

Module 3: Introduction to JavaScript

Quick Reference Guide

Learning Outcomes

- Explain the importance of JavaScript in web design.
- Define variables using JavaScript.
- Develop a JavaScript script.
- Cast basic data types.
- Declare variable scope in JavaScript.

The Need for JavaScript

JavaScript is a versatile and dynamic programming language that plays a pivotal role in web development. JavaScript can be executed directly in web browsers, making it a key technology for creating interactive and responsive websites.

JavaScript is crucial for modern web development due to its multifaceted capabilities. It:

- Enables you to create responsive and interactive web pages.
- Dynamically update content on a web page without needing to reload the entire page.
- Helps ensure that data entered by users through forms is accurate and secure.
- Supports asynchronous operations, allowing you to make network requests.
- Helps ensure that your web application works consistently across various web browsers.

Variables

variables are fundamental building blocks that allow developers to store and manipulate data within their programs. They provide a way to give names to values, making code more readable and manageable.

JavaScript offers three main ways to declare variables: `var`, `let`, and `const`, each with its own scope and behavior. The choice of which to use depends on the desired scope and mutability of the variable.

The Characteristics of Variables:

- **Data storage:** Data can be saved for later use or manipulation.

- **Dynamic behavior:** Values can be changed as needed during execution of the code.
- **Code reusability:** Values do not need to be hard coded each time you need them.
- **Modularity:** Variables enable each block of code to work independently.
- **Improved readability:** Meaningful variable names are helpful for understanding the code better.

What Can Variables Hold?

Variables can hold the following types of data, but are not limited to:

- Numbers, which are useful for calculations.
- Text, which is useful for storing information.
- Boolean values (e.g., true/false), which are useful for verifying.
- Objects, which are useful for structuring data.

Programming in JavaScript

Programming is how you tell machines what to do and when in order to perform tasks.

A task can be something simple, like calculating the sum of two numbers, or something complex, like rendering a web page.

A statement in JavaScript is equivalent to a single step or instruction in a recipe. Common JavaScript statements might include variable assignments such as `var x = 10;` or function calls such as `console.log("Hello, world");` The semicolon at the end of a statement is similar to a period at the end of a sentence; it signifies the end of a complete thought or action.

`console.log()` is a built-in JavaScript function used extensively for debugging and informational purposes. When you call `console.log()` with one or more arguments, it prints those arguments to the web browser's console.

The versatility of `console.log()` extends to handling various data types - strings, numbers, arrays, objects, and more. It's commonly used during development to verify code behavior, track variable values, and debug issues.

The Core of Programming

Programs have four programming pillars. Consider a login page:

- **Input:** A user types their email and password.
- **Process:** The program checks if the credentials are correct.

- **Output:** A welcome message or an error message is displayed.
- **Storage:** User session data might be saved for use in future interactions.

Programming, particularly in JavaScript, consists of writing a series of statements that are executed in sequence or as specified by the control structures. This is similar to a recipe: you gather the ingredients (input), perform the steps (process), taste the food (output), and maybe store some for later (storage).

JavaScript script

A script is a set of instructions written in the JavaScript language that the browser can execute. Unlike static HTML and CSS, scripts can update and change both HTML and CSS. A script provides step-by-step instructions for a machine to follow. Think of it as a recipe for the computer.

The DOM represents a web page as a structured tree of objects. These objects represent various things in an HTML document, such as elements, attributes, and text. The DOM provides a way for programming languages such as JavaScript to interact with and modify the web page.

“document.ready” – A special function ensures the page's DOM is fully loaded and ready to be manipulated with JavaScript. It ensures the entire page content is available before your script runs.

Injecting JavaScript into HTML web pages is a common practice for adding interactivity, manipulating the DOM (Document Object Model), and enhancing the functionality of web applications.

There are two main ways of injecting JavaScript into HTML web pages:

- Inline JavaScript
- External JavaScript

Modifying HTML Using JavaScript

By injecting JavaScript into HTML web pages, you can modify HTML and its styles, which increases the overall interactivity of the web pages and enhances the user experience. This includes:

- Changing element content
- Modifying element attributes
- Adding and removing elements
- Styling elements
- Event handling

Scope of Variable in JavaScript

A variable comes into existence, and you can define it either as a `const`, a `var`, a `let`, or it could be an argument and come into scope when that function is called.

In JavaScript, variables are like containers used to store and manage data, allowing developers to work with information in their programs. The concept of scope defines where a variable is accessible and where it isn't.

Variable scoping defines where in your code a variable is accessible. In JavaScript, there are three main scopes.

- Global scope
- Function scope
- Block scope

