Contents

Foreword

The creation of this book has been for me, Mike McGrath, an exciting personal journey in discovering how JavaScript can be implemented in today's web browsers with HTML5. It has been fascinating to discover how the modern Document Object Model (DOM) is implemented by Internet Explorer, Firefox, Google Chrome, Safari, and Opera. All the examples I have given in this book demonstrate JavaScript features that are presently supported by Internet Explorer and most other leading web browsers and the screenshots illustrate the actual results produced by the listed code. I truly believe that now, more than ever, authors can integrate JavaScript functionality with HTML5 content markup and CSS presentation to produce stunning interactive web pages.

Conventions in this book

In order to clarify the code listed in the steps given in each example I have adopted certain colorization conventions. Those parts of the JavaScript language itself are colored blue, like this:

```
document.addEventListener
```

Variable and function names specified by the script author are colored red, like this:

```
var myVariable ;

function myFunction () { }
```

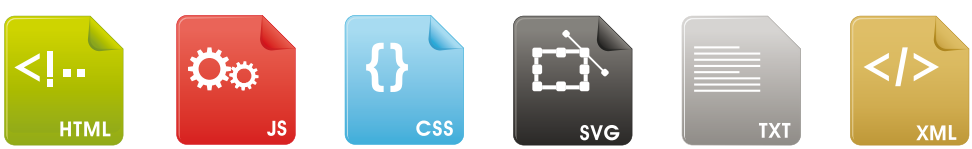
Literal content of numeric or text string value is colored black, like this:

```
var myNumber = 7 ;

var myString = "JavaScript in easy steps" ;
```

Comments are colored green, like this:

```
// Statements to be executed go here.
```

Additionally, in order to identify each source code file described in the steps a colored icon and the file name appears in the margin alongside the steps, such as these:



page.html script.js style.css vector.svg string.txt data.xml

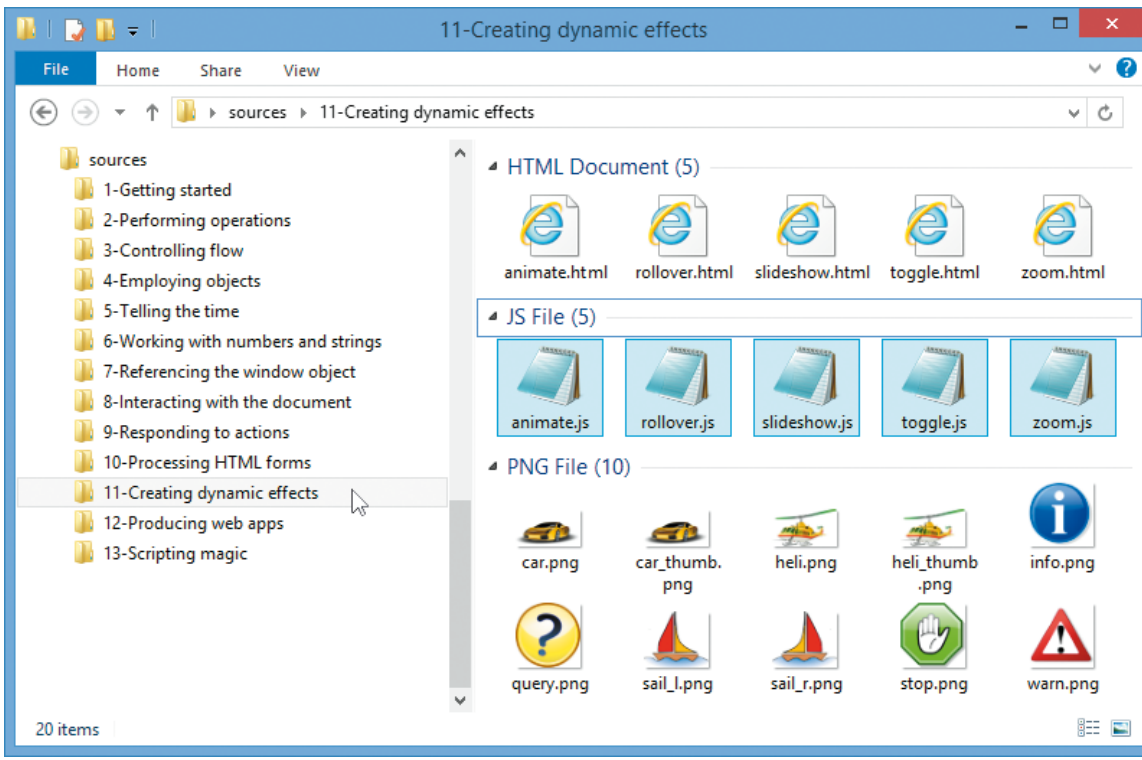
Grabbing the source code

For convenience I have placed all the source code files and associated files featured in this book into a single ZIP archive file, arranged in folders numbered to match the chapter numbers. You can obtain the complete archive by following these easy steps:

1. Browse to **http://www.ineasysteps.com**, then navigate to the "Free Resources" tab and choose the "Downloads" section

2. Find "JavaScript in easy steps, 5th edition" in the list, then click on the hyperlink entitled "All Code Examples" to download the archive

3. Now extract the archive contents to any convenient location on your computer



Undoubtedly JavaScript and HTML5 provide significant new creative possibilities in web page authoring – as I trust my examples demonstrate. I sincerely hope you enjoy discovering how JavaScript can be used to create stunning interactive web pages in today's latest web browsers as much as I did in writing this book.

Mike McGrath

1 Getting started

Welcome to the exciting world of JavaScript. This chapter demonstrates how to incorporate script within an HTML document and introduces JavaScript functions and variables.

Introduction

Brendan Eich, creator of the JavaScript language.

JavaScript is an object-based scripting language whose interpreter is embedded inside web browser software, such as Microsoft Internet Explorer, Mozilla Firefox, Opera and Safari. This allows scripts contained in a web page to be interpreted when the page is loaded in the browser to provide functionality and dynamic effects. For security reasons JavaScript cannot read or write files, with the exception of "cookie" files that store minimal data.

Created by Brendan Eich at Netscape, JavaScript was first introduced in December 1995, and was initially named "LiveScript". It was soon renamed, however, to perhaps capitalize on the popularity of Sun Microsystems' Java programming language – although it bears little resemblance.

Before the introduction of JavaScript, web page functionality required the browser to call upon "server-side" scripts, resident on the web server, where slow response could impede performance. Calling upon "client-side" scripts, resident on the user's system, overcame the latency problem and provided a superior experience.

JavaScript quickly became very popular but a disagreement arose between Netscape and Microsoft over its licensing – so Microsoft introduced their own version named "JScript". Although similar to JavaScript, the new JScript version had extended features and some differences that remain today. Recognizing the danger of fragmentation, the JavaScript language was standardized by the European Computer Manufacturers Association (ECMA) in June 1997 as "ECMAScript". This helped to stabilize core features but the name, sounding like some kind of skin disease, is not widely used and most people will always call the language "JavaScript".

Hot tip

The Document Object Model (DOM) is a hierarchical arrangement of objects representing the currently-loaded HTML document.

The JavaScript examples in this book describe three key ingredients:

- **Language basics** – illustrating the mechanics of the language syntax, keywords, operators, structure, and built-in objects
- **Web page functionality** – illustrating how to use the browser's Document Object Model (DOM) to provide user interaction and to create Dynamic HTML (DHTML) effects
- **Rich internet applications** – illustrating the latest AJAX techniques to create responsive web based applications

JavaScript keywords

Keywords:					
break	case	catch	continue	default	delete
do	else	false	finally	for	function
if	in	instanceof	new	null	return
switch	this	throw	true	try	typeof
var	void	while	with		

The words listed in the table above are all "keywords" that have special meaning in JavaScript and may not be used when choosing names in scripts. You should also avoid using any of the reserved words that are listed in the table below as they may be introduced in future versions of JavaScript:

Reserved words:				
abstract	boolean	byte	char	class
const	debugger	double	enum	export
extends	final	float	goto	implements
import	int	interface	long	native
package	private	protected	public	short
static	super	synchronized	throws	transient
volatile				

Other words to avoid when choosing names in scripts are the names of JavaScript's built-in objects and browser DOM objects:

Objects (Built-in):				
Array	Date	Math	Object	String

Objects (DOM):				
window	location	history	navigator	document
images	links	forms	elements	XMLHttpRequest

JavaScript is a case-sensitive language where, for example, **VAR**, **Var**, and **var** are regarded as different words – of these three only **var** is a keyword.

Notice that all built-in object names begin with a capital letter and must be correctly capitalized, along with the DOM's **XMLHttpRequest** object.

Including inline script

JavaScript code can be included in a web page by adding HTML **<script> </script>** tags, to enclose the script, and the opening tag must have a **type** attribute specifying the unique MIME type of "text/javascript" – to identify the element's contents as JavaScript.

Hot tip

MIME (Multipart Internet Mail Extension) types describe content types – **text/html** for HTML, **text/css** for style sheets, and **text/javascript** for JavaScript code.

An HTML **<script>** element may also include helpful code comments. The JavaScript engine ("parser") ignores everything between **/*** and ***/** characters, allowing multi-line comments, and ignores everything between **//** characters and the end of a line, allowing single-line comments – like this:

```
<script type = "text/javascript">

/* This is a multi-line comment that might describe the script's
purpose and provide information about the author and date. */

// This is a single line comment that might describe a line of code.

</script>
```

Don't forget

Notice how each JavaScript statement must be terminated by a semi-colon character.

Optionally, alternative text can be provided, for occasions when JavaScript support is absent or disabled, by adding **<noscript> </noscript>** HTML tags to enclose an explanatory message.

The **<script>** element can appear anywhere within the HTML document's body section to include "inline" JavaScript code, which will be executed as the browser reads down the document. Additionally, inline JavaScript code can be assigned to any of the HTML event attributes, such as **onload**, **onmouseover**, etc, which will be executed each time that event gets fired by a user action.

inline.html

1. Create an HTML document and add a ** ** element to its body section, in which to write from JavaScript, and assign its **id** attribute a value of "panel"

```
<body>
        <div id = "panel" > </div>
</body>
```

2. In the ** ** element, insert a **<script>** element containing inline code to write a greeting in the panel

```
<script type = "text/javascript" >

// Dynamically write a text string as this page loads.
document.write( "Hello World!" ) ;

</script>
```

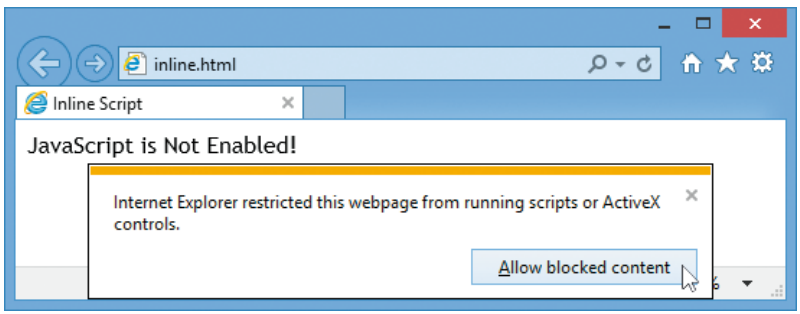
3 After the **<script>** element, insert a **<noscript>** element for alternative text when JavaScript support is absent

```
<noscript>JavaScript is Not Enabled!</noscript>
```

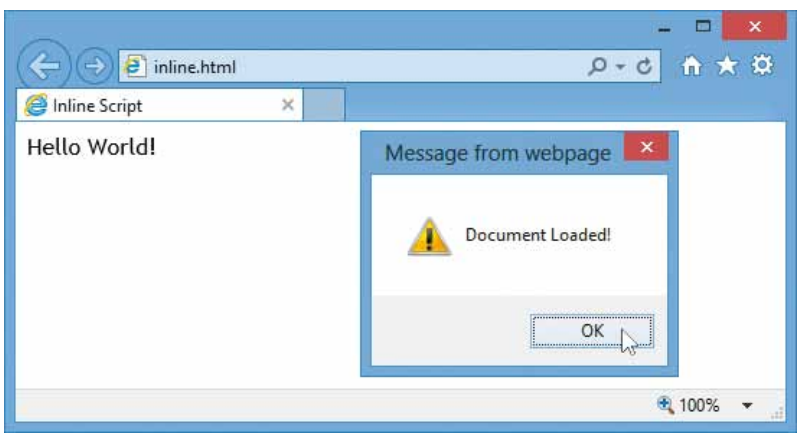
4 Now, add an attribute to call a JavaScript method whenever the document gets loaded into the browser

```
// Display a message dialog after the page has loaded.
<body onload = " window.alert( 'Document Loaded!' ) ; ">
```

5 Save the HTML document and disable JavaScript support in your browser, then open the web page to see the alternative text get written in the panel



6 Enable JavaScript support to see the inline script write the greeting in the panel and open a message dialog box



Beware

Text strings must be enclosed within quote characters. Nested inner strings should be surrounded by single quote characters to avoid conflict with the double quote characters that surround outer strings.

Hot tip

This example calls the **write()** method of the DOM **document** object, to write the string within its parentheses, then calls the **alert()** method of the DOM **window** object, to display the text string within its parentheses in a dialog box.

Calling head section script

Adding JavaScript functionality with inline **<script>** elements and assigning code to HTML event attributes throughout the body section of a document is perfectly legitimate but it intrudes on the structural nature of the HTML elements and does not make for easy code maintenance. It is better to avoid inline script and, instead, place the JavaScript statements inside a "function" block within a single **<script>** element in the head section of the HTML document – between the **<head> </head>** tags.

A function block begins with the JavaScript **function** keyword, followed by a function name and trailing parentheses. These are followed by a pair of **{ }** curly brackets (braces) to enclose the statements. So its syntax looks like this:

```
function function-name ( )
{
  // Statements to be executed go here.
}
```

Notice that spaces, carriage returns, and tabs are collectively known as "whitespace" and are completely ignored in JavaScript code so the function can be formatted for easy readability. Some script authors prefer to place the opening brace on the same line as the function name, others choose to vertically align brace pairs.

Typically, a function to execute statements immediately after the HTML document has loaded in the browser is named "init" – as it performs initial tasks. This function can be called upon to execute the statements it contains by stating its name (including the trailing parentheses) to the **onload** attribute of the HTML **<body>** tag like this:

```
<body onload = "init()" >
```

This nominates the function to be called by the browser when the window has loaded. At this point a load "event" occurs. The function nominated by the **onload** attribute is consequently known as the "event handler" – as it responds to that event.

There are many events that can occur in a web page, such as the click event that occurs when the user clicks a button, and JavaScript functions can be specified as event handlers for each one – to respond to each event.

Hot tip

A JavaScript function simply contains a set of statements to be executed whenever that function gets called.

Don't forget

Finding a missing brace in a lengthy function block can be very difficult if brace pairs are not vertically aligned.

1. Create an HTML document then add a ** ** element to its body section, with an **id** attribute value of "panel"

```
<div id = "panel" > </div>
```

2. In the head section of the document, insert a **<script>** element containing an "init" function block

```
<script type = "text/javascript" >

function init()
{
    // Statements to be executed go here.
}

</script>
```

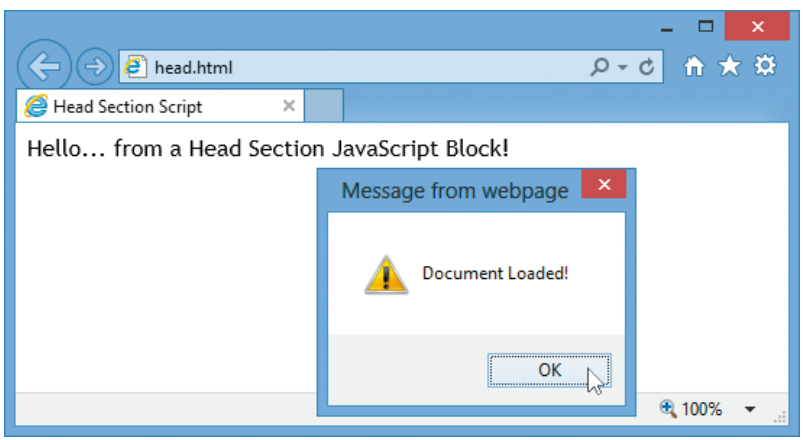
3. In the function block, insert statements to write text in the panel and to display a message dialog

```
document.getElementById( "panel" ).innerHTML =
"Hello... from a Head Section JavaScript Block!" ;

window.alert( "Document Loaded!" ) ;
```

4. Now, add an atribute to the **<body>** element – to call the function when the document has loaded into the browser

```
<body onload = "init()" >
```

5. Save the HTML document then open it in a JavaScript-enabled browser to see the function write text content in the panel and open a message dialog box



head.html

Beware

As JavaScript is a case-sensitive language you must be sure to correctly capitalize the **getElementById()** method and the **innerHTML** property.

Hot tip

This example calls the **getElementById()** method of the DOM **document** object, to reference the panel element, then writes content by assigning a text string to its **innerHTML** property.

Embedding external script

Where it is desirable to create a single portable HTML document its functionality can be provided by a **<script>** element within the document's head section, as in the previous example, and styling can be provided by a **<style>** element within the head section.

Where portability is of no importance, greater efficiency can be achieved by creating external script and style files. For instance, all the examples in this chapter could employ the same single style file to create a border style around the panel element. Similarly, all HTML files throughout a website could employ a single script file to embed JavaScript functionality in each web page. Often the JavaScript file may be referred to as a "library" because it contains a series of behavioral functions which can be called from any page on that website.

Embedding an external JavaScript file in the head section of an HTML document requires an **src** attribute be added to the usual **<script>** tag to specify the path to the script file. Where the script file is located in the same directory as the HTML document this merely needs to specify its file name and file extension – typically JavaScript files are given a ".js" file extension. For example, you can embed a local JavaScript file named "local.js" like this:

```
<script type = "text/javascript" src = "local.js" > </script>
```

The separation of structure (HTML), presentation (Cascading Style Sheets), and behavior (JavaScript), is recommended by the WorldWideWeb Consortium (W3C) as it makes site maintenance much simpler and each HTML document much cleaner – and so easier to validate.

Using HTML event attributes, such as **onload**, **onmouseover**, etc, to specify behavior continues to intrude on the structural nature of the HTML elements and is not in the spirit of the W3C recommendation. It is better to specify the behaviors in JavaScript code contained in an external file so the HTML document contains only structural elements, embedding behaviors and styles from elements in the head section specifying their file locations. The technique of completely separating structure and behavior in this way creates unobtrusive JavaScript, which is considered to be "best practice" and is employed throughout the rest of this book.

W3C®

The W3C is the recognized body that oversees standards on the Web. See the latest developments on their informative website at **www.w3.org**.

Remember to add the closing **</script>** tag. It is required even though the element is empty.

1. Create an HTML document then add a ** ** element to its body section, with an **id** attribute value of "panel"

```
<div id = "panel" > </div>
```

external.html

2. In the head section of the HTML document, insert an element to embed an external JavaScript file

```
<script type = "text/javascript" src = "external.js" >
</script>
```

3. Open a plain text editor, like Windows Notepad, and add an "init" function to write content in the panel and to display a message dialog box

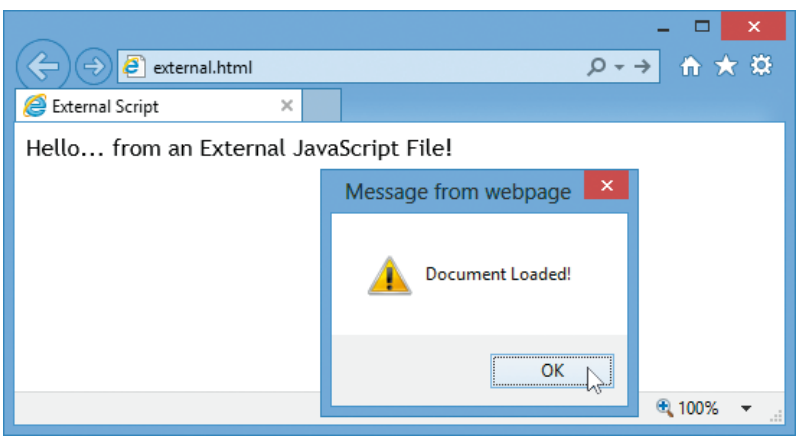
```
function init()
{
  document.getElementById( "panel" ).innerHTML =
  "Hello... from an External JavaScript File!" ;

  window.alert( "Document Loaded!" ) ;
}
```

external.js

4. Immediately after the function block add a statement to call the function when the HTML document has loaded

```
window.onload = init ;
```

5. Save the HTML document then open it in a JavaScript-enabled browser to see the function write text content in the panel and open a message dialog box



Beware

An error will occur if you include trailing parentheses after the function name when assigning a function to the **window.onload** property – just assign its name only.

Accelerating initialization

The **window.load** event that occurs when a web page has loaded in the browser window is only triggered when all dependent resources have been fully loaded – including styles and images. This means that statements contained in the initializing JavaScript function will not be executed until all resources have been loaded. Where the page includes large image files it must wait for these to finish loading before the JavaScript initialization can take place.

As there may be an undesirable initialization delay in waiting for the **window.load** event to be triggered modern web browsers have been made to recognize a "DOMContentLoaded" event that is triggered when just the HTML document and script have loaded – without waiting for external resources such as images. The JavaScript initialization function can therefore be nominated as the event handler to the DOMContentLoaded event, rather than to the load event, to accelerate initialization. This means that statements contained in the initializing JavaScript function will be executed as soon as the HTML document and script have loaded. Where the page includes large image files it need not wait for these to finish loading before the JavaScript initialization happens.

Nomination of the JavaScript initialization function as the event handler to the DOMContentLoaded event must be made in a different way to that for the **window.onload** event. It requires a statement to "listen" out for the DOMContentLoaded event. This uses the JavaScript **document.addEventListener()** function to specify a comma-separated list of three parameters within its parentheses. The parameters state in order the event to listen out for, the name of the event handler function to call when that event is triggered, and an event phase. In the case of page initialization the event to listen out for is "DOMContentLoaded", the event handler function is typically named **init**, and the desired "bubbling phase" is specified with the boolean Javascript keyword **false**. So the entire statement looks like this:

```
document.addEventListener( "DOMContentLoaded" , init , false ) ;
```

As it is generally preferable to initialize the web page at the earliest opportunity the DOMContentLoaded event is used to execute the examples in this book. Its advantage can be seen by displaying a message dialog box when each event is triggered and noting the order in which they appear.

Hot tip

"DOM" refers to the Document Object Model that represents the page contents – much more on the DOM later.

Beware

Notice that only the **init** function name is used to nominate it as the **DOMContentLoaded** event handler – an error will occur if you include its trailing parentheses.

1. Create an HTML document that embeds an external JavaScript file and has a "panel" element in its body

```
<script type = "text/javascript" src = "domload.js" >
</script>
<div id = "panel" > </div>
```

domload.html

2. Open a plain text editor, like Windows Notepad, and add a function to simply display a message dialog box

```
function loaded()
{
  window.alert( "Window Loaded" ) ;
}
```

domload.js

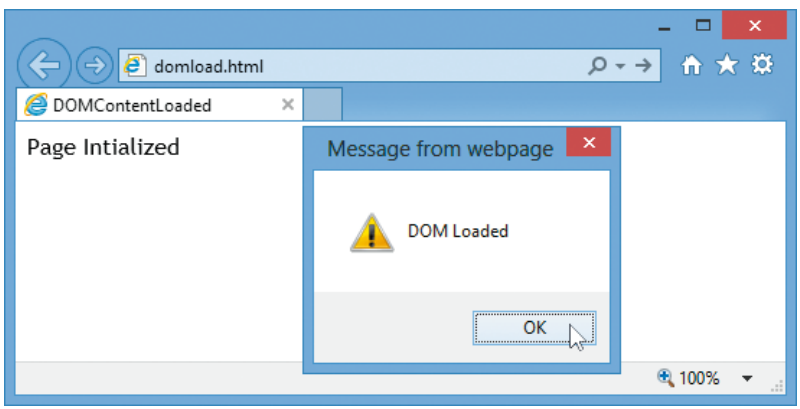
3. Next, add an "init" function to write content in the panel and to also display a message dialog box

```
function init()
{
  document.getElementById( "panel" ).innerHTML =
  "Page Initialized" ;
  window.alert( "DOM Loaded" ) ;
}
```

4. After the function blocks add statements to call an appropriate function when a event occurs

```
window.onload = loaded ;
document.addEventListener( "DOMContentLoaded", init, false ) ;
```

5. Save the script alongside the HTML document then open the web page in a browser to see the message dialog box and panel identify the event that occurs first



Beware

The **DOMContentLoaded** event fires when just the HTML document has loaded whereas the **window.onload** event only fires when the entire page, including images, has loaded – but you must include that alternative if you are trying out any of this book's examples in an older web browser.

Storing data in variables

A "variable" is a container, common to every scripting and programming language, in which data can be stored and retrieved later. Unlike the "strongly typed" variables in most other languages, which must declare a particular data type they may contain, JavaScript variables are much easier to use because they are "loosely typed" – so they may contain any type of data:

Don't forget

A variable name is an alias for the value it contains – using the name in script references its stored value.

Data Type:	Example:	Description:
boolean	**true**	A true (1) or false (0) value
number	**100** **3.25**	An integer or A floating-point number
string	**"M"** **"Hello World!"**	A single character or A string of characters, with spaces
function	**init** **fido.bark**	A user-defined function or A user-defined object method
object	**fido** **document**	A user-defined object or A built-in object

A JavaScript variable is declared using the **var** keyword followed by a space and a name of your choosing, within certain naming conventions. The variable name may comprise letters, numbers, and underscore characters, but may not contain spaces or begin with a number. Additionally, you must avoid the JavaScript keywords, reserved words, and object names listed in the tables on page 11. The declaration of a variable in a script may simply create a variable to which a value can be assigned later, or may include an assignation to instantly "initialize" the variable with a value:

Hot tip

Choose meaningful names for your variables to make the script easier to understand later.

```
var myNumber ;                    // Declare a variable.
myNumber = 10 ;                   // Initialize a variable.
var myString = "Hello World!" ; // Declare and initialize a variable.
```

Multiple variables may be be declared on a single line too:

```
var i , j , k ;                   // Declare 3 variables.
var num =10 , char = "C" ;        // Declare and initialize 2 variables.
```

Upon initialization, JavaScript automatically sets the variable type for the value assigned. Subsequent assignation of a different data type later in the script can be made to change the variable type. The current variable type can be revealed by the **typeof** keyword.

1. Create an HTML document that embeds an external JavaScript file and has a "panel" element in its body

```
<script type = "text/javascript" src = "variable.js" >
</script>
<div id = "panel" > </div>
```

variable.html

2. Open a plain text editor, like Windows Notepad, and add a function to execute after the document has loaded

```
function init()
{
  // Statements to be executed go here.
}
document.addEventListener( "DOMContentLoaded", init, false ) ;
```

variable.js

3. In the function block, insert statements to declare and intialize variables of different data types

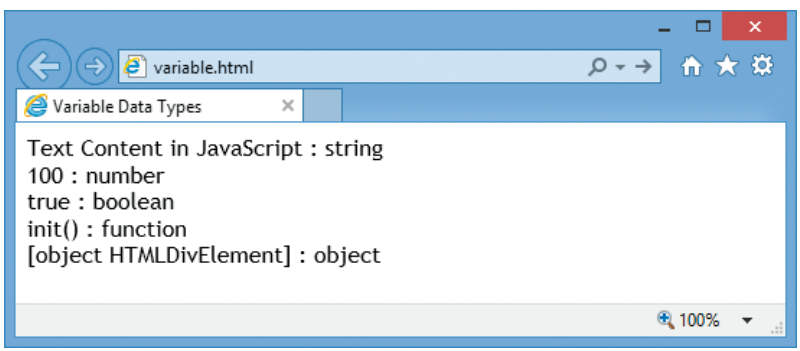
```
var str = "Text Content in JavaScript" ;
var num = 100 ;
var bln = true ;
var fcn = init ;
var obj = document.getElementById( "panel" ) ;
```

The **typeof** returns a value of "undefined" for uninitialized variables.

4. Now, insert statements to write the variable values and data types into the panel

```
obj.innerHTML = str + " : " + typeof str ;
obj.innerHTML += "<br>" + num + " : " + typeof num ;
obj.innerHTML += "<br>" + bln + " : " + typeof bln ;
obj.innerHTML += "<br>init() : " + typeof fcn ;
obj.innerHTML += "<br>" + obj + " : " + typeof obj ;
```

5. Save the script alongside the HTML document then open the page in your browser to see the variable data



Notice how the + operator is used here to join (concatenate) parts of a string and with += to append strings onto existing strings.

Passing function arguments

Functions and variables are the key components of JavaScript.

A function may be called once or numerous times to execute the statements it contains. Those functions that belong to an object, such as **document.write()**, are known as "methods" – just to differentiate them from user-defined functions. Both have trailing parentheses that may accept "argument" values to be passed to the function for manipulation. For example, the text string value passed in the parentheses of the **document.write()** method that gets written into the HTML document.

Just as object functions are known as "methods" their variables are known as "properties".

The number of arguments passed to a function must match those specified within the parentheses of the function block declaration. For example, a user-defined function requiring exactly one argument looks like this:

```
function function-name ( argument-name )
{
  // Statements to be executed go here.
}
```

Multiple arguments can be specified as a comma-separated list:

```
function function-name ( argument-A , argument-B , argument-C )
{
  // Statements to be executed go here.
}
```

Multiple arguments must also be passed as a comma-separated list.

Like variable names, function names and argument names may comprise letters, numbers, and underscore characters, but may not contain spaces or begin with a number. Additionally, you must avoid the JavaScript keywords, reserved words, and object names listed in the tables on page 11.

Optionally, a function can return a value to the caller using the **return** keyword at the end of the function block. After a return statement has been made the script flow continues at the caller – so no further statements in the called function get executed.
It is typical to return the result of manipulating passed argument values back to the caller:

```
function function-name ( argument-A , argument-B , argument-C )
{
  // Statements to be executed go here.

  return result ;
}
```

1. Create an HTML document that embeds an external JavaScript file and has a "panel" element in its body

```
<script type = "text/javascript" src = "argument.js" >
</script>
<div id = "panel" > </div>
```

argument.html

2. Open a plain text editor and add a function to execute after the HTML document has loaded

```
function init()
{
  // Statements to be executed go here.
}
document.addEventListener( "DOMContentLoaded", init, false ) ;
```

argument.js

3. In the function block, insert a statement that calls another user-defined function and passes it four argument values

```
document.getElementById( "panel" ).innerHTML =
          stringify( "JavaScript" , "In" , "Easy" , "Steps" ) ;
```

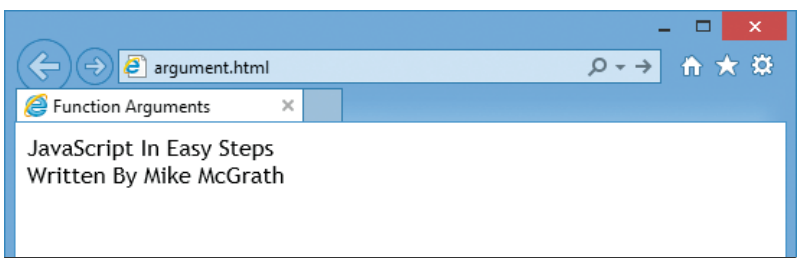
4. Next, insert a second statement that also calls the user-defined function, passing it four different argument values

```
document.getElementById( "panel" ).innerHTML+=
          stringify( "Written" , "By" , "Mike" , "McGrath" ) ;
```

5. Now, before the init function block, declare the function being called from the statements within the init function

```
function stringify( argA , argB , argC , argD )
{
  var str=argA+" "+argB+" "+argC+" "+argD+"<br>" ;
  return str ;
}
```

6. Save the script alongside the HTML document then open the page in your browser to see the returned values



A function must have been declared before it can be called, so function declarations should appear first in the script.

Recognizing variable scope

The extent to which a variable is accessible is called its "scope" and is determined by where the variable is declared:

- A variable declared inside a function block is only accessible to code within that same function block. This variable has "local" scope – it is only accessible locally within that function, so is known as a "local variable"
- A variable declared outside all function blocks is accessible to code within any function block. This variable has "global" scope – it is accessible globally within any function in that script so is known as a "global variable"

Local variables are generally preferable to global variables as their limited scope prevents possible accidental conflict with other variables. Global variable names must be unique throughout the entire script but local variable names only need be unique throughout their own function block – so the same variable name can be used in different functions without conflict.

scope.html

1. Create an HTML document that embeds an external JavaScript file and has a "panel" element in its body

```
<script type = "text/javascript" src = "scope.js" >
</script>
<div id = "panel" > </div>
```

scope.js

2. Open a plain text editor then declare and initialize a global variable

```
var global = "This is Worldwide Global news<hr>" ;
```

3. Add a function to execute after the HTML document has loaded

```
function init()
{
  // Statements to be executed go here.
}
document.addEventListener( "DOMContentLoaded", init, false ) ;
```

4 In the function block, declare and initialize a local variable then write the value of the global variable into the panel

```
var obj = document.getElementById( "panel" ) ;
obj.innerHTML = global ;
```

5 Now, in the function block call two other functions, passing the value of the local variable to each one

```
us( obj ) ;
eu( obj ) ;
```

6 Before the "init" function block, insert a function with one argument that initializes a local variable, then appends its value and that of the global variable into the panel

```
function us( obj )
{
  var local = "***This is United States Local news***<hr>" ;
  obj.innerHTML += local ; obj.innerHTML += global ;
}
```

7 Before the init function block, insert another function with one argument that initializes a local variable, then appends its value and that of the global variable into the panel

```
function eu( obj )
{
  var local = "---This is European Local news---<hr>" ;
  obj.innerHTML += local ; obj.innerHTML += global ;
}
```

8 Save the script alongside the HTML document then open the page in your browser to see the values of the global and local variables written by the functions

Hot tip

Notice that the "local" variable names do not conflict because they are only visible within their respective function blocks.

Don't forget

A variable can be declared without initialization, then assigned a value later in the script to initialize it.

Summary

- JavaScript is a client-side, object-based, case-sensitive language whose interpreter is embedded in web browser software
- Variable names and function names must avoid the JavaScript keywords, reserved words, and object names
- For JavaScript code each opening HTML **<script>** tag must specify the MIME type of "text/javascript" to its **type** attribute
- Script blocks may include single-line and multi-line comments
- Each JavaScript statement must be terminated by a semi-colon
- Inline JavaScript code can be assigned to any HTML event attribute, such as **onload**, or enclosed within a **<script>** element in the document body section – but is best avoided
- All JavaScript code is best located in an external file whose path is specified to an **src** attribute of the **<script>** tag
- Unobtrusive JavaScript places all script code in an external file and can specify a function to the **DOMContentLoaded** event to set behaviors when the HTML document has loaded
- The **window.onload** event can be used to set behaviors for older browsers when the entire page content has loaded
- JavaScript variables are declared using the **var** keyword and can store any data type – boolean, number, string, function, or object
- JavaScript functions are declared using the **function** keyword and the function name must have trailing parentheses, followed by a pair of { } braces enclosing statements to execute
- A function declaration may specify arguments within its trailing parentheses that must be passed from its caller
- A value can be returned to the caller using the **return** keyword
- Unlike global variables declared in the main script body, local variables declared inside a function are only accessible from within that function