
Foundations of JavaScript in Web Development

- The Role of JavaScript in Web Applications
  JavaScript enables dynamic behavior, user interaction, and real-time updates in web apps.
- The Document Object Model (DOM)
  The DOM is a tree structure representing web page elements, allowing JavaScript to access and manipulate them.
- Fundamentals of JavaScript
  Covers basic syntax, data types, variables, operators, and basic control flow.
- A Hello World App in JavaScript
  A simple starting point to output text using `console.log()` or manipulating the DOM.
- Communicating with End Users from JavaScript
  Use methods like `alert()`, `prompt()`, and `confirm()` to interact with users.
- Separating HTML and JavaScript Sources
  Best practice to use external `.js` files for cleaner code and separation of concerns.
- Accessing the DOM from JavaScript
  Methods like `getElementById()`, `querySelector()` help JavaScript access and modify page elements.

JavaScript Variables and Data Types

- Variable Declarations: var, let and const
  `var` is function-scoped, `let` and `const` are block-scoped; `const` is for constants.
- Empty Values in JavaScript: undefined and null
  `undefined` means a variable has been declared but not assigned. `null` represents intentional absence of value.
- User Interactions Using alert, prompt, and confirm
  Simple dialog boxes to display messages and get user input or confirmation.
- Numbers in JavaScript
  JavaScript supports floating point numbers and has built-in operations via the `Math` object.

- Initializing and Manipulating Strings in JavaScript
  Strings can be created with quotes and modified using built-in string methods.
- Analysing and Modifying Strings in JavaScript
  Methods like `length`, `indexOf`, `slice`, `replace`, `toUpperCase`, etc., help work with strings.
- Dates in JavaScript
  The `Date` object allows creation, formatting, and manipulation of dates and times.
- Using the Math Library for Common Math Operations
  The `Math` object provides constants and methods like `Math.round()`, `Math.random()`, `Math.max()`.
- Arithmetic Operators
  Basic math operations: `+`, `-`, `*`, `/`, `%`.
- Logical and Conditional Operators
  Used for decision-making: `&&`, `||`, `!`, `==`, `===`, `!=`, `!==`, `>`, `<`.
- Type Casting
  Converting between types using functions like `Number()`, `String()`, or automatic coercion.

Control Flow and Functions

- Looping Control Structures
  Includes `for`, `while`, and `do...while` loops for repetitive tasks.
- An Introduction to Functions in JavaScript
  Functions are blocks of code designed to perform specific tasks and can be reused.
- Global and Local Variables
  Scope determines accessibility: global variables are accessible anywhere, local are within functions.
- Working with Functions
  Covers parameters, return values, anonymous functions, and arrow functions.
- The Fundamentals of Error Handling
  Use `try...catch...finally` to gracefully handle runtime errors.

Working with Arrays

- Creating Arrays
  Arrays store ordered lists of elements and can be created using `[]` or `Array()`.
- Copying Arrays
  Use methods like `slice()` or spread syntax `[...array]` to create copies.
- Splicing and Slicing Arrays
  `splice()` modifies arrays by adding/removing items. `slice()` returns a portion without altering original.
- Concatenating and Sorting Arrays
  Use `concat()` to merge, and `sort()` with custom logic to order elements.

JavaScript Objects and Advanced Array Methods

- An Introduction to JavaScript Objects
  Objects store key-value pairs, ideal for representing structured data.
- Removing Properties from Objects
  Use `delete object.property` to remove a key.
- The "this" Keyword in JavaScript Objects
  Refers to the current object in context, especially inside methods.
- Linking Functions to Objects
  Functions can be assigned as object properties, becoming methods.
- Object Constructors
  Constructor functions create object templates using `new`.
- Creating New Objects from Existing Ones
  Use `Object.create()` or spread syntax to clone or extend objects.
- Object Methods
  Functions defined within objects to perform actions using internal data.
- Freezing Objects
  `Object.freeze()` makes objects immutable (no changes to properties).
- The map Method for JavaScript Arrays
  Creates a new array by applying a function to each item.
- The reduce and filter Methods for JavaScript Arrays
  `reduce()` accumulates a result; `filter()` returns items meeting a condition.
- The instanceOf Operator
  Tests whether an object is an instance of a particular constructor/class.