

Document Object Model (DOM)

What is DOM?

The DOM (Document Object Model) is a programming interface for HTML and XML documents. It represents the document as a tree of nodes, allowing scripts to access, manipulate, and update its content, structure, and style dynamically.

DOM Tree Structure

The DOM represents an HTML document as a hierarchical tree structure with elements as nodes.

Key Elements:

1. **Document Node:** The root of the tree (document).
2. **Element Node:** HTML tags (<div>, <p>, etc.).
3. **Attribute Node:** Attributes within elements (class, id).
4. **Text Node:** Content inside elements (Hello World).

Example DOM Tree for HTML:

```
<html>
  <head>
    <title>Example Page</title>
  </head>
  <body>
    <h1 id="title">Welcome</h1>
    <p class="intro">This is an example page.</p>
  </body>
</html>
```

DOM Tree Representation:

- Document
 - html
 - head

- title: "Example Page"
 - body
 - h1: "Welcome"
 - p: "This is an example page."
-

Examples

Accessing the DOM

e.g

```
let title = document.getElementById("title"); // Accessing element by ID
```

Manipulating the DOM

e.g

```
title.textContent = "Hello, DOM!"; // Updating element content
```

Event Handling

e.g

```
title.addEventListener("click", function () {  
    alert("Title clicked!");  
});
```

Traversing the DOM

e.g

```
let parent = title.parentNode; // Access parent node
```

```
let sibling = title.nextElementSibling; // Access next sibling element
```

Performance Considerations

- Minimize DOM manipulations to reduce reflows and repaints.

- Use DocumentFragment for batch updates.
- Optimize event delegation for better performance on dynamic content.
- Avoid deep nesting in the DOM structure.

Browser Support

DOM is universally supported by modern browsers, though older versions may require compatibility checks.

Common Methods and Properties

Methods

- getElementById(): Selects an element by ID.
- querySelector(): Selects the first matching element.
- createElement(): Creates a new element.
- appendChild(): Appends an element to a parent.
- removeChild(): Removes a child node.

Properties

- innerHTML: Sets or gets HTML content.
- textContent: Sets or gets text content.
- className: Accesses class name of an element.
- style: Accesses or modifies inline styles.

Problem 1: Dynamic Content Update

Original Heading

Change Heading

Problem 2: Real-Time Character Counter

Type your message here

Character count: 0

Problem 3: Add and Remove List Items

Enter new item

Add

Problem 4: Change Background Color

Red

Blue

Green

Problem 5: Toggle Dark Mode

