Information Technologies for Industrial Engineers

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Document Object Model (DOM)

What is the DOM?

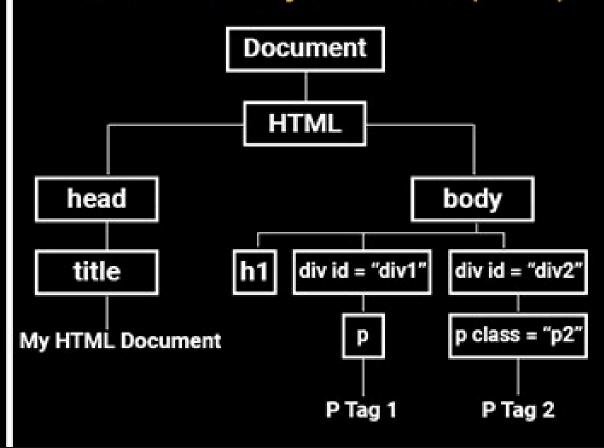
- The Document Object Model (DOM) is a programming interface for web documents.
- It represents the page so that programs can change the document structure, style, and content.
- The DOM represents the document as nodes and objects; that way, programming languages can interact with the page.

What is Document Object Model?

HTML Document

```
    index.html ×
      <html>
          <head>
              <title>My HTML Document</title>
          </head>
          ⟨body>
              <h1>Heading</h1>
              <div id="div1">
                  P Tag 1
              </div>
  10
              <div id="div2">
 11
                  P Tag 2
 12
              </div>
  13
          </body>
  14
      </html>
  15
```

Document Object Model (DOM)



Data type

- Document : represents any web page loaded in the browser
- Node : represents an object located within a document.
 - Element : represents an element in HTML.
 - TextNode: specifies text in an element.
 - Attr: speicifies attributes of an element.
- NodeList: A nodeList is an array of elements.

DOM Navigation

HTML

```
<!DOCTYPE html>
<html lang="en">
  <head>
  </head>
  <body>
    <h1>Headings</h1>
    <div id="div1">
     div1 text
     p> text
    </div>
    <div id="div2">div2 text</div>
  </body>
</html>
```

```
// document object
console.log(document.childNodes);
// html
const html = document.childNodes[1];
console.log(html);
// head, body, text nodex
console.log(html.childNodes);
const head = html.childNodes[0];
const body = html.childNodes[2];
console.log(head);
console.log(body);
```

```
// #div1
console.log(body.childNodes);
const div1 = body.childNodes[3];
console.log(div1);

// We can change the text of #div1
div1.childNodes[0].textContent = "Changed";

// Note that this is different from
// div1.textContent = 'Changed';
```

Introduction to events

Event

- Events are *actions* that happen in the system you are programming, which the system tells you about.
 - So your code can react to them.
- For example, if the user clicks a button on a webpage, you might want to react to that action by displaying an information box.

Event type

- The user selects a certain element or hovers the cursor over a certain element.
- The user chooses a key on the keyboard.
- The user resizes or closes the browser window.
- A web page finishes loading.
- A form is submitted.
- A video is played, paused, or finishes.
- An error occurs.

Event type

- Event reference
- Element -> click event

Event handler

- To react to an event, you attach an event handler to it.
- This is a block of code that runs when the event fires.
- Event handlers are sometimes called event listeners.

Example

<button>Click Me</button>

Example

```
const btn = document.querySelector("button");
function random(number) {
  return Math.floor(Math.random() * (number + 1));
function clickHandler() {
  const rndCol = `rgb(${random(255)}, ${random(255)}, ${random(255)})`;
  document.body.style.backgroundColor = rndCol;
btn.addEventListener("click", clickHandler);
```

Adding multiple listeners

(Add to the above code)

```
function doubleClickHandler() {
   alert("Reset to white");
   document.body.style.backgroundColor = "white";
}
btn.addEventListener("dblclick", doubleClickHandler);
```

Remove listeners

btn.removeEventListener("dblclick", doubleClickHandler);

Event object

- Sometimes, inside an event handler function, you'll see a parameter specified with a name such as event, evt, or e.
- This is called the **event object**, and it is automatically passed to event handlers to provide extra features and information.

Example

HTML

```
<div style="width: 16rem; height: 16rem; border: 1px solid gray"></div>
```

Example

JavaScript

```
const div = document.querySelector("div");

div.addEventListener("mousemove", onMouseMove);

function onMouseMove(e) {
   div.innerText = `${e.offsetX}, ${e.offsetY}`;
   div.style.backgroundColor = `rgb(${e.offsetX}, ${e.offsetY}, ${
        (e.offsetX + e.offsetY) / 2
   })`;
}
```

Event target

event.target

- The element that caused the event.
- Useful when you want to reuse the event handler.

```
<head>
  <style>
    body {
      display: flex;
      flex-wrap: wrap;
      gap: 1rem;
    div {
      width: 8rem;
      height: 8rem;
      border: 1px solid gray;
      display: flex;
      justify-content: center;
      align-items: center;
  </style>
</head>
```

```
const divs = document.querySelectorAll("div");
divs.forEach((div) => {
  div.addEventListener("mousemove", handler);
});
function handler(e) {
  e.target.innerText = `${e.offsetX}, ${e.offsetY}`;
  e.target.style.color = "white";
  e.target.style.backgroundColor = `rgb(${e.offsetX}, ${e.offsetY}, ${
    (e.offsetX + e.offsetY) / 2
  })`;
```

Form

index.html

```
<h1>Enter Your Name</h1>
<div>
<label for="id-fname">First name:</label>
<input type="text" id="id-fname" name="fname" />
</div>
```

script.js

```
const fname = document.getElementById("id-fname");
const h1 = document.querySelector("h1");

fname.addEventListener("input", (e) => {
   const text = e.target.value;
   if (text) {
     h1.textContent = e.target.value;
   } else {
     h1.textContent = "Enter Your Name";
   }
});
```

Super Secret

index.html

```
<h1>My Super Secret</h1>
<label for="id-pass">Password:</label>
<input type="password" id="id-pass" name="pass" />
```

script.js

```
const pass = document.getElementById("id-pass");
const h1 = document.querySelector("h1");
pass.addEventListener("input", (e) => {
  const text = e.target.value;
  if (text === "1234") {
    h1.textContent = "You know my password, great job.";
  } else if (text === "") {
    h1.textContent = "My Super Secret";
  } else {
    h1.textContent = "Wrong Password";
});
```