

JavaScript and NodeJS (5 days)

By Dr. Vishwanath Rao

Course Overview

Overview of the JavaScript Language
Typical Uses of JavaScript
Evolution of the JavaScript Language
ECMAScript Version Support

What is Core JavaScript?
What are JavaScript APIs?
Writing JavaScript in Visual Studio Code

JavaScript Fundamentals
Using Strict Mode
JavaScript and Whitespace
Adding Comments
Declaring Variables
var, let and const Keywords
Local vs. Global Variables
Declaring Block-Scoped Variables

JavaScript DataTypes
Primitive Types
Objects
Performing Data Conversions

Working with JavaScript Operators
Assignment Operators
Type Operators
Bitwise Operators
Conditional Operator
Working with Dates

Working with Numeric Data

Solving Precision Problems with Numbers

Rounding Numbers

Creating Random Numbers

Arithmetic Operation

Working with Exponents

Converting to Numbers

parseInt, parseFloat and Number Functions

Dealing with Errors

Types of JavaScript Errors

Error Handling

try

catch

finally

Throwing Custom Errors with throw

Controlling Flow

Creating Boolean Expressions

Using Standard and Strict Equality Operators

Using Logical and Comparison Operators

Conditional Constructs

if else

switch

Looping Constructs

do while

while

for

for in

for...of

Branching Statements

break

continue

Using Labels

Working with Arrays
Creating Arrays
Using the Array Constructor
Using Literal Notation
String.split()
Array.of()
Accessing Array Elements
Common Array Methods
forEach()
includes()
find() and findIndex()
Adding and Removing Elements
Sorting Arrays
Creating a Custom Sort Function
Looping through an Array

Working with Strings
Creating String Objects
Using String Methods
Searching within a String
Returning a Substring
Converting Character Case
Template Literals
Escape Sequences

Implementing Functions
Declaring Functions
Function Parameters
Default Parameters
Rest Parameters
Invoking Functions
Passing Arguments
Spread Operator
Named and Anonymous Functions

Local vs. Global Variables
Returning Values from a Function
The this Keyword
IIFEs

Closures
Callback Functions
Arrow Functions

Using JavaScript in the Browser
Embedding JavaScript in a Page
Referencing an External Script File
Using the JavaScript Console
Logging Messages in the Console
Debugging with Console
Deferring Script Loading
Where to Include JavaScript
DOMContentLoaded vs Load Events
Browser Object Model

Overview of the Browser Object Model
Using the window Object
Opening and Closing Windows
Using Timers
Interacting with the User with Dialogs
Using the document Object
Writing to the Web Page
Useful Properties of the Document
navigator Object
Feature detection
location Object
screen Object

Introduction to the Document Object Model (DOM)
Overview of Common DOM Types
Selecting DOM Elements
Selecting Elements By Id and Name
Selecting Elements By Class
Using CSS Selectors to Select Elements
Modifying Page Content with the DOM
innerHTML and.textContent Properties
createElement
createDocumentFragment
Accessing Attributes

Event Handling in JavaScript

Overview of JavaScript Events

The event Object Members

Event Capturing and Bubbling

Adding Event Handlers

Traditional (Inline) Model

Registering Events in JavaScript

Adding Multiple Handlers with `addEventListener`

Mouse and Keyboard Events

Preventing Default Behavior

Canceling Events

Scripting CSS with JavaScript

Using the `style` Property

`CSSStyleDeclaration` Objects

`getComputedStyle`

Modifying Classes with the `classList` API

Working with Forms

Enhancing Forms with JavaScript

Preventing a Double Submission

Selecting All Checkboxes

Conditionally Showing Fields

Working with Form Elements

Form Validation

Client-Side vs Server-Side Validation

Validating Form Fields

Checking Required Fields

Checking Length of Input

Overview of HTML 5 Validation

Constraint API

Canceling Form Submission

Using Regular Expressions

Overview of Regular Expressions

Using Regular Expressions in JavaScript

- Creating a RegExp Object
- Using i and g Flags
- Pattern Matching with Regular Expressions
- Using Backreferences
- Working with JavaScript Objects and JSON
- Understanding Objects
- Defining Custom Objects
- Object Literal Notation
- Defining Properties and Methods
- Creating a Constructor

- Using the in and instanceof Operators
- Overview of JSON
- Using JSON.stringify and JSON.parse
- Using Ajax

- Overview of Ajax
- The XMLHttpRequest Object
- Configuring an Ajax Request
- Processing JSON with Ajax
- Using Ajax to Call a Web Service
- HTML5 JavaScript APIs
- Overview of APIs
- Using Modernizr
- Geolocation API
- Using the getCurrentPosition() Method
- The Position Object
- Using the Google Maps JavaScript API
- Obtaining an API Key

- Creating a Map
- Adding Custom Markers to a Map
- Adding Info Windows to a Map
- Web Storage API
- Local Storage
- Session Storage

Introduction to Node.js

RAM vs. I/O latency

Blocking vs. Non-Blocking

Event-driven Programming

Event Loop

Blocking The Event Loop

Node.js Philosophy

Node.js Platform Setup

Download and Install

Node REPL

First Hello World

Modules and npm

Anatomy of a module

Private code

Accessing and using modules

npm commands

package.json

The Callback Pattern

What are callbacks

Callback-last

Error-first

Events

When to use Event Emitters

Binding Functions to Events

Event Requests and Listening

Error Handling

Callbacks: Error-first

Errors in Event Emitters

Uncaught Exceptions

Using Domains

Buffers

Why Buffers exist

Creating Buffers

Reading and Writing Buffers

Manipulating Buffers

Streams

What are streams

Read and Write Stream API

Flow Control

Piping

Duplex Stream

Transform Stream

Express.js

Intro and Installing Express.js

Building a Hello Express application

Creating routes

Rendering Layouts

Using templates

Adding partials

Using locals and conditional templates

Modularizing routes

Socket.io

Listening for

Broadcasting

Answering questions

Connecting to Databases

No SQL and Document Stores

Relational DBs

Configuration and platform setup

CRUD Operations