JavaScript Interactive Websites

HTML script element src attribute

The `src` attribute of a `<script>` element is used to point to the location of a script file.
The file referenced can be local (using a relative path) or hosted elsewhere (using an absolute path).

```
<!-- Using a relative path -->
<script src="./script.js"></script>

<!-- Using an absolute path -->
<script
src="https://code.jquery.com/jquery-
3.3.1.min.js"></script>
```

HTML script element defer attribute

The `defer` attribute of a `<script>` tag is a boolean attribute used to indicate that the script can be loaded but not executed until after the HTML document is fully parsed. It will only work for externally linked scripts (with a `src` attribute), and will have no effect if it is applied to an inline script.

In the example code block, the `<h1>` tag will be loaded and parsed before the script is executed due to the `defer` attribute.

```
<body>
  <script src="main.js" defer></script>
  <h1>Hello</h1>
</body>
```

HTML script tag async attribute

Scripts are loaded synchronously as they appear in an HTML file, before the following HTML is loaded and parsed. The `async` attribute can be used to load the scripts asynchronously, such that they will load in the background without blocking the HTML parser from continuing.
In the example code block, the script will load asynchronously in the background, without blocking the HTML parser.

```
<body>
  <script src="main.js" async></script>
  <h1>Hello world!</h1>
</body>
```

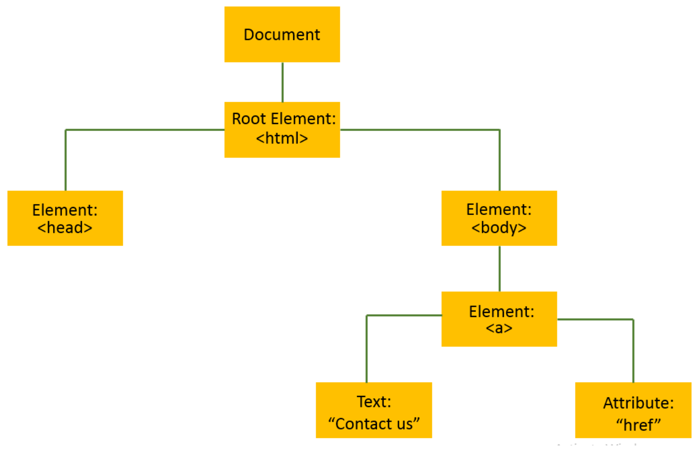
HTML script element

The HTML `<script>` element can contain or reference JavaScript code in an HTML file. The `<script>` element needs both an opening and a closing tag, and JavaScript code can be *embedded* between the tags.

```
<script>
  console.log("Hello world!");
</script>
```

Nodes in DOM tree

A *node* in the DOM tree is the intersection of two branches containing data. Nodes can represent HTML elements, text, attributes, etc. The *root node* is the top-most node of the tree. The illustration shows a representation of a DOM containing different types of node.



HTML DOM

The DOM is an interface between scripting languages and a web page's structure. The browser creates a Document Object Model or DOM for each of the webpage it renders. The DOM allows scripting languages to access and modify a web page. With the help of DOM, JavaScript gets the ability to create dynamic HTML.

Accessing HTML attributes in DOM

The DOM nodes of type Element allow access to the same attributes available to HTML elements. For instance, for the given HTML element, the `id` attribute will be accessible through the DOM.

```
<h1 id="heading">Welcome!</h1>
```

The Document Object Model

The *Document Object Model*, or DOM is a representation of a document (like an HTML page) as a group of objects. While it is often used to represent HTML documents, and most web browsers use JavaScript interfaces to the DOM, it is language agnostic as a model.
The DOM is tree-like and heirarchical, meaning that there is a single top-level object, and other objects descend from it in a branching structure.

DOM parent-child relationship

The parent-child relationship observed in the DOM is reflected in the HTML nesting syntax.
Elements that are nested inside the opening and closing tag of another element are the children of that element in the DOM.

In the code block, the two `<p>` tags are children of the `<body>`, and the `<body>` is the parent of both `<p>` tags.

```
<body>
  <p>first child</p>
  <p>second child</p>
</body>
```

DOM Element Attributes

DOM Nodes of type Element provide access to attributes of those elements declared in HTML markup. For instance, if an HTML tag has attributes like `id` or `class` or `src`, those attributes can be accessed through the DOM.

```
<p id="intro">Welcome to my website</p>
<script>
  const paragraph =
document.querySelector('p');
  console.log(paragraph.id) // "intro"
</scrip>
```

The `element.parentNode` Property

The `.parentNode` property of an element can be used to return a reference to its direct parent node. `.parentNode` can be used on any node.

```
<div id="parent">
  <p id ="first-child">Some child
text</p>
  <p id ="second-child">Some more child
text</p>
</div>
<script>
  const firstChild =
document.getElementById('first-child');
  firstChild.parentNode;  // reference
to the parent element
</script>
```

The JavaScript `document.createElement()` Method

The `document.createElement()` method creates and returns a reference to a new Element Node with the specified tag name.

`document.createElement()` does not actually add the new element to the DOM, it must be attached with a method such as `element.appendChild()`.

```
const newButton
= document.createElement("button");
```

`element.InnerHTML`

The `element.innerHTML` property can be used to access the HTML markup that makes up an element's contents.

`element.innerHTML` can be used to access the current value of an element's contents or to reassign them.

```
<box>
  <p>Hello there!</p>
</box>

<script>
  const box =
document.querySelector('p');
  // Outputs '<p>Hello there!</p>':
  console.log(box.innerHTML)
  // Reassigns the value:
  box.innerHTML = '<p>Goodbye</p>'
</script>
```

JavaScript `document.getElementById()` Method

The `document.getElementById()` method returns the element that has the `id` attribute with the specified value.

`document.getElementById()` returns `null` if no elements with the specified ID exists.

An ID should be unique within a page. However, if more than one element with the specified ID exists, the `.getElementById()` method returns the first element in the source code.

```
// To save a reference to the element
with id 'demo':
const demoElement
= document.getElementById('demo');
```

The JavaScript `.querySelector()` Method

The `.querySelector()` method selects the first child/descendant element that matches its selector argument.

It can be invoked on the `document` object to search the entire document or on a single element instance to search that element's descendants.

```
// Select the first <div>
const firstDiv
= document.querySelector('div');

// Select the first .button element
inside .main-navigation
const navMenu
= document.getElementById('main-
navigation');
const firstButtonChild
= navMenu.querySelector('.button');
```

The `document.body` Object

`document.body` returns a reference to the contents of the `<body>` HTML element of a document/HTML page. The `<body>` element contains all the visible contents of the page.

JavaScript `element.onclick` property

The `element.onclick` property can be used to set a function to run when an element is clicked. For instance, the given code block will add an `<li>` element each time the element with ID `addItem` is clicked by the user.

```
let element
= document.getElementById('addItem');
element.onclick = function() {
  let newElement
= document.createElement('li');
  document.getElementById('list').appen
dChild(newElement);
};
```

JavaScript `element.appendChild()` method.

The `parentElement.appendChild(childElement)` method appends an element as the last child of the parent.

In the given code block, a newly created `<li>` element will be appended as the last child of the HTML element with the ID `list`.

```
var node1
= document.createElement('li');
document.getElementById('list').appendC
hild(node1);
```

Changing CSS in Javascript with `element.style`.

The `element.style` property can be used to access or set the CSS style rules of an element. To do so, values are assigned to the attributes of `element.style`. In the example code, `blueElement` contains the HTML elements with the ID `colorful-element`. By setting the `backgroundColor` attribute of the `style` property to blue, the CSS property `background-color` becomes blue.

Also note that, if the CSS property contains a hyphen, such as `font-family` or `background-color`, Camel Case notation is used in Javascript for the attribute name, so `background-color` becomes `backgroundColor`.

```
let blueElement
= document.getElementById('colorful-
element');
blueElement.style.backgroundColor
= 'blue';
```