JavaScript Introduction

JavaScript Can Change HTML Content

One of many JavaScript HTML methods is `getElementById()`.

The example below "finds" an HTML element (with id="demo"), and changes the element content (innerHTML) to "Hello JavaScript":

Example

```
document.getElementById("demo").innerHTML = "Hello JavaScript";
```

JavaScript accepts both double and single quotes:

Example

```
document.getElementById('demo').innerHTML = 'Hello JavaScript';
```

JavaScript Can Change HTML Attribute Values

In this example JavaScript changes the value of the `src` (source) attribute of an `<img>` tag:

JavaScript Can Change HTML Styles (CSS)

Changing the style of an HTML element, is a variant of changing an HTML attribute:

Example

```
document.getElementById("demo").style.fontSize = "35px";
```

JavaScript Can Hide HTML Elements

Hiding HTML elements can be done by changing the `display` style:

Example

```
document.getElementById("demo").style.display = "none";
```

JavaScript Can Show HTML Elements

Showing hidden HTML elements can also be done by changing the `display` style:

Example

```
document.getElementById("demo").style.display = "block";
```

The <script> Tag

In HTML, JavaScript code is inserted between `<script>` and `</script>` tags.

Example

```
<script>
document.getElementById("demo").innerHTML = "My First JavaScript";
</script>
```

JavaScript in <head> or <body>

You can place any number of scripts in an HTML document.

Scripts can be placed in the `<body>`, or in the `<head>` section of an HTML page, or in both.

JavaScript in <head>

In this example, a JavaScript `function` is placed in the `<head>` section of an HTML page.

The function is invoked (called) when a button is clicked:

Example

```
<!DOCTYPE html>
<html>

<head>
<script>
function myFunction() {
  document.getElementById("demo").innerHTML = "Paragraph changed.";
}
</script>
```

```
</head>
<body>

<h1>A Web Page</h1>
<p id="demo">A Paragraph</p>
<button type="button" onclick="myFunction()">Try it</button>

</body>
</html>
```

JavaScript in <body>

In this example, a JavaScript `function` is placed in the `<body>` section of an HTML page.

The function is invoked (called) when a button is clicked:

Example

```
<!DOCTYPE html>
<html>
<body>

<h1>A Web Page</h1>
<p id="demo">A Paragraph</p>
<button type="button" onclick="myFunction()">Try it</button>

<script>
function myFunction() {
  document.getElementById("demo").innerHTML = "Paragraph changed.";
}
</script>

</body>
</html>
```

External JavaScript

Scripts can also be placed in external files:

External file: myScript.js

```
function myFunction() {
  document.getElementById("demo").innerHTML = "Paragraph changed.";
}
```

External scripts are practical when the same code is used in many different web pages.

JavaScript files have the file extension **.js**.

To use an external script, put the name of the script file in the `src` (source) attribute of a `<script>` tag:

Example

```
<script src="myScript.js"></script>
```

External JavaScript Advantages

Placing scripts in external files has some advantages:

- It separates HTML and code
- It makes HTML and JavaScript easier to read and maintain
- Cached JavaScript files can speed up page loads

To add several script files to one page - use several script tags:

Example

```
<script src="myScript1.js"></script>
<script src="myScript2.js"></script>
```

External References

External scripts can be referenced with a full URL or with a path relative to the current web page.

This example uses a full URL to link to a script:

Example

```
<script src="https://www.w3schools.com/js/myScript1.js"></script>
```

This example uses a script located in a specified folder on the current web site:

Example

```
<script src="/js/myScript1.js"></script>
```

This example links to a script located in the same folder as the current page:

Example

```
<script src="myScript1.js"></script>
```

You can read more about file paths in the chapter HTML File Paths.

JavaScript Functions

A JavaScript function is a block of code designed to perform a particular task.

A JavaScript function is executed when "something" invokes it (calls it).

Example

```
function myFunction(p1, p2) {
  return p1 * p2;   // The function returns the product of p1 and p2
}
```

JavaScript Function Syntax

A JavaScript function is defined with the `function` keyword, followed by a **name**, followed by parentheses **()**.

Function names can contain letters, digits, underscores, and dollar signs (same rules as variables).

The parentheses may include parameter names separated by commas:
(*parameter1, parameter2, ...*)

The code to be executed, by the function, is placed inside curly brackets: **{}**

```
function name(parameter1, parameter2, parameter3) {
  // code to be executed
}
```

Function **parameters** are listed inside the parentheses () in the function definition.

Function **arguments** are the **values** received by the function when it is invoked.

Inside the function, the arguments (the parameters) behave as local variables.

A Function is much the same as a Procedure or a Subroutine, in other programming languages.

Function Invocation

The code inside the function will execute when "something" **invokes** (calls) the function:

- When an event occurs (when a user clicks a button)
- When it is invoked (called) from JavaScript code
- Automatically (self invoked)

Function Return

When JavaScript reaches a `return` statement, the function will stop executing.

If the function was invoked from a statement, JavaScript will "return" to execute the code after the invoking statement.

Functions often compute a **return value**. The return value is "returned" back to the "caller":

Example

Calculate the product of two numbers, and return the result:

```
var x = myFunction(4, 3);   // Function is called, return value will end up in x

function myFunction(a, b) {
  return a * b;             // Function returns the product of a and b
}
```

The result in x will be:

```
12
```

Why Functions?

You can reuse code: Define the code once, and use it many times.

You can use the same code many times with different arguments, to produce different results.

Example

Convert Fahrenheit to Celsius:

```
function toCelsius(fahrenheit) {
  return (5/9) * (fahrenheit-32);
}
document.getElementById("demo").innerHTML = toCelsius(77);
```

The () Operator Invokes the Function

Using the example above, `toCelsius` refers to the function object, and `toCelsius()` refers to the function result.

Accessing a function without () will return the function object instead of the function result.

Example

```
function toCelsius(fahrenheit) {
  return (5/9) * (fahrenheit-32);
}
document.getElementById("demo").innerHTML = toCelsius;
```

Functions Used as Variable Values

Functions can be used the same way as you use variables, in all types of formulas, assignments, and calculations.

Example

Instead of using a variable to store the return value of a function:

```
var x = toCelsius(77);
var text = "The temperature is " + x + " Celsius";
```

You can use the function directly, as a variable value:

```
var text = "The temperature is " + toCelsius(77) + " Celsius";
```

Local Variables

Variables declared within a JavaScript function, become **LOCAL** to the function.

Local variables can only be accessed from within the function.

Example

```
// code here can NOT use carName

function myFunction() {
  var carName = "Volvo";
  // code here CAN use carName
}

// code here can NOT use carName
```