JavaScript Foundations - Part 2

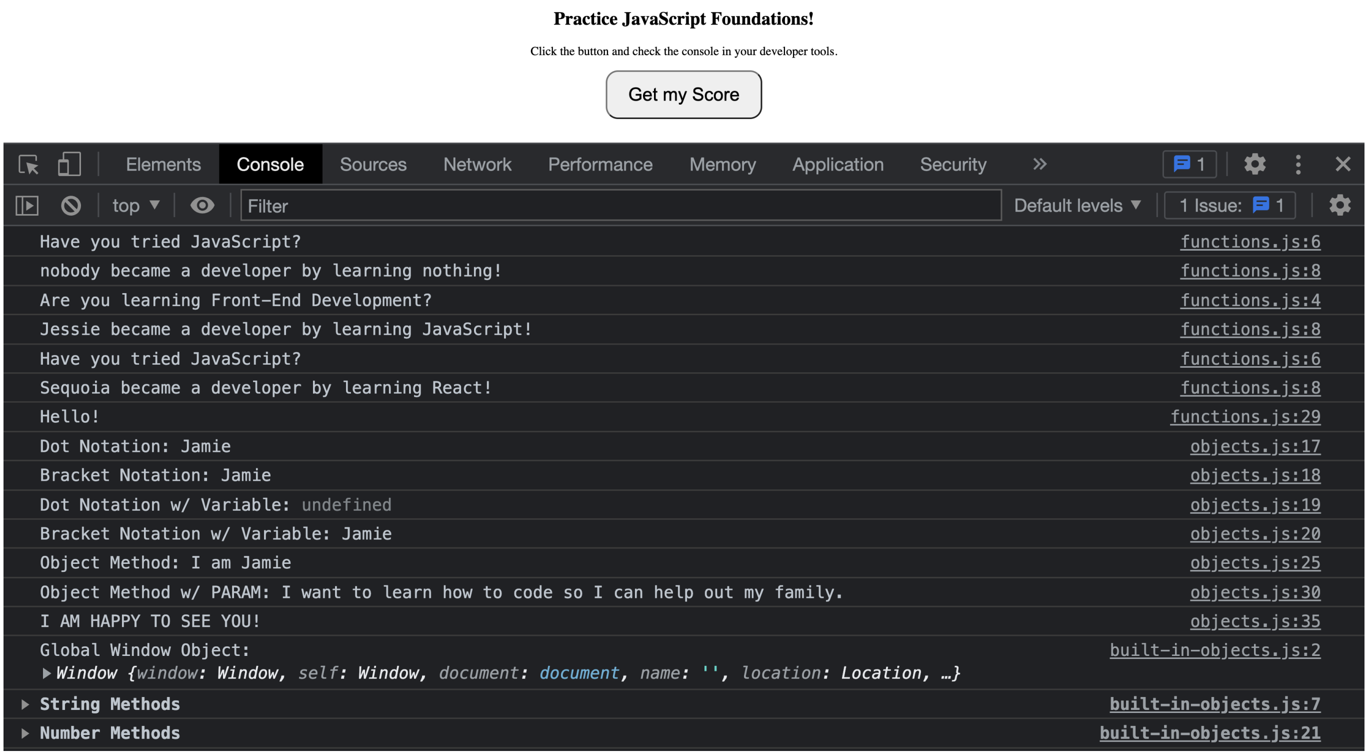
Class 3 Course Content

Preparation

GOALS

By the end of this lesson, you will be able to:

1. **Create JS Functions**
2. **Create JS Objects**
3. **Grasp Common JS Built-in Objects & Methods**



Practice JavaScript Foundations!

Click the button and check the console in your developer tools.

```
Have you tried JavaScript?                                              functions.js:6
nobody became a developer by learning nothing!                          functions.js:8
Are you learning Front-End Development?                                 functions.js:4
Jessie became a developer by learning JavaScript!                       functions.js:8
Have you tried JavaScript?                                              functions.js:6
Sequoia became a developer by learning React!                           functions.js:8
Hello!                                                                  functions.js:29
Dot Notation: Jamie                                                       objects.js:17
Bracket Notation: Jamie                                                   objects.js:18
Dot Notation w/ Variable: undefined                                       objects.js:19
Bracket Notation w/ Variable: Jamie                                       objects.js:20
Object Method: I am Jamie                                                 objects.js:25
Object Method w/ PARAM: I want to learn how to code so I can help out my family.   objects.js:30
I AM HAPPY TO SEE YOU!                                                    objects.js:35
Global Window Object:                                               built-in-objects.js:2
▸Window {window: Window, self: Window, document: document, name: '', location: Location, …}
▸ String Methods                                                    built-in-objects.js:7
▸ Number Methods                                                    built-in-objects.js:21
```

CONCEPTS

- **Function:** A *function* is a way to create an on-demand, reusable and executable code block.
- **Object:** Almost everything in JavaScript is an *object*. *Objects* in a nutshell, are a set of self-contained key-value pairs.

Walkthrough

STEP 1: FUNCTIONS

Aim: Comprehend creating and using JavaScript Functions

| *./functions.js* |

- [ ] **Creating Our First Function**
    - The purpose of functions is to create a block of code you can run anytime. Creating functions helps reduce the duplication of code and enhances the readability
    - You can replace multiple `console.log()` statements that say the same thing by creating a function that prints the statement and calling the function multiple times instead

```
// console.log("You became a developer by learning with Codefi!")
// console.log("You became a developer by learning with Codefi!")
// console.log("You became a developer by learning with Codefi!")

// * FUNCTION DECLARATION (Generic) * \\
function learnToCode() {
  console.log("You became a developer by learning with Codefi!");
}

// * FUNCTION CALLS * \\
learnToCode();
learnToCode();
learnToCode();
```

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- [ ] **Pass Parameters to a Function**
    - To add dynamic abilities to a function, it can accept an *argument* and use that information inside to run differently depending on the parameter's value
    - Pass in a student variable, give it a default value of "nobody"
    - Use a template literal to pass in the student's name with a string after
    - When you are calling the function, pass in a string for a student's name

```
// * FUNCTION DECLARATION (Generic) * \\
function learnToCode(student = "nobody") {
  console.log(`${student} became a developer by learning with Codefi!`);
}
```

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- [ ] **Conditionalally Rendering a Statement Depending on an Argument**
    - Pass in a second variable `language` with a default value of "nothing"
    - In the template literal string, use this argument to further the dynamic abilities
    - Use this argument to create a conditional statement
    - If the language is equal to JavaScript, render a different string

```
// * FUNCTION DECLARATION (Generic) * \\
function learnToCode(student = "nobody", language = "nothing") {
  if (language.toLowerCase() === "javascript") {
    console.log("Are you learning Front-End Development?");
  } else {
    console.log("Have you tried JavaScript?");
  }
  console.log(`${student} became a developer by learning ${language}!`);
}
```

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- [ ] **Functions with Return Values**
    - Create a new function `gradeAssignment(score = 0)` that takes in a score (default to 0) and returns that score
    - Call the function, pass in a score and save the result in a variable
    - `console.log()` the variable

```
function gradeAssignment(score = 0) {
  return score;
}

const myTest = gradeAssignment(99);

console.log(myTest);
```

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| *./index.html* |

- [ ] **Call a Function Via Button Click**
    - Create a button that calls the `gradeAssignment()` function - pass in any score you want

```
<!-- * MAIN CONTENT * -->
<section class="container">
  <h1>Practice JavaScript Foundations!</h1>
  <p>Click the button and check the console in your developer tools.</p>

  <button onclick="gradeAssignment(99)" class="btn-primary">
    Get my Score
  </button>
</section>
```

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| *./functions.js* |

- [ ] **Creating Anonymous Functions & ES6 Arrow Functions**
  - Create an anonymous function and store the value in a variable. *Note*: function variables can only be called AFTER they are declared
  - Practice ES6 arrow functions by refactoring the first two functions we created

```
// * FUNCTION DECLARATION (ES6 ARROW) * \\
const learnToCodeES6 = (student, language) => {
  // Your Code Here
};

// * FUNCTION DECLARATION (ES6 ARROW) * \\
const gradeAssignmentES6 = (score) => {
  // Your Code Here
};

// * FUNCTION DECLARATION (Anonymous) * \\
const greet = function () {
  console.log("Hello");
};
```

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Check: Assess your understanding of JavaScript functions.

- What is another name for a function parameter?
- How do you write an ES6 arrow function?
- When can you call a function before it is declared?

STEP 2: OBJECTS

Aim: Comprehend Creating and Using JavaScript Objects

| *./objects.js* |

- [ ] **Creating an Object**
  - Create an object that represents basic information on a single student

```
const student = {
  name: "Jamie",
  shouldBuildProjects: true,
  age: 44,
};
```

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- [ ] **Accessing Object Properties**
  - To access, you can use the objects name followed by a `.` and then the property on the object

  - You can also use the [""] syntax, which is especially useful for variables
  - Create a separate variable that holds a string value of a property on the object
  - Try to use the dot notation and the bracket notation and see what the results are in your console

```
// * ACCESSING an OBJECT * \\
const filterWord = "name";

console.log("Dot Notation:", student.name);
console.log("Bracket Notation:", student["name"]);
console.log("Dot Notation w/ Variable:", student.filterWord);
console.log("Bracket Notation w/ Variable:", student[filterWord]);
```

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- [ ] **Creating & Calling a Method on an Object**
  - You can place functions inside of objects; these are called *methods*
  - Create a method that uses the `this` keyword to return a template literal statement of the student's name

```
// * DECLARING an OBJECT * \\
const student = {
  name: "Jamie",
  shouldBuildProjects: true,
  age: 44,
  introduce: function () {
    return `I am ${this.name}`;
  },
};

// . . .

// * CALLING a METHOD on an OBJECT * \\
const sayHello = student.introduce();

console.log("Object Method:", sayHello);
```

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- [ ] **Creating a Method that Takes in a Parameter**
  - Create another method on the `student` object that takes in a parameter and returns a template literal string using the argument passed into it

```
// * DECLARING an OBJECT * \\
const student = {
  name: "Jamie",
  shouldBuildProjects: true,
  age: 44,
  introduce: function () {
    return `I am ${this.name}`;
  },
  motivate: function (reasonForLearningToCode) {
    return `I want to learn how to code so I can
${reasonForLearningToCode}`;
  },
};

// . . .
// * CALLING a METHOD w/ a PARAMETER on an OBJECT * \\
const findingYourWhy = student.motivate("help out my family.");

console.log("Object Method w/ PARAM:", findingYourWhy);
```

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- ☐ **Global Methods for Different Data Types**
  - Almost everything in JavaScript is an object
  - Strings, Numbers, Objects, Arrays all have specific methods you can call on them because JS has an object with prebuilt methods for each data type

```
// * GLOBAL METHODS PREVIEW * \\
const veryHappyGreeting = "I am happy to see you!".toUpperCase();

console.log(veryHappyGreeting);
```

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Check: Assess your understanding of JavaScript objects

- How do you define key-value pairs in a JavaScript object?
- What object property notation would you use if you wanted to search using a separate variable?
- What is a function inside an object typically called?

STEP 3: BUILT-IN OBJECTS

Aim: Comprehend the various built-in JavaScript objects

| *./built-in-objects.js* |

- ☐ **Discovering the Global `window` object**
  - JavaScript requires a browser to run (we will learn about NodeJS later on), and so, every browser stores a global JS object
  - If you type window into your developer tools console, you can see all the methods and properties available to you.

  - Every time we create a function or object, it will be available on this global window object. Everything in the global object you can omit the window... it is implied

```
console.log(window);
```

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- ☐ **Introduce Common Built-in String Methods**
  - toUpperCase()
  - toLowerCase()
  - startsWith()
  - repeat()
  - trim()
  - charAt()
  - replace()
  - split()

```
// * ===> COMMON BUILT-IN STRING METHODS <=== * \\
const myString = "       TESTING methods       ";

console.groupCollapsed("String Methods");
console.log("toUpperCase():", myString.toUpperCase());
console.log("toLowerCase():", myString.toLowerCase());
console.log("startsWith():", myString.startsWith(" "));
console.log("trim():", myString.trim());
console.log("repeat():", myString.repeat(3));
console.log("charAt():", myString.charAt(9));
console.log("split():", myString.split("TESTING"));
console.log("replace():", myString.replace("methods", "complete"));
console.groupEnd();
```

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- ☐ **Introduce Common Built-in Number Methods**
  - toString()
  - Number.isInterger()
  - toFixed()
  - isNaN()

```
// * ===> COMMON BUILT-IN NUMBER METHODS <=== * \\
const myNumber = 3.14159263;

console.groupCollapsed("Number Methods");
console.log("toString():", myNumber.toString());
console.log("Number.isInteger():", Number.isInteger(myNumber));
console.log("toFixed():", myNumber.toFixed(2));
console.log("isNaN():", isNaN(myNumber));
console.groupEnd();
```

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- [ ] **Introduce Common Built-in Math Methods**
    - random()
    - floor()
    - ceil()
    - round()
    - min()
    - max()

```
// * ===> COMMON BUILT-IN MATH METHODS <=== * \\
console.groupCollapsed("Math Methods");
console.log("random():", Math.random());
console.log("floor():", Math.floor(3.9));
console.log("ceil():", Math.ceil(3.1));
console.log("round():", Math.round(3.49));
console.log("min():", Math.min(2, 5, 1));
console.log("max():", Math.max(2, 5, 1));
console.groupEnd();
```

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- [ ] **Introduce Common Built-in Date Methods**
    - now()
    - getDate()
    - toDateString()
    - toISOString()
    - getSeconds()
    - getMinutes()
    - getHours()
    - getDay()
    - getMonth()
    - getYear()

```
// * ===> COMMON BUILT-IN DATE METHODS <=== * \\
console.groupCollapsed("Date Methods");
console.log("now():", Date.now());
console.log("getDate():", new Date().getDate());
console.log("toDateString():", new Date().toDateString());
console.log("toISOString():", new Date().toISOString());
console.log("getSeconds():", new Date().getSeconds());
console.log("getMinutes():", new Date().getMinutes());
console.log("getHours():", new Date().getHours());
console.log("getDay():", new Date().getDay());
console.log("getMonth():", new Date().getMonth());
console.log("getYear():", new Date().getYear());
console.groupEnd();
```

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- [ ] **Introduce Common Built-in Document Methods**
    - title
    - URL
    - body
    - images
    - querySelector()
    - createElement()

```
// * ===> COMMON BUILT-IN DOCUMENT METHODS <=== * \\
console.groupCollapsed("Document Methods");
console.log("title:", document.title);
console.log("URL:", document.URL);
console.log("body:", document.body);
console.log("images:", document.images);
console.log("querySelector():", document.querySelector("h1"));
console.log("createElement():", document.createElement("h1"));
console.groupEnd();
```

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- [ ] **Introduce Common Built-in Array Methods**
    - length
    - push()
    - pop()
    - includes()
    - indexOf()

```
// * ===> COMMON BUILT-IN ARRAY METHODS <=== * \\
const myArray = [1, "Hello", false, 20, true];

console.groupCollapsed("Array Methods");
console.log("length:", myArray.length);
console.log("push():", myArray.push("Last Item"));
console.log("pop():", myArray.pop());
console.log("includes():", myArray.includes("Hello"));
console.log("indexOf():", myArray.indexOf("Hello"));
console.groupEnd();
```

- [ ] **Future Array Methods We Will Learn**
    - forEach()

- slice()
- splice()
- filter()
- map()
- sort()
- every()
- some()
- reduce()

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Check: Assess your understanding of JavaScript built-in objects

- How would you turn an all-caps string into a lower case string?
- How would you remove all preceding and trailing whitespace in a string?
- How would you turn the number 10.2132130 into 10.21?
- How do you create a random number in JavaScript?
- How do you get the Date?
- What method do you call to grab the title of the document?
- How do you check the overall length of an array?
- How do you take off the last element in an array?

Review

ACCOMPLISHMENTS

Congratulations yet again! 🎊 🎉

Feel proud that **you learned something new and valuable today**.

Learning to code is a journey, and you are taking the necessary steps to improve your skills and opportunities for the future.

Good on you!

Specifically, we learned how to:

- Create functions in old and modern fashion
- Code custom objects and understand their capabilities
- Recognize and use everyday built-in JavaScript objects

RESOURCES

JavaScript Fundamentals - Functions *(Article)*

Modern JavaScript Tutorial #5 - Objects *(Video)*
