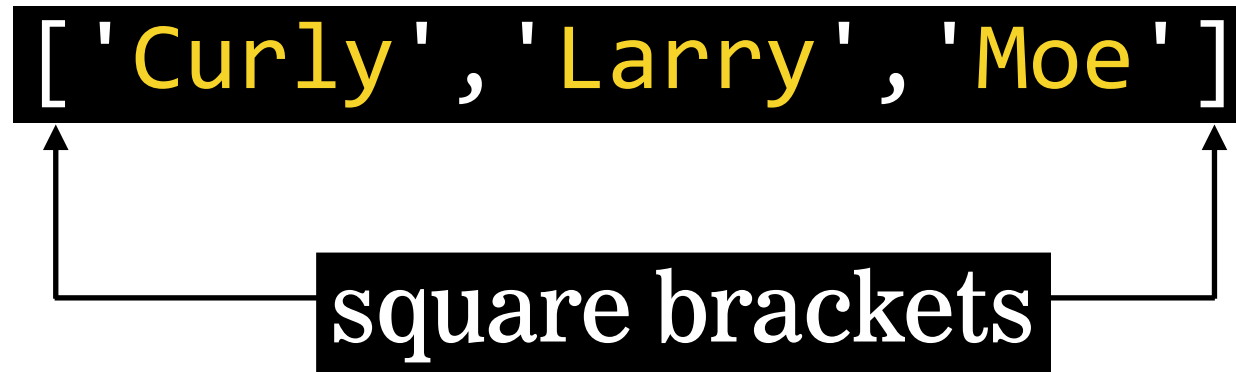
ARRAYS

- An **array** is a collection of data that you can use efficiently

```
[ 'Curly', 'Larry', 'Moe' ]
```

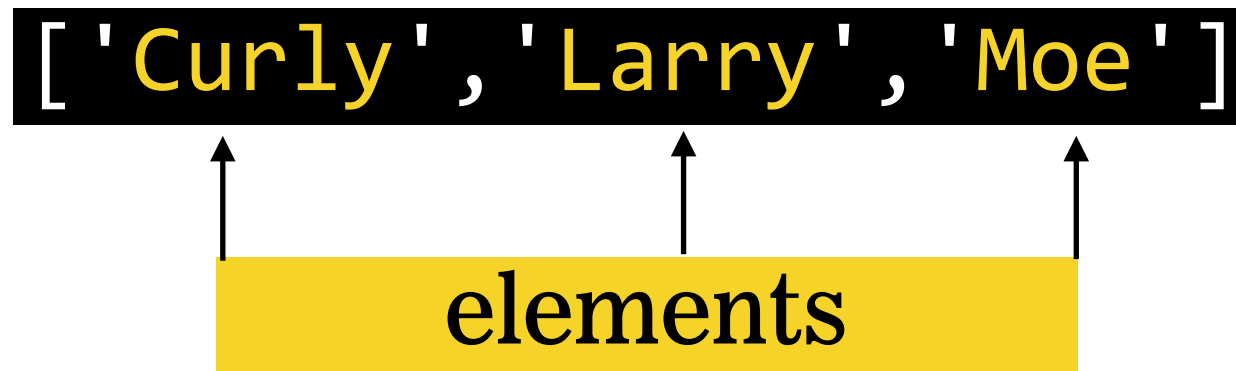
ARRAYS

- An array is enclosed in square brackets []



ARRAYS

- Each item in an array is called an **element**
- An element can be any data type



ARRAYS

- Elements are separated by commas

```
[ 'Curly' , 'Larry' , 'Moe' ]
```

commas

ARRAYS

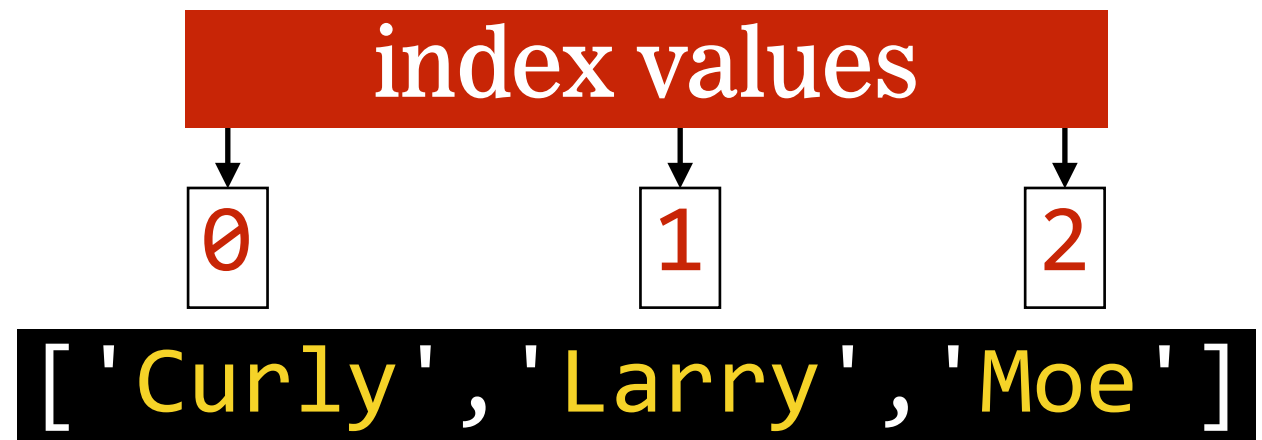
- An array is similar in concept to a list
- Good for storing, enumerating, and quickly reordering data

- Curly
- Larry
- Moe

```
['Curly', 'Larry', 'Moe']
```

ARRAY INDEX

- Each array element is assigned an **index**, which is a number used to reference that element
- Index starts at 0



ARRAY INDEX

- The final index value is always the length of the array minus 1

0	1	2
'Curly'	'Larry'	'Moe'

Array length	3
-	1
<hr/>	
Final index value	2

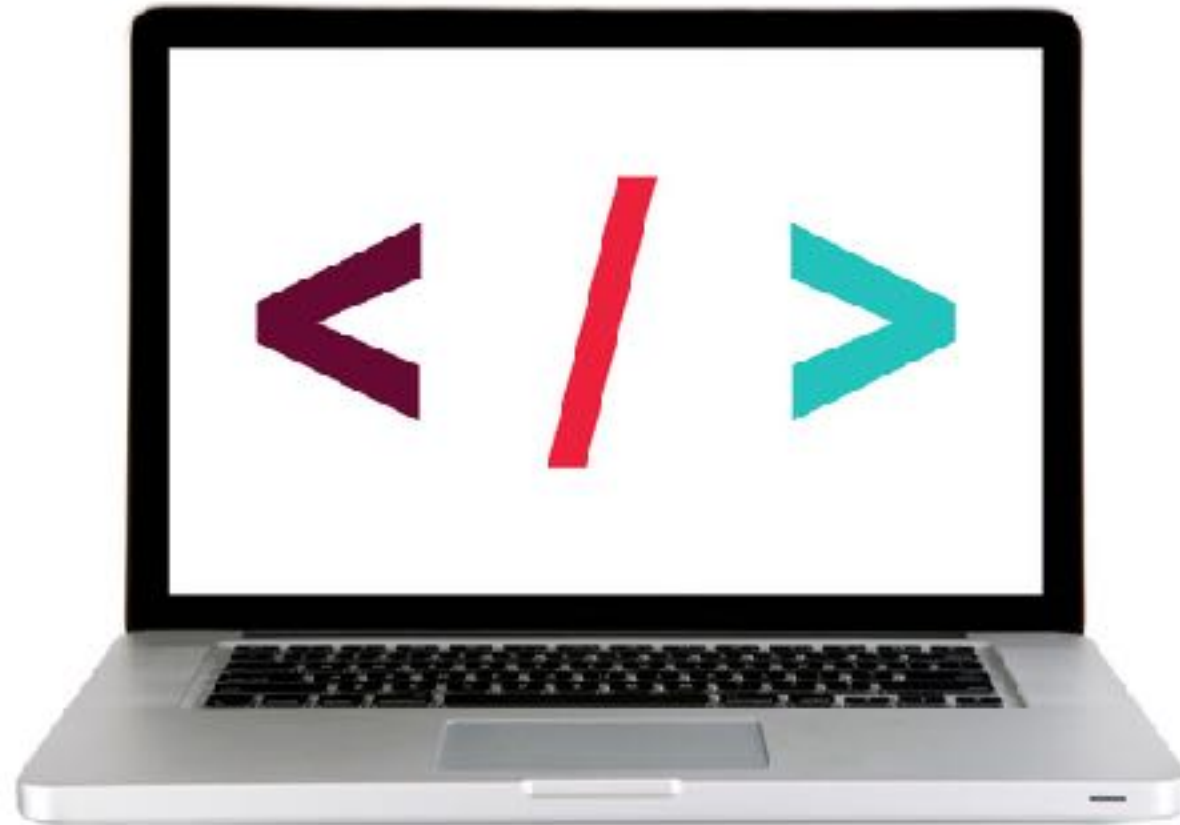
LENGTH PROPERTY

- length property is a number 1 greater than the final index number
- `length !==` number of elements in the array

0	1	2
['Curly', 'Larry', 'Moe']		

$$\begin{array}{rcl} & \text{Final index} & 2 \\ & + & 1 \\ \hline \text{Value of length property} & & 3 \end{array}$$

LET'S TAKE A CLOSER LOOK



LAB — ARRAYS



EXERCISE

TYPE OF EXERCISE

‣ Individual / Pair

LOCATION

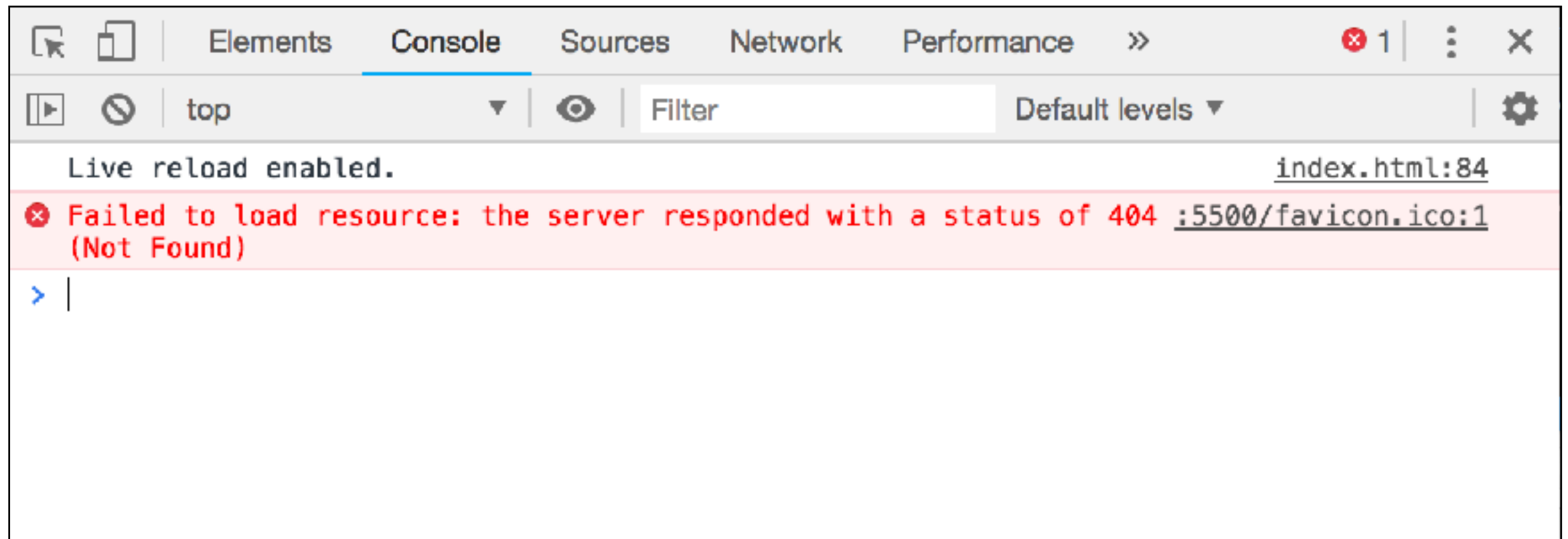
‣ `starter-code > 0-arrays-loops-exercise`

TIMING

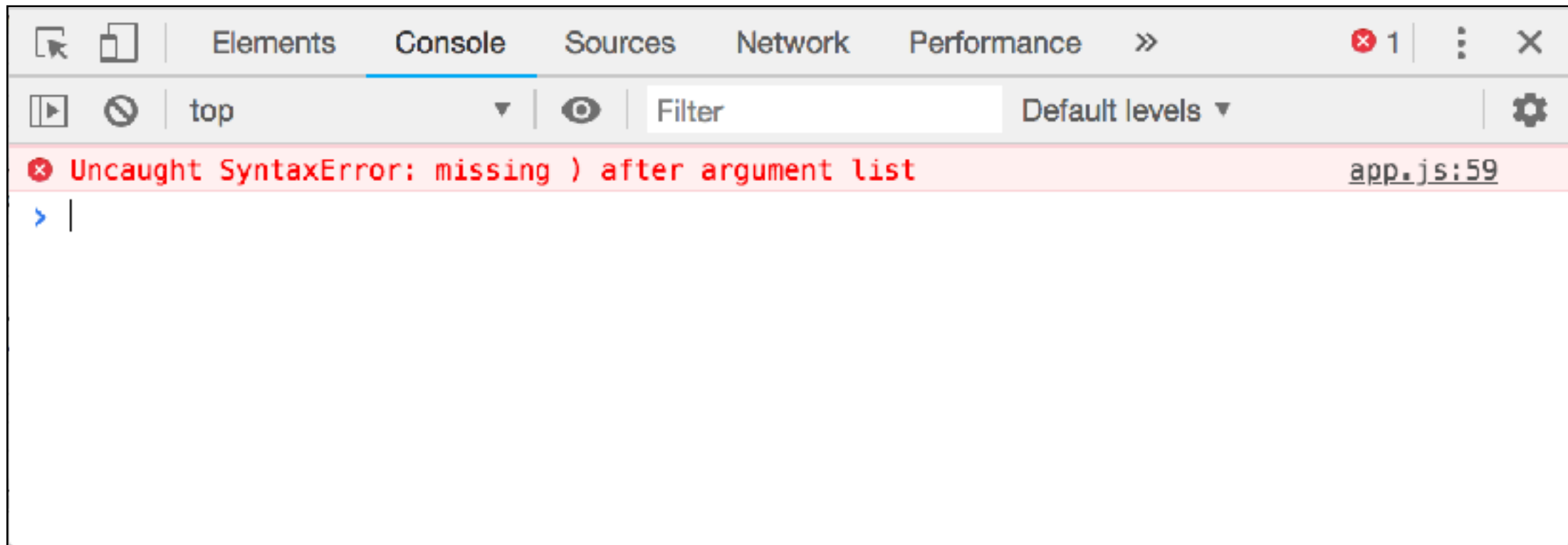
8 min

1. In the `app.js` file, complete questions 1-4.
2. Note that most of your answers should be stored in variables called `q1`, `q2` etc., and the variables printed to the console. See Question 0, which is already completed, for an example.
3. You will work on the remaining questions later in class today.

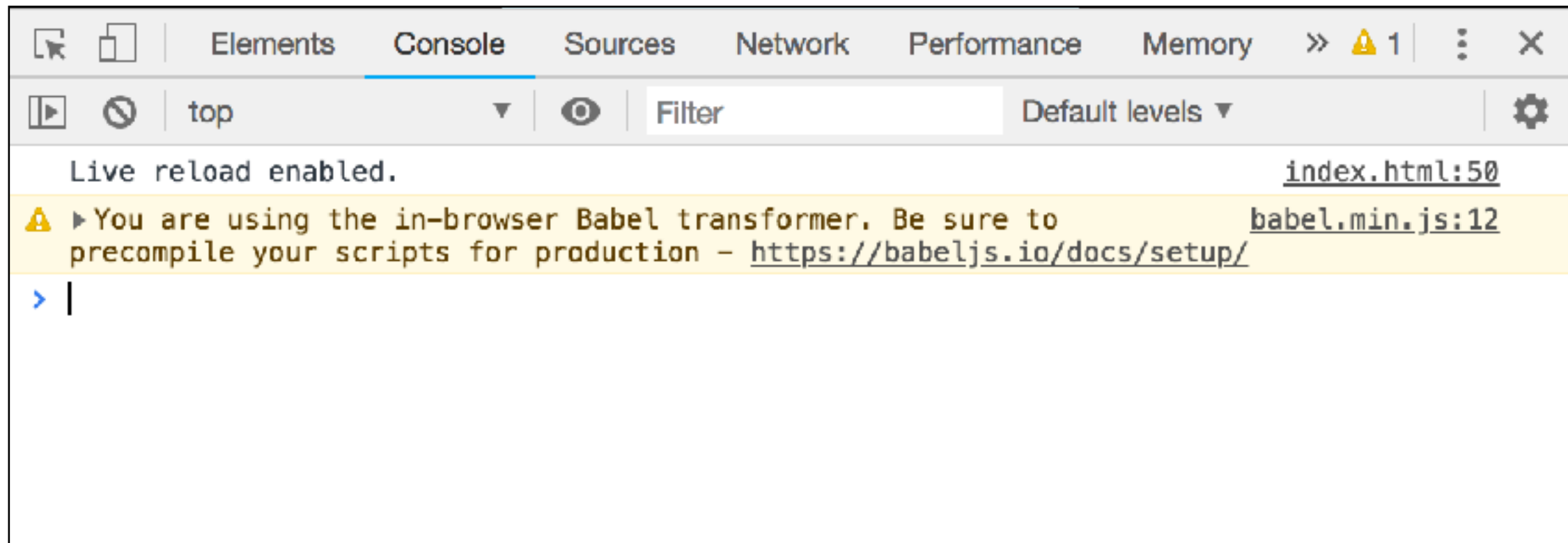
DEBUGGING



DEBUGGING



DEBUGGING

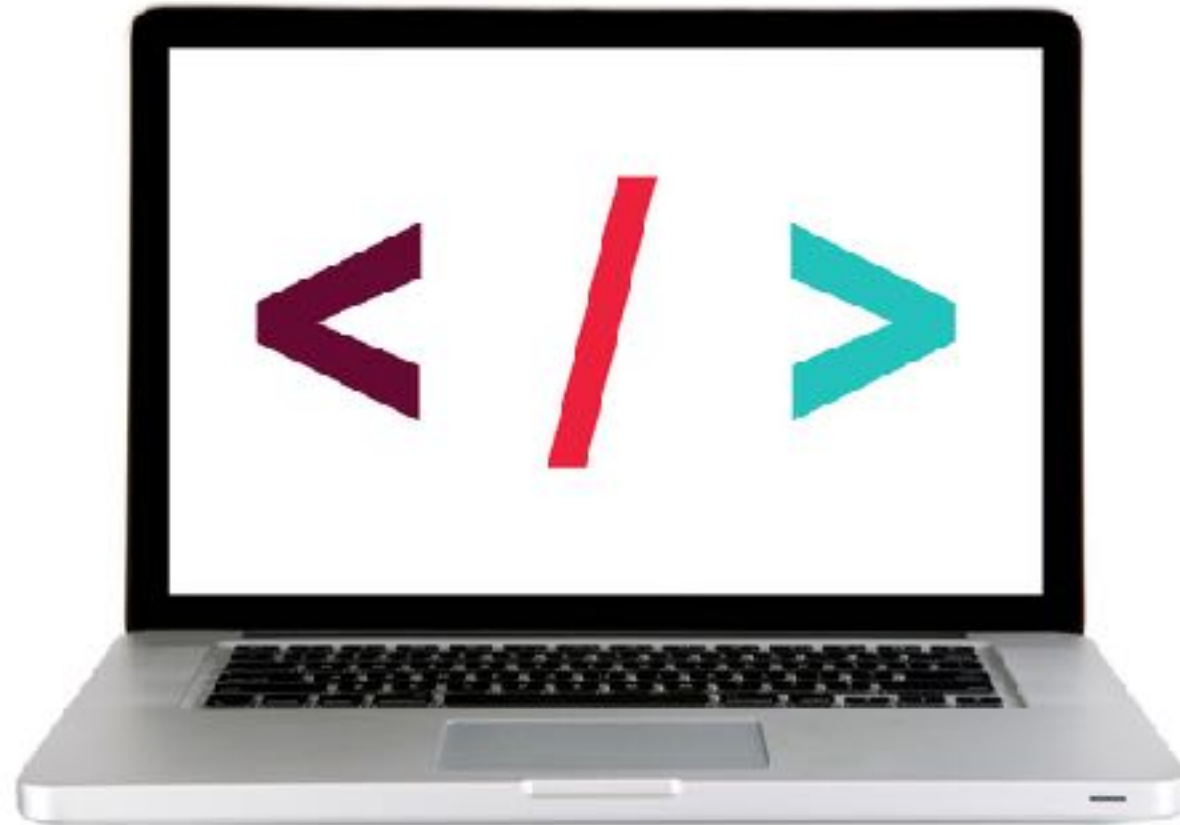


ARRAY HELPER METHODS

ARRAY HELPER METHODS

<code>toString()</code>	Returns a single string consisting of the array elements converted to strings and separated by commas
<code>join()</code>	Same as <code>toString()</code> , but allows you to pass a custom separator as an argument
<code>pop()</code>	Removes and returns the item at the end of the array
<code>push(item1, ..., itemN)</code>	Adds one or more items to the end of the array
<code>reverse()</code>	Reverses the array
<code>shift()</code>	Removes and returns the item at the start of the array
<code>unshift(item1, ..., itemN)</code>	Adds one or more items to the start of the array

LET'S TAKE A CLOSER LOOK



WHY IS THIS AD FUNNY?



FOR LOOPS

ITERATING

**Going through the same process with a bunch of items,
one at a time**

for STATEMENT

iterator declaration

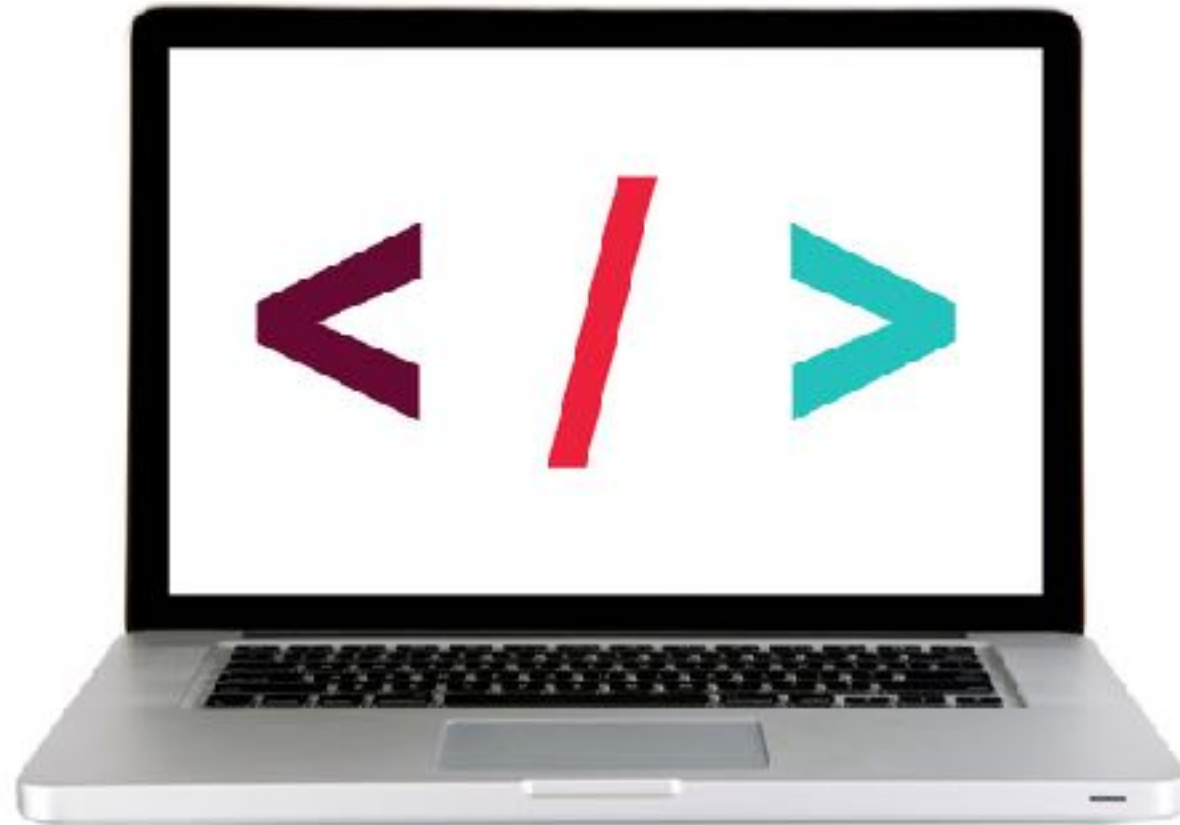
condition (execute
statements as long as
this statement is true)

change to iterator at the
end of each loop
(increment or decrement)

```
for (let i = 0; i < teams.length; i += 1) {  
    console.log(teams[i]);  
}
```

statement(s) to execute
enclosed in braces

LET'S TAKE A CLOSER LOOK



STRICT MODE

`"use strict";`

- Goes at the top of the file
- Tells browsers to be unforgiving in interpreting our code
- Helps us write good code by ensuring that even little mistakes trigger errors

for STATEMENT

```
let fruits = ['apples', 'oranges', 'bananas'];  
  
for (let i = 0; i < fruits.length; i += 1) {  
    console.log(fruits[i]);  
});
```

result in console:

```
< "apples"  
< "oranges"  
< "bananas"
```

LAB — FOR LOOPS



EXERCISE

TYPE OF EXERCISE

‣ Individual / Pair

LOCATION

‣ starter-code > 2-loops-exercise

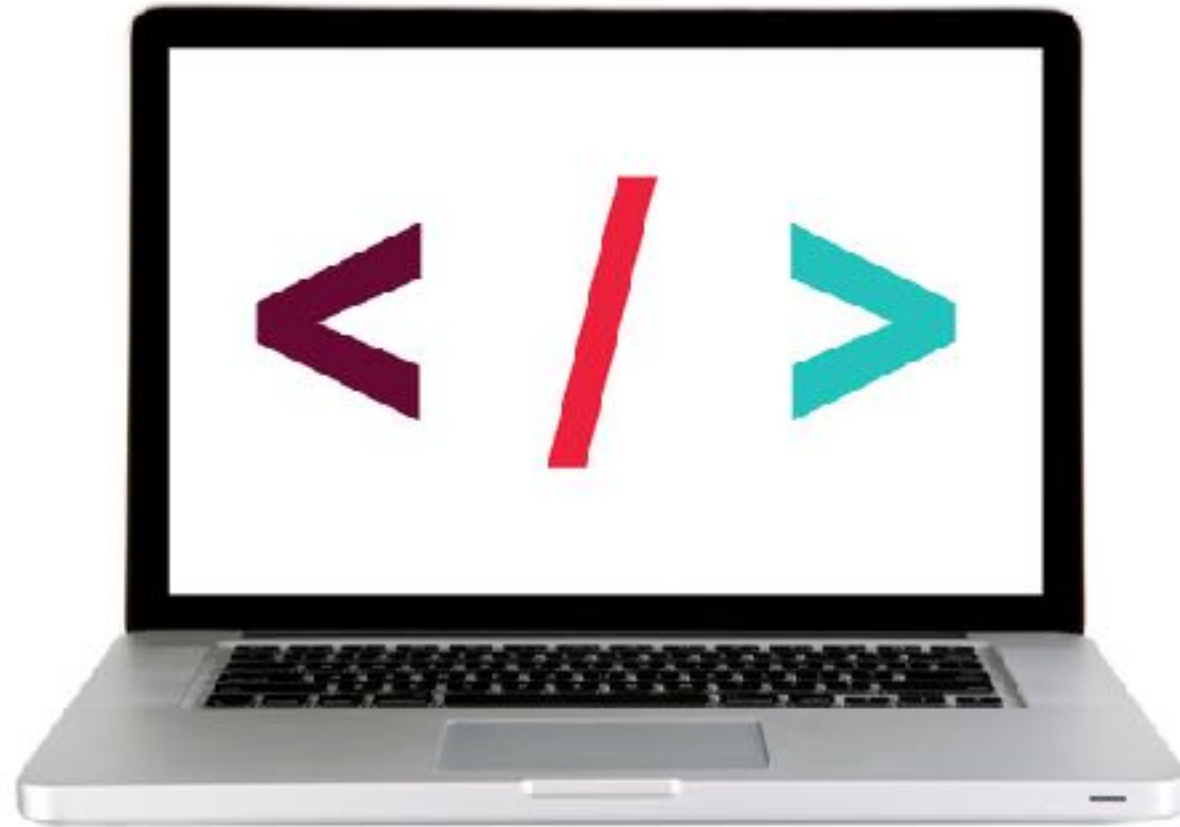
TIMING

10 min

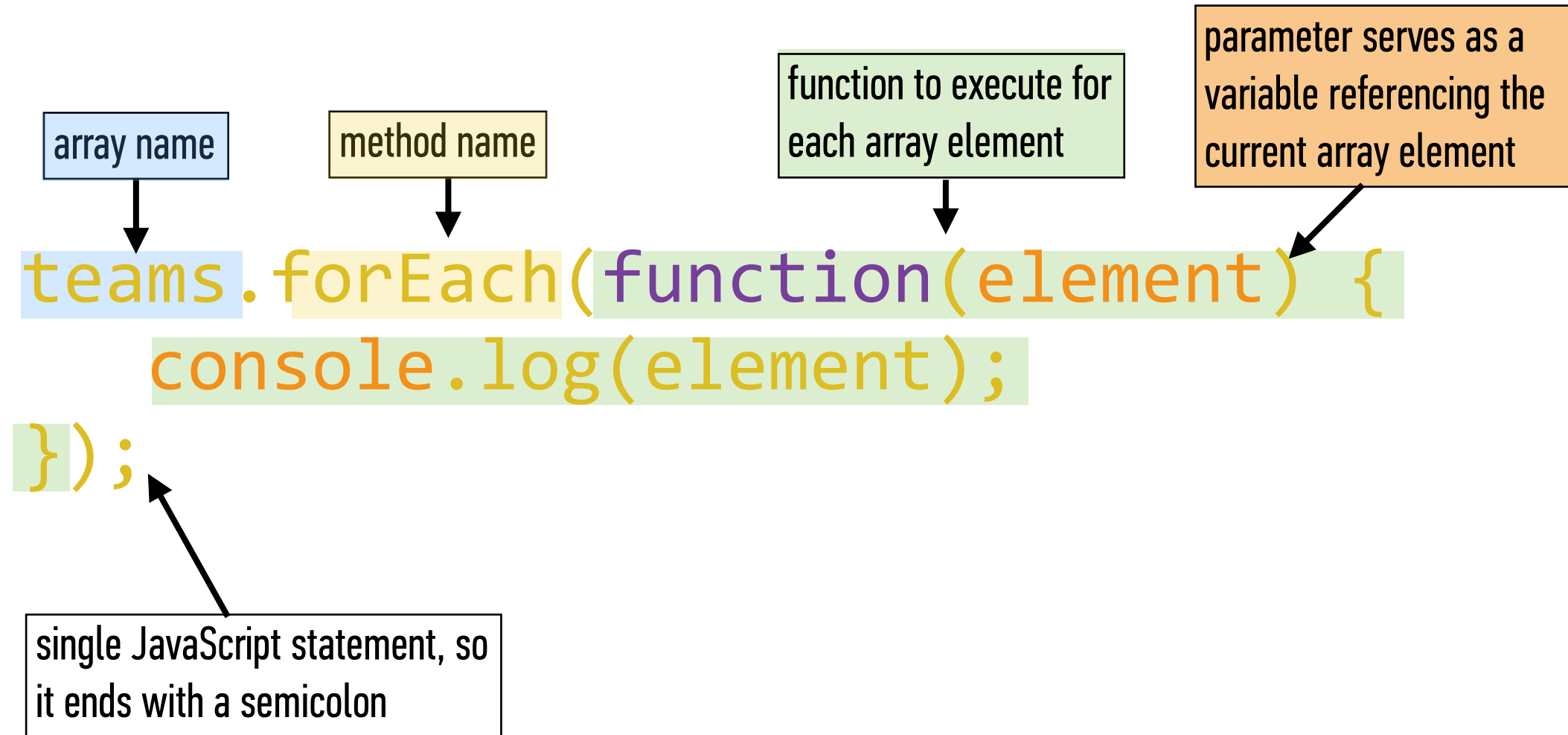
1. Write code that creates a for loop that calculates 2 to the 10th power, and console.logs each step of the calculation. (Full instructions in the `app.js` file.)
2. BONUS 1: Rewrite your code to allow a user to enter the exponent value, rather than hard-coding it into your program. (Hint: Read up on the [window.prompt method](#).)
3. BONUS 2: Rewrite your code to use a [while loop](#) rather than a for loop.
4. BONUS 3: Rewrite your code to use a [do/while loop](#) rather than a for loop or while loop.

ARRAY ITERATOR METHODS

LET'S TAKE A CLOSER LOOK



forEach()



forEach() EXAMPLE

```
let teams = ['Bruins', 'Bears', 'Ravens', 'Ducks'];  
  
teams.forEach(function(element) {  
    console.log(element);  
});
```

LAB — ARRAY LOOPS



EXERCISE

TYPE OF EXERCISE

‣ Individual / Pair

LOCATION

‣ starter-code > 0-arrays-loops-exercise

TIMING

10 min

1. In the `app.js` file, complete questions 5-6.
2. As in the section you did earlier, your answers should be stored in variables called `q1`, `q2` etc., and the variables logged to the console.
3. Answer these questions using `forEach()` loops, not `for` loops.

ARRAY ITERATOR METHODS

<code>forEach()</code>	Executes a provided function once per array element
<code>every()</code>	Tests whether all elements in the array pass the test implemented by the provided function
<code>some()</code>	Tests whether some element in the array passes the test implemented by the provided function
<code>filter()</code>	Creates a new array with all elements that pass the test implemented by the provided function
<code>map()</code>	Creates a new array with the results of calling a provided function on every element in this array

LAB — ARRAY LOOPS



EXERCISE

TYPE OF EXERCISE

‣ Individual / Pair

LOCATION

‣ starter-code > 0-arrays-loops-exercise

TIMING

5 min

1. In the `app.js` file, complete question 7.
2. As in the section you did earlier, your answer should be stored in a variable called `q7` and the variable logged to the console.

LAB — PUTTING IT ALL TOGETHER!



EXERCISE

TYPE OF EXERCISE

‣ Individual / Pair

LOCATION

‣ starter-code > 4-arrays-loops-exercise-2

TIMING

until 9:25

1. Write code for a website shopping cart that calculates the sales tax for each item in a cart array and stores the result in a 2nd array. (Full instructions in the `app.js` file.)
2. Calculate the total with tax of all cart items and store the result in a new variable.
3. BONUS: Update your code to round each item to the nearest cent. (Hint: Read up on `Math.round`)
4. BONUS: Rewrite your code to use the `array.map` method.

ROUNDING IS IMPORTANT FOR UX!

Subscription

Silver Extension (1yr) \$14.99

Gold Upgrade (1.41 yr) \$21.08

✓ Gold Upgrade (1.41 yr) and 1yr Extension \$51.069999999999999

Platinum Upgrade (1.41 yr) \$105.41

Platinum Upgrade (1.41 yr) and 1yr Extension \$195.399999999999998

Exit Tickets!

(Class #2)

LEARNING OBJECTIVES: REVIEW

- Declare, assign to, and manipulate data stored in a variable.
- Create arrays and access values in them.
- Build iterative loops using for statements.
- Iterate over and manipulate values in an array.

Next class preview: Conditionals & Functions

- Use Boolean logic to combine and manipulate conditional tests.
- Use `if/else` conditionals to control program flow based on Boolean tests.
- Differentiate among `true`, `false`, `truthy`, and `falsy`.
- Describe how parameters and arguments relate to functions
- Create and call a function that accepts parameters to solve a problem
- Define and call functions defined in terms of other functions
- Return a value from a function using the `return` keyword
- Define and call functions with argument-dependent return values

Q&A