

Web Development **from Beginner to** **Paid Professional**

Volume 3

Learn JavaScript Algorithms & Data Structures Step By Step.
Examples, Practice Exercises and Projects Included.

By

Bolakale Aremu

Ojula Technology Innovations

Web Development
from Beginner to Paid Professional

Volume 3

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Examples, Practice Exercises and Projects Included.



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How to Learn HTML5, CSS & JavaScript Well

I know there are more than sufficient resources online to teach absolute beginners everything they need to learn web development from scratch. But this book is different because it addresses a few web development problems. The credibility of a web developer is much more than their credentials. It's actually about the strength of their portfolio.

Employment opportunities (www.turing.com/jobs) often come from work samples and concrete skills, rather than a college degree. So, you need to learn well enough. This book will not only help you learn well and build a stunning portfolio, it will also provide you continuous help and support.

With this book and my **dedicated 24/7 help and support team**, there's nothing for you to fear. I have helped many web developers update their development skills, launch successful careers and get hired for **remote jobs** (<https://vanhack.com/jobs>). I notice that even the most ambitious beginners can run into problems, such as unable to decide where to begin. Sometimes they get completely lost on the way and therefore need further help.

The truth is everyone needs help at one point or the other to learn html5, CSS or JavaScript correctly in their web development journey. I put sufficient coding challenges, hints and solutions in volumes 1, 2 and 3 of the series. In this volume, you will get **practice projects in this book to test your skills. You will also get further help if you use the free support link at the bottom of this book. I will help you learn well.**

Finally, if you buy this book, I will add you to my web development community so you can continue to learn and get more help until you become a well-paid professional.

Bolakale Aremu
CEO, Ojula Technology Innovations
Web developer and Software Engineer
Ojulaweb.com

1. Basic JavaScript

1.0. Getting Started

This book is volume 3 of *Web Development from Beginner to Paid Professional*. In this volume, you'll learn JavaScript Algorithms and Data Structures. While HTML and CSS control the content and styling of a page, JavaScript is used to make it interactive. In this volume, you'll learn the **fundamentals of JavaScript** including **variables, arrays, objects, loops, and functions**.

Once you have the fundamentals down, you'll apply that knowledge by creating algorithms to manipulate strings, factorialize numbers, and even calculate the orbit of the International Space Station.

Along the way, you'll also learn two important programming styles or paradigms: **Object Oriented Programming** (OOP) and **Functional Programming** (FP).

The great thing about web development is it's very suitable for people coming from many different backgrounds. So, it doesn't matter if you have little or no technical experience, or if you do have a technical background and you're looking to transition your skill sets into web development.

For the lessons in the subsequent sections, you will need to create a few files and open them in Visual Studio. How to install and use Visual Studio was explained in Book 1 of the series. If you don't already have them, I highly recommend you download and install Visual Studio editor (<https://code.visualstudio.com/download>) and Google Chrome browser (<https://www.google.com/chrome/>) right now to get started. They are very easy to install, and they have a bunch of developer tools pre-installed.

There are tons of videos on Youtube on how to install the latest versions of Visual Studio (www.youtube.com/watch?v=m9mIwKeTJhk) and Chrome browser (www.youtube.com/watch?v=ThQAkabE0J8).

Alternatively, with W3schools' online JavaScript editor (www.w3schools.com/js/tryit.asp?filename=tryjs_editor), you can edit HTML, CSS and JavaScript code, and view the result in your browser.

Below are the six simple steps you should follow to create a new folder in your portfolio and open it in Visual Studio:

1. Create a new folder and name it **JS_Course**, similar to the folder you created in volume 2 of the series.
2. In visual Studio, click the **File** menu at the top and select **Open Folder...**
3. Navigate to the location where you saved your folder and select it.

4. Select this folder to load/open it on your **Visual Studio** explorer.
5. Close the *Get Started* tab.
6. Get ready to start coding.

Practice **exercises** (shown in color) are provided near the end of every section of this book. Each exercise is immediately followed by one or more **hints** that point to the correct results on your browser when you run your codes.

Note: Some browser extensions, such as ad-blockers and script-blockers can interfere with the codes. If you face issues, I recommend taking the following steps to disable extensions that modify or block the content of your pages while taking the course.

Google Chrome:

1. Open Chrome and click on the three-dot menu icon in the top-right corner.
2. Hover over "More tools" in the dropdown menu.
3. Select "Extensions" to open the Extensions page.
4. Disable the extensions that you suspect are causing issues by toggling the switch next to each extension.

Mozilla Firefox:

1. Open Firefox and click on the three-line menu icon in the top-right corner.
2. Select "Add-ons" to open the Add-ons Manager.
3. In the left sidebar, click on "Extensions."
4. Disable the extensions that may be causing problems by clicking the toggle switch next to each extension.

Microsoft Edge:

1. Open Edge and click on the three-dot menu icon in the top-right corner.
2. Select "Extensions" to open the Extensions page.
3. Disable the extensions causing issues by toggling the switch next to each extension.

1.1. JavaScript Fundamental

JavaScript (JS) is a scripting language you can use to make web pages interactive. It is one of the core technologies of the web, along with HTML and CSS, and is supported by all modern browsers.

The name "JavaScript" was chosen by Netscape, the company that originally developed the language, to leverage the popularity of Java at the time. However, it's important to note that despite the similar name, JavaScript and Java are distinct and unrelated programming languages.

In this course, you'll learn fundamental programming concepts in JavaScript. You'll start with basic data structures like numbers and strings. Then you'll learn to work with arrays, objects, functions, loops, if/else statements, and so much more.

This book in particular identifies the three main pillars around which the JavaScript language is organized: scope/closures, prototypes/objects, and types/coercion. JavaScript is a broad and sophisticated language, with many features and capabilities. But all of it is founded on these three mentioned foundational pillars.

1.2. Comment Your JavaScript Code

Comments are lines of code that JavaScript will intentionally ignore. Comments are a great way to leave notes to yourself and to other people who will later need to figure out what that code does. There are two ways to write comments in JavaScript:

Using `//` will tell JavaScript to ignore the remainder of the text on the current line. This is an in-line comment:

```
1 // This is an in-line comment.
```

You can make a multi-line comment beginning with `/*` and ending with `*/`. This is a multi-line comment:

```
1 /* This is a
2 multi-line comment */
```

NOTE: As you write code, you should regularly add comments to clarify the function of parts of your code. Good commenting can help communicate the intent of your code—both for others *and* for your future self. Try creating one of each type of comment.

Line numbers like 1, 2, 3 are not be included in the codes in this book. When you copy JS code from this book and paste it in your IDE, or as you write the code directly in your chosen IDE (such as **Visual Studio**), line numbers are automatically be added.

1.3. Declare JavaScript Variables

In computer science, *data* is anything that is meaningful to the computer. JavaScript provides eight different *data types* which are `undefined`, `null`, `boolean`, `string`, `symbol`, `bigint`, `number`, and `object`.

For example, computers distinguish between numbers, such as the number 12, and `strings`, such as `"12"`, `"dog"`, or `"123 cats"`, which are collections of characters. Computers can perform mathematical operations on a number, but not on a string.

Variables allow computers to store and manipulate data in a dynamic fashion. They do this by using a "label" to point to the data rather than using the data itself. Any of the eight data types may be stored in a variable.

Variables are similar to the x and y variables you use in mathematics, which means they're a simple name to represent the data we want to refer to. Computer variables differ from mathematical variables in that they can store different values at different times.

We tell JavaScript to create or *declare* a variable by putting the keyword `var` in front of it, like so:

```
var ourName;
```

creates a variable called `ourName`. In JavaScript we end statements with semicolons. Variable names can be made up of numbers, letters, and `$` or `_`, but may not contain spaces or start with a number.

Use the `var` keyword to create a variable called `myName`.

Hints

Look at the `ourName` example above if you get stuck.

You should declare `myName` with the `var` keyword, ending with a semicolon

1.4. Storing Values with the Assignment Operator

In JavaScript, you can store a value in a variable with the *assignment* operator (`=`).

```
myVariable = 5;
```

This assigns the `Number` value `5` to `myVariable`.

If there are any calculations to the right of the `=` operator, those are performed before the value is assigned to the variable on the left of the operator.

```
var myVar;  
myVar = 5;
```

First, this code creates a variable named `myVar`. Then, the code assigns `5` to `myVar`. Now, if `myVar` appears again in the code, the program will treat it as if it is `5`.

In the following exercise, assign the value `7` to variable `a`.

```
// Setup  
var a;
```

```
// Only change code below this line
```

Hints

- You should not change code above the specified comment.
- `a` should have a value of 7.

1.5. Assigning the Value of One Variable to Another

After a value is assigned to a variable using the *assignment* operator, you can assign the value of that variable to another variable using the *assignment* operator.

```
var myVar;  
myVar = 5;  
var myNum;  
myNum = myVar;
```

The above declares a `myVar` variable with no value, then assigns it the value 5. Next, a variable named `myNum` is declared with no value. Then, the contents of `myVar` (which is 5) is assigned to the variable `myNum`. Now, `myNum` also has the value of 5.

In the following exercise, assign the contents of `a` to variable `b`.

```
// Setup  
var a;  
a = 7;  
var b;  
  
// Only change code below this line
```

Hints

- You should not change code above the specified comment.
- `b` should have a value of 7.
- `a` should be assigned to `b` with `=`.

1.6. Initializing Variables with the Assignment Operator

It is common to *initialize* a variable to an initial value in the same line as it is declared.

```
var myVar = 0;
```

Creates a new variable called `myVar` and assigns it an initial value of 0.

Define a variable `a` with `var` and initialize it to a value of 9.

Hints

You should initialize `a` to a value of 9.

1.7. Declare String Variables

Previously you used the following code to declare a variable:

```
var myName;
```