AJAX 程式設計 AJAX PROGRAMMING DESIGN

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JAVASCRIPT & AJAX PROGRAMMING

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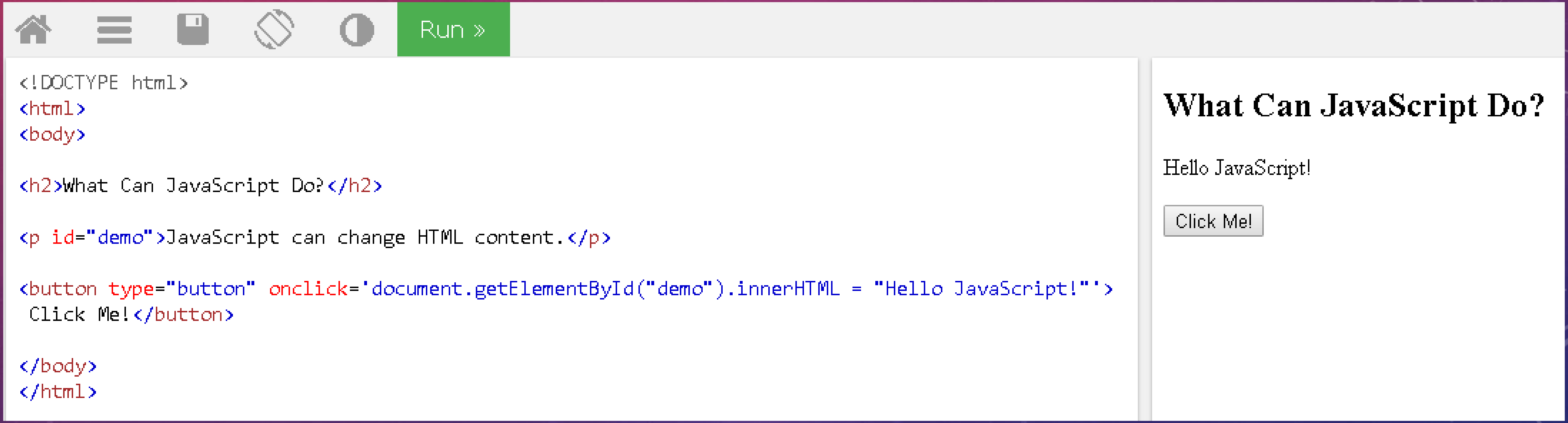
JAVASCRIPT

JAVASCRIPT INTRODUCTION

1. <script> ... </script> 擺在 <head> ... </head> ，會優先載入 Javascript
2. <script> ... </script> 擺在 <body> ... </body> ，會優先載入 html
3. 外部引入 js 檔案於 <head> 或 <body>，可使用 <script src="js/main.js"></script>
   - 請注意：引入外部 js 檔案時，不可在中間寫 js code！

JAVASCRIPT INTRODUCTION



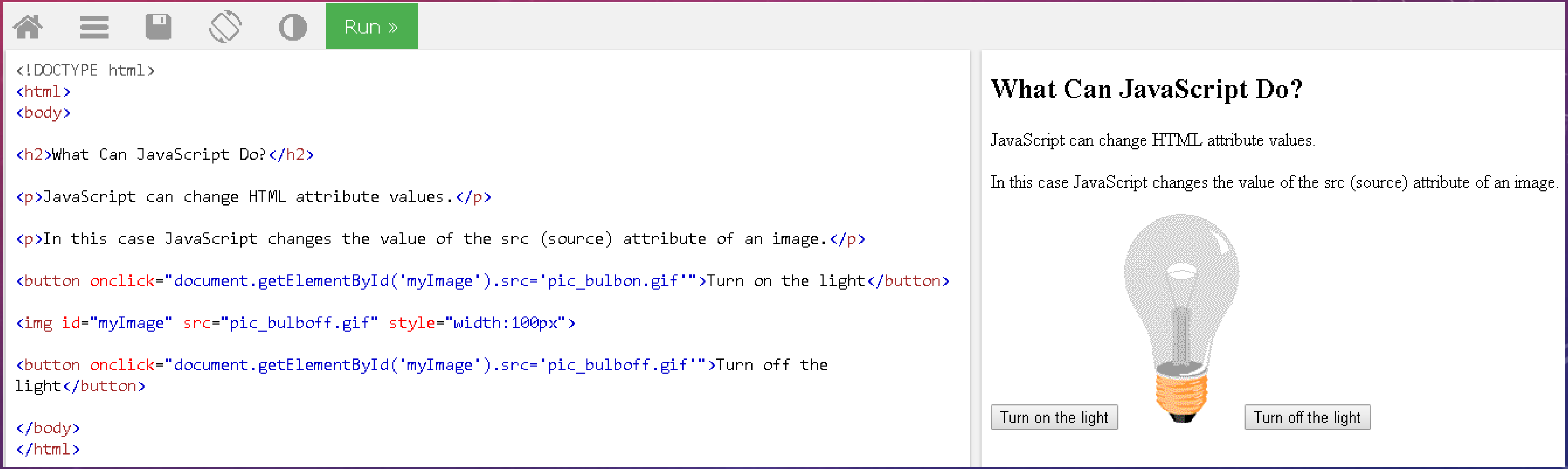
```
<!DOCTYPE html>
<html>
<body>

<h2>What Can JavaScript Do?</h2>

<p id="demo">JavaScript can change HTML content.</p>

<button type="button" onclick='document.getElementById("demo").innerHTML = "Hello JavaScript!"'>
 Click Me!</button>

</body>
</html>
```

What Can JavaScript Do?

Hello JavaScript!

Click Me!

JAVASCRIPT INTRODUCTION



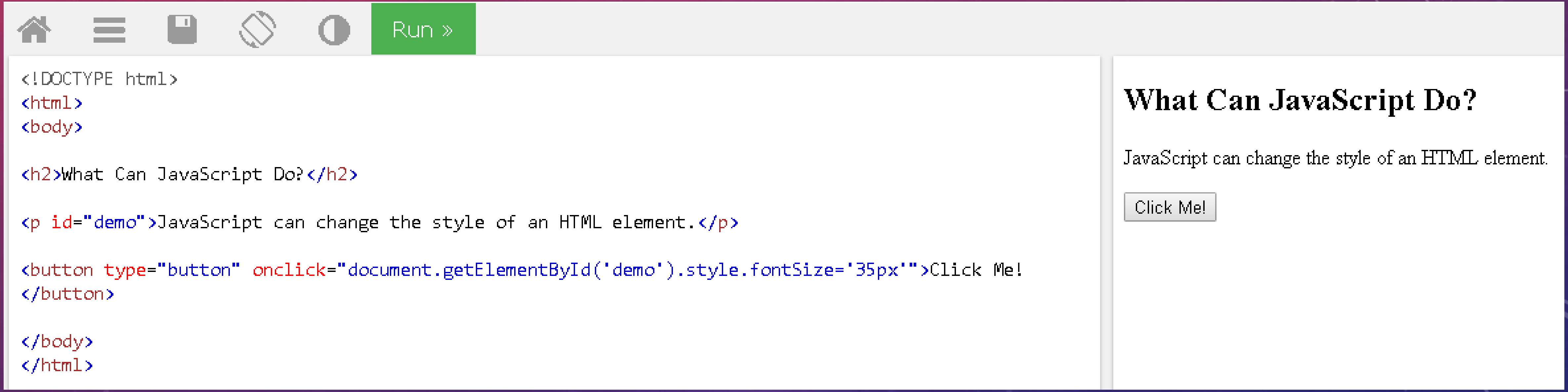
```html
<!DOCTYPE html>
<html>
<body>

<h2>What Can JavaScript Do?</h2>

<p>JavaScript can change HTML attribute values.</p>

<p>In this case JavaScript changes the value of the src (source) attribute of an image.</p>

<button onclick="document.getElementById('myImage').src='pic_bulbon.gif'">Turn on the light</button>

<img id="myImage" src="pic_bulboff.gif" style="width:100px">

<button onclick="document.getElementById('myImage').src='pic_bulboff.gif'">Turn off the
light</button>

</body>
</html>
```

What Can JavaScript Do?

JavaScript can change HTML attribute values.

In this case JavaScript changes the value of the src (source) attribute of an image.

JAVASCRIPT INTRODUCTION

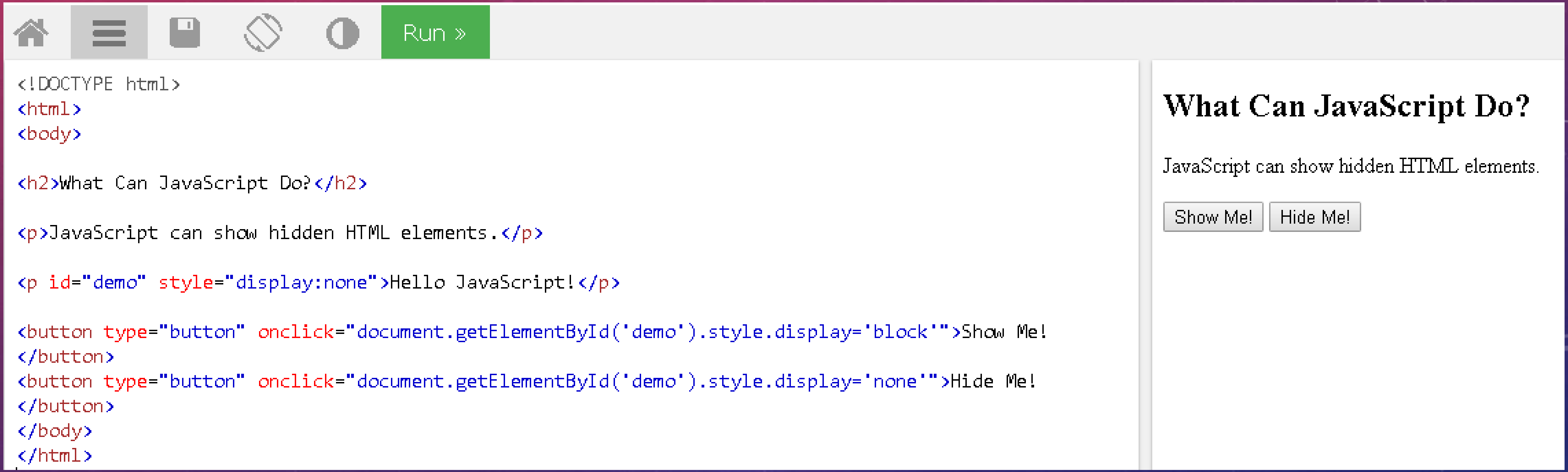


```
<!DOCTYPE html>
<html>
<body>

<h2>What Can JavaScript Do?</h2>

<p id="demo">JavaScript can change the style of an HTML element.</p>

<button type="button" onclick="document.getElementById('demo').style.fontSize='35px'">Click Me!
</button>

</body>
</html>
```

What Can JavaScript Do?

JavaScript can change the style of an HTML element.

JAVASCRIPT INTRODUCTION



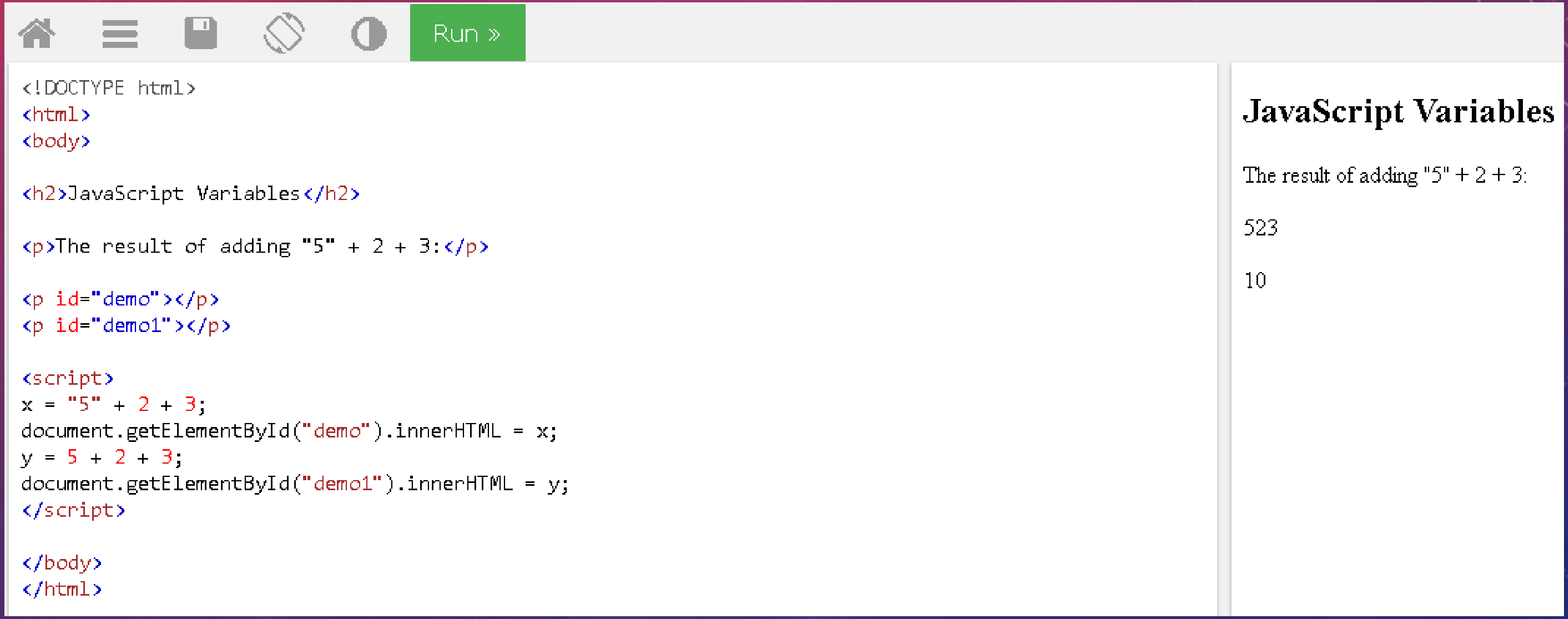
```
<!DOCTYPE html>
<html>
<body>

<h2>What Can JavaScript Do?</h2>

<p>JavaScript can show hidden HTML elements.</p>

<p id="demo" style="display:none">Hello JavaScript!</p>

<button type="button" onclick="document.getElementById('demo').style.display='block'">Show Me!
</button>
<button type="button" onclick="document.getElementById('demo').style.display='none'">Hide Me!
</button>
</body>
</html>
```

What Can JavaScript Do?

JavaScript can show hidden HTML elements.

Show Me! Hide Me!

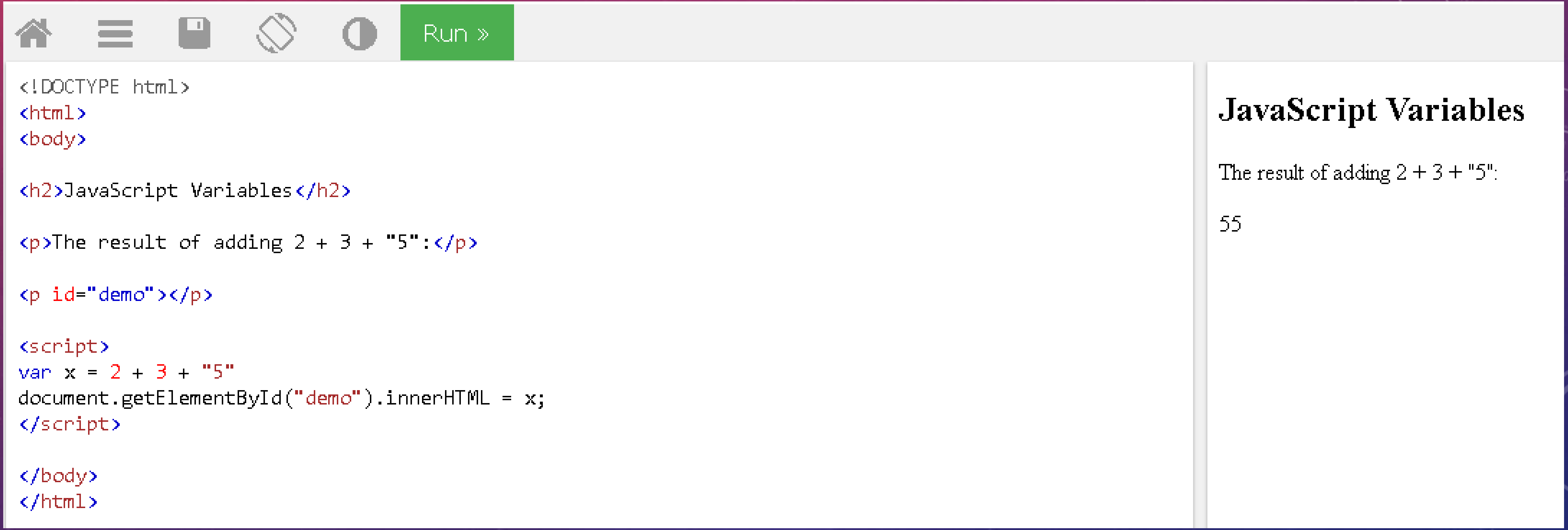
JAVASCRIPT VARIABLES



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

<h2>JavaScript Variables</h2>

<p>The result of adding "5" + 2 + 3:</p>

<p id="demo"></p>
<p id="demo1"></p>

<script>
x = "5" + 2 + 3;
document.getElementById("demo").innerHTML = x;
y = 5 + 2 + 3;
document.getElementById("demo1").innerHTML = y;
</script>

</body>
</html>
```

```
JavaScript Variables

The result of adding "5" + 2 + 3:

523

10
```

JAVASCRIPT VARIABLES



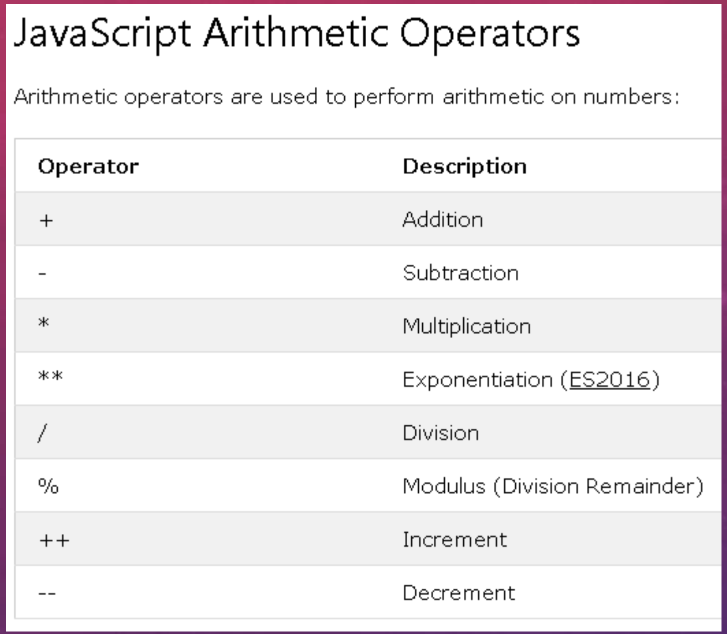
```
<!DOCTYPE html>
<html>
<body>

<h2>JavaScript Variables</h2>

<p>The result of adding 2 + 3 + "5":</p>

<p id="demo"></p>

<script>
var x = 2 + 3 + "5"
document.getElementById("demo").innerHTML = x;
</script>

</body>
</html>
```

JavaScript Variables

The result of adding 2 + 3 + "5":

55

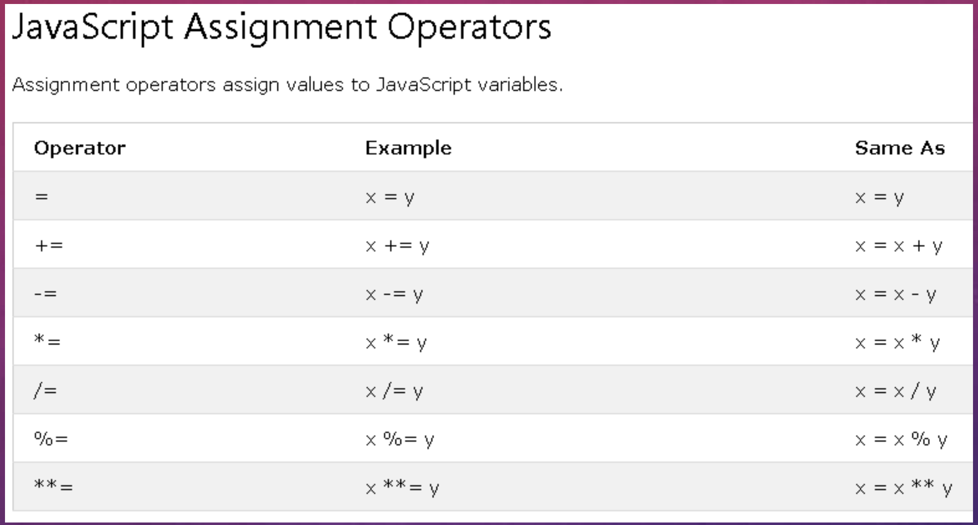
JAVASCRIPT OPERATORS



JavaScript Arithmetic Operators

Arithmetic operators are used to perform arithmetic on numbers:

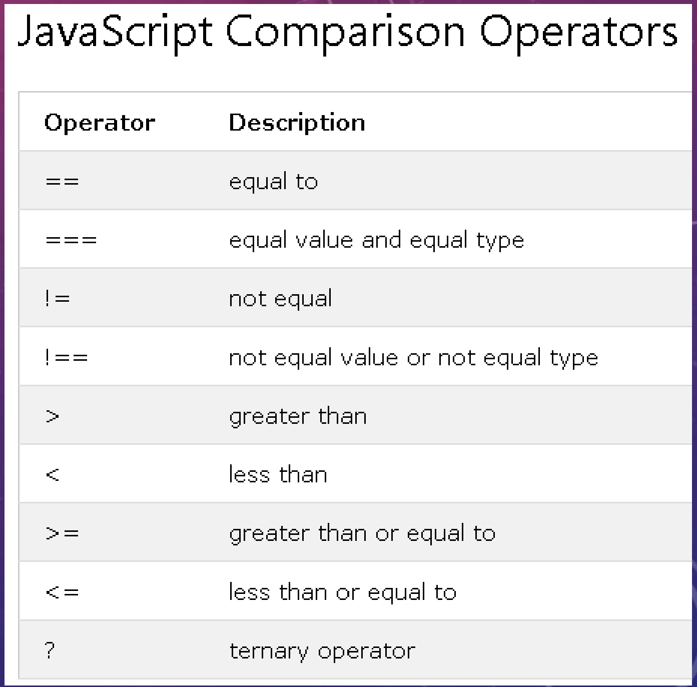
Operator	Description
+	Addition
-	Subtraction
*	Multiplication
**	Exponentiation (ES2016)
/	Division
%	Modulus (Division Remainder)
++	Increment
--	Decrement



JavaScript Assignment Operators

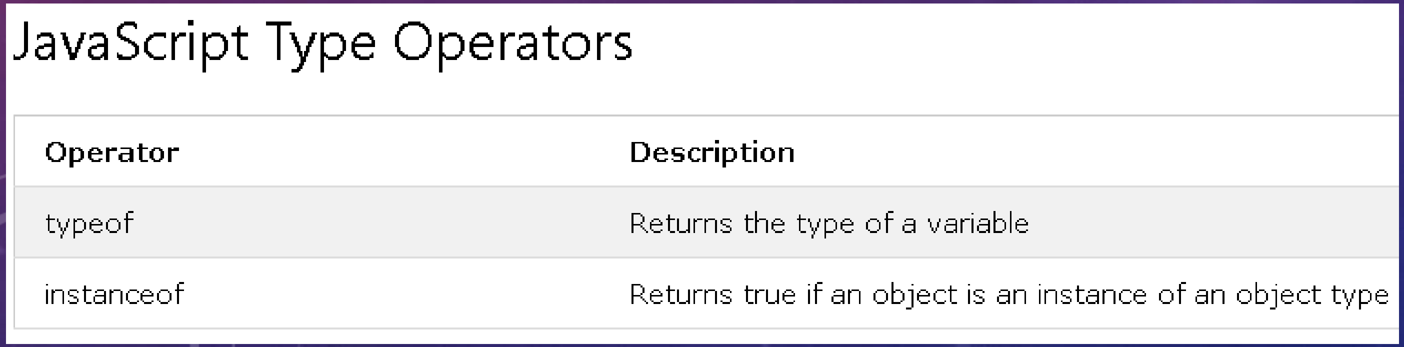
Assignment operators assign values to JavaScript variables.

Operator	Example	Same As
=	x = y	x = y
+=	x += y	x = x + y
-=	x -= y	x = x - y
*=	x *= y	x = x * y
/=	x /= y	x = x / y
%=	x %= y	x = x % y
**=	x **= y	x = x ** y



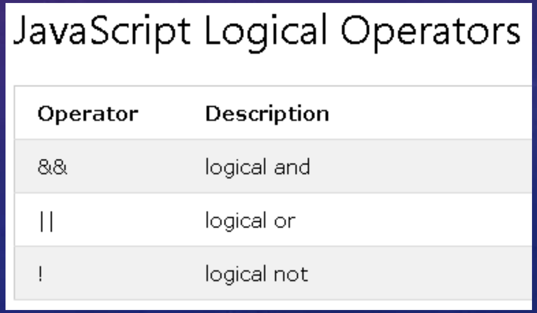
JavaScript Comparison Operators

Operator	Description
==	equal to
===	equal value and equal type
!=	not equal
!==	not equal value or not equal type
>	greater than
<	less than
>=	greater than or equal to
<=	less than or equal to
?	ternary operator



JavaScript Type Operators

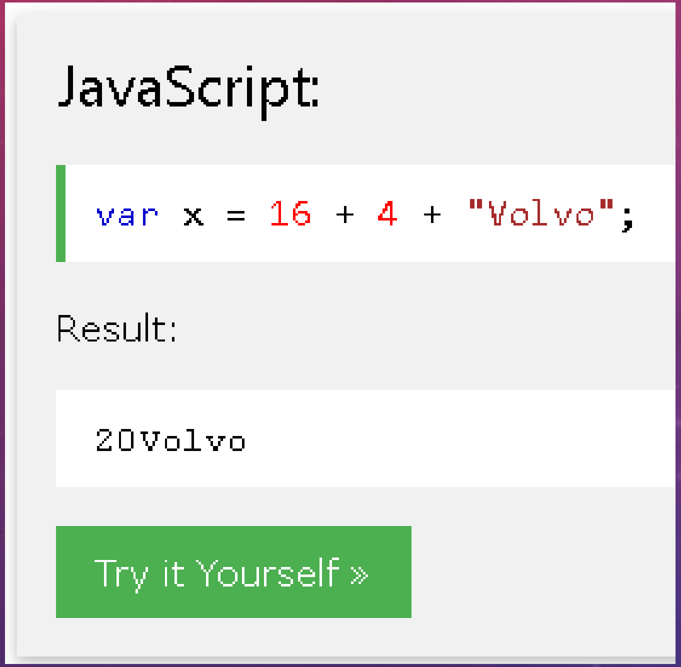
Operator	Description
typeof	Returns the type of a variable
instanceof	Returns true if an object is an instance of an object type



JavaScript Logical Operators

Operator	Description
&&	logical and
||	logical or
!	logical not

JAVASCRIPT DATA TYPES

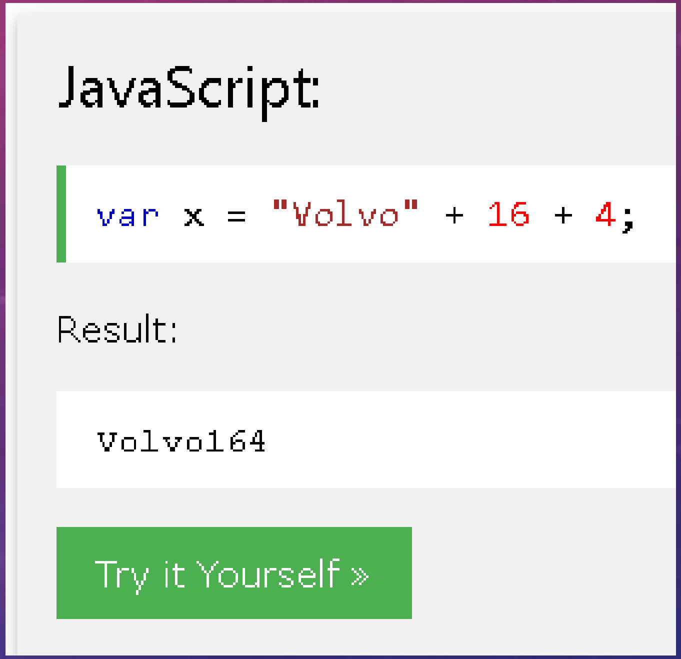


JavaScript:

```
var x = 16 + 4 + "Volvo";
```

Result:

```
20Volvo
```



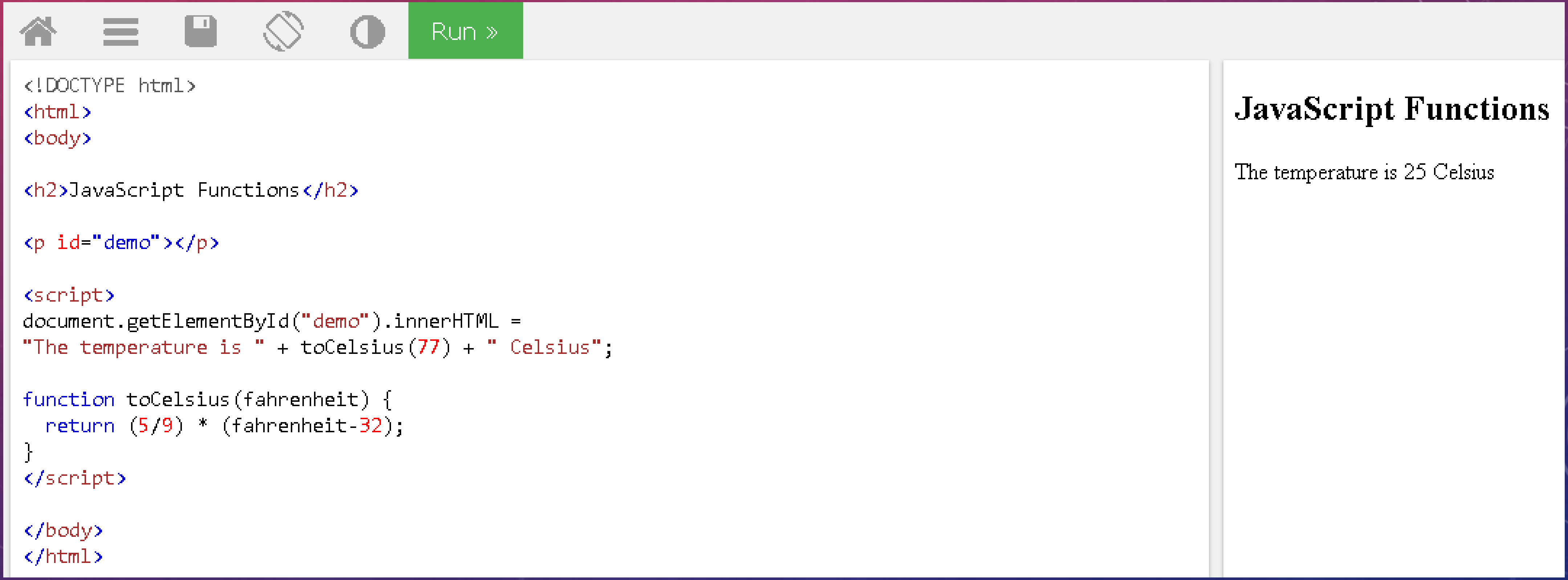
JavaScript:

```
var x = "Volvo" + 16 + 4;
```

Result:

```
Volvo164
```

JAVASCRIPT FUNCTIONS

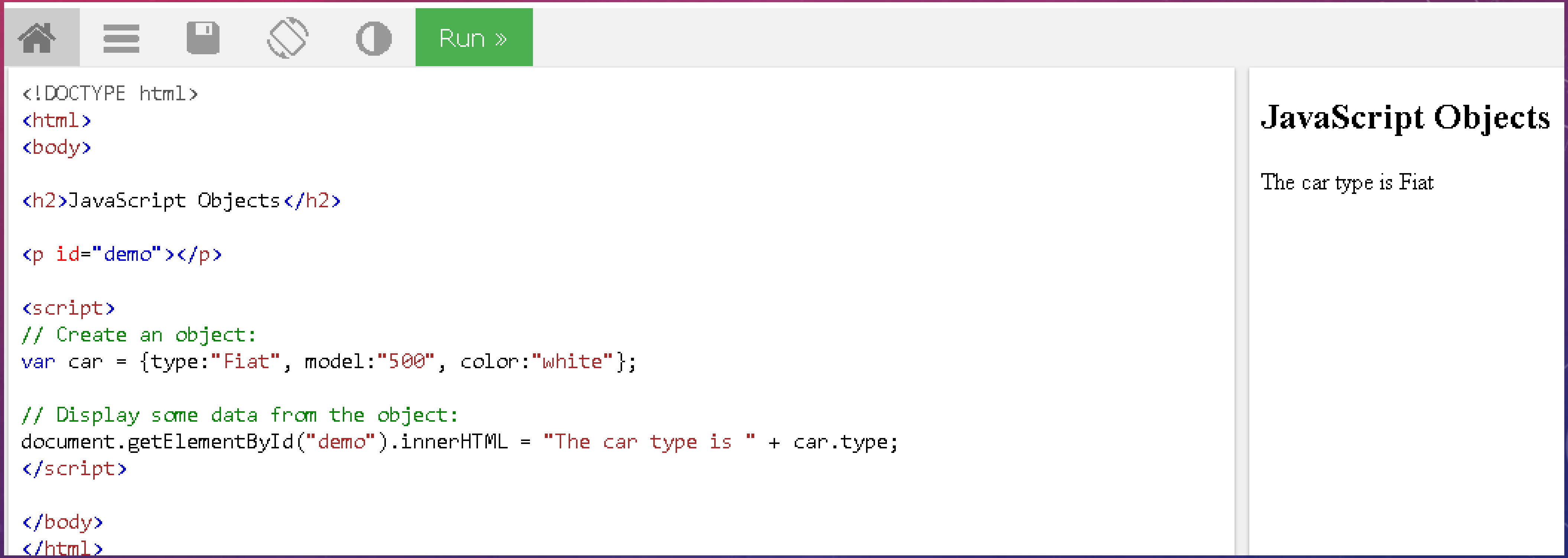


```
<!DOCTYPE html>
<html>
<body>

<h2>JavaScript Functions</h2>

<p id="demo"></p>

<script>
document.getElementById("demo").innerHTML =
"The temperature is " + toCelsius(77) + " Celsius";

function toCelsius(fahrenheit) {
  return (5/9) * (fahrenheit-32);
}
</script>

</body>
</html>
```

JavaScript Functions

The temperature is 25 Celsius

JAVASCRIPT OBJECTS

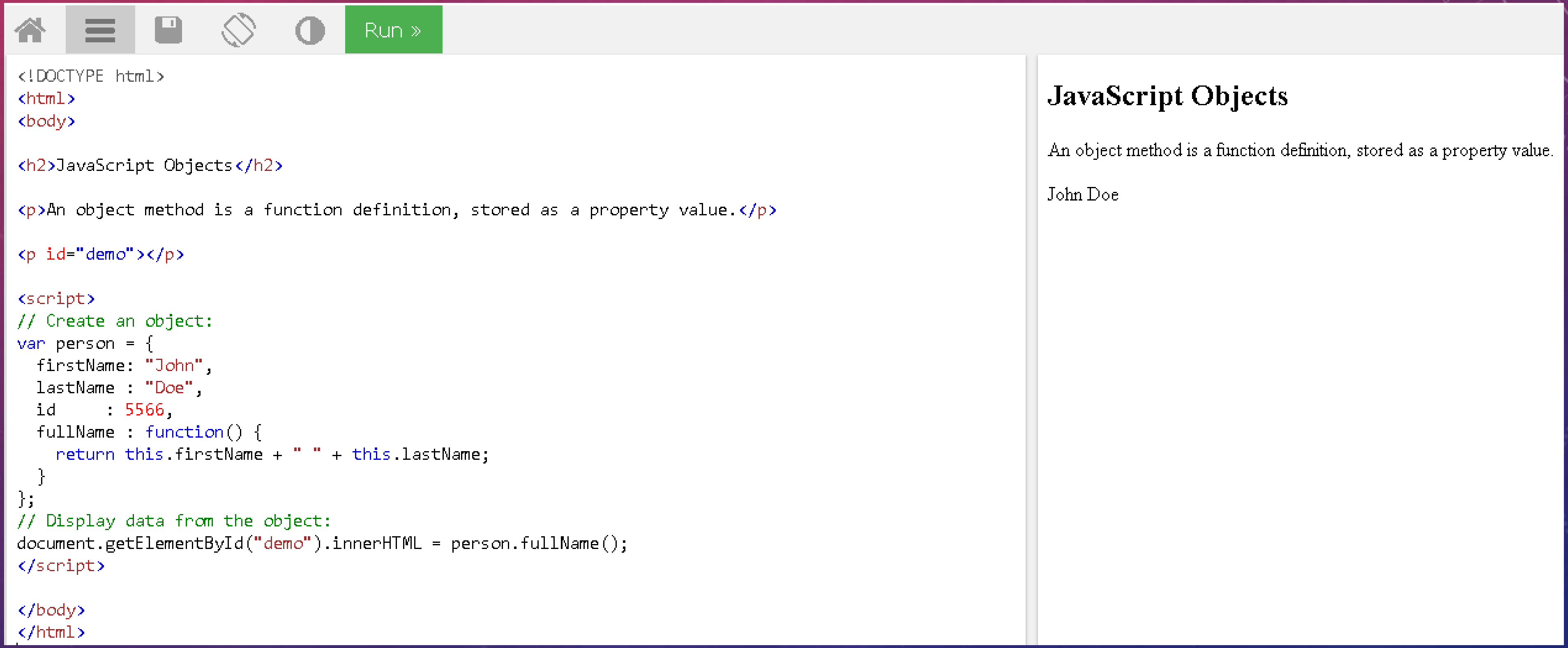


```
<!DOCTYPE html>
<html>
<body>

<h2>JavaScript Objects</h2>

<p id="demo"></p>

<script>
// Create an object:
var car = {type:"Fiat", model:"500", color:"white"};

// Display some data from the object:
document.getElementById("demo").innerHTML = "The car type is " + car.type;
</script>

</body>
</html>
```

JavaScript Objects

```
The car type is Fiat
```

JAVASCRIPT OBJECTS



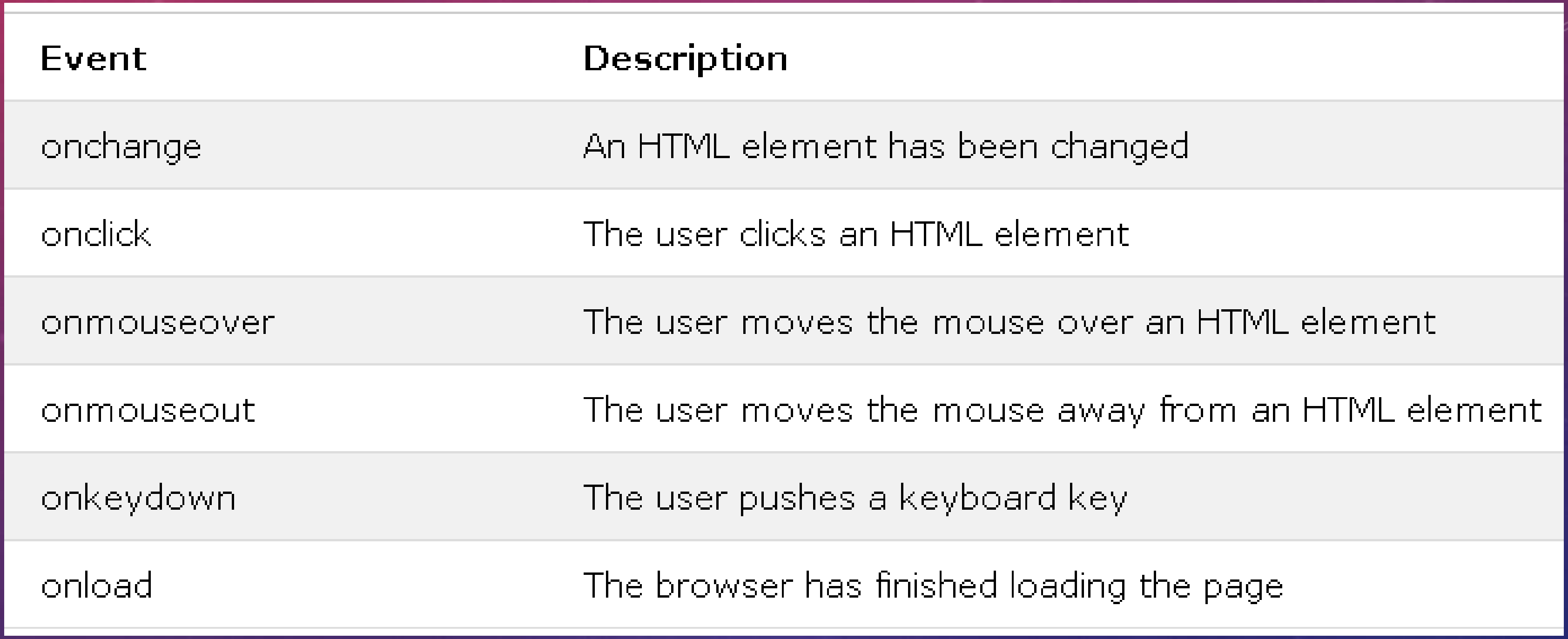
```
<!DOCTYPE html>
<html>
<body>

<h2>JavaScript Objects</h2>

<p>An object method is a function definition, stored as a property value.</p>

<p id="demo"></p>

<script>
// Create an object:
var person = {
  firstName: "John",
  lastName : "Doe",
  id       : 5566,
  fullName : function() {
    return this.firstName + " " + this.lastName;
  }
};
// Display data from the object:
document.getElementById("demo").innerHTML = person.fullName();
</script>

</body>
</html>
```

JavaScript Objects

An object method is a function definition, stored as a property value.

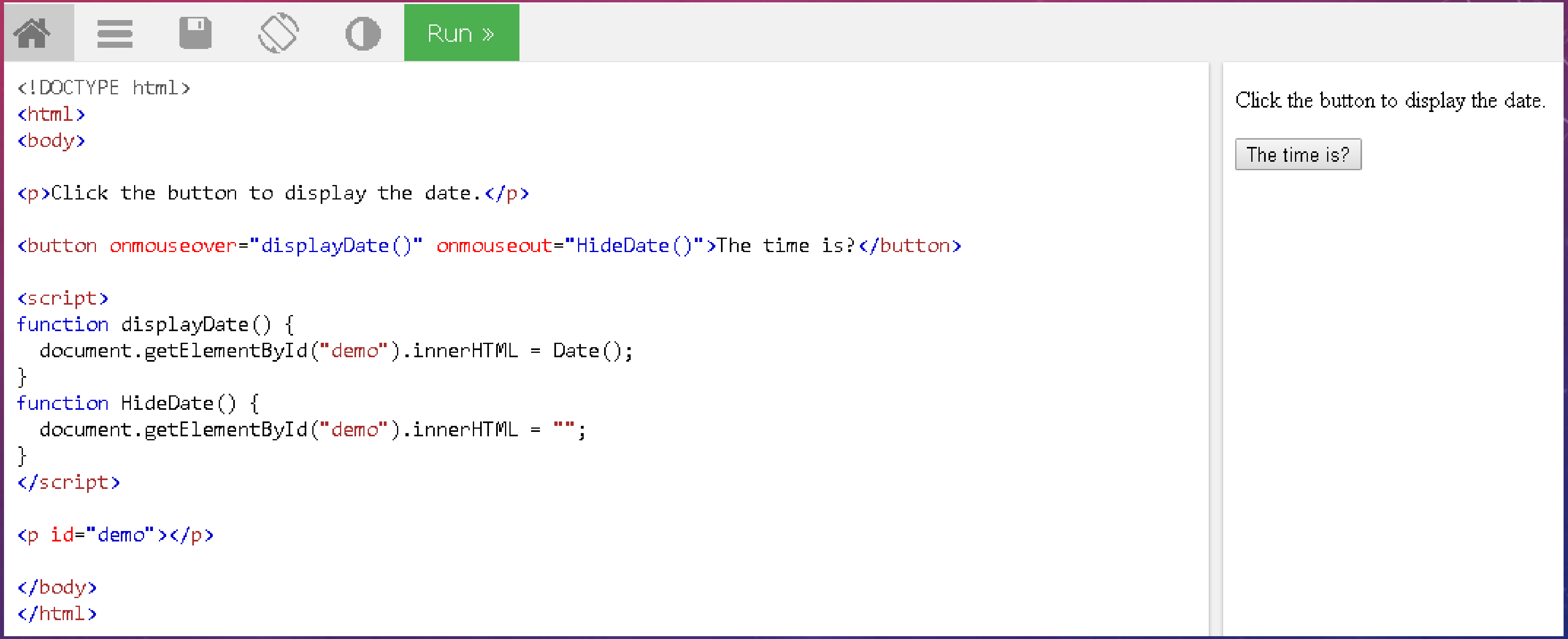
John Doe

JAVASCRIPT EVENTS



Event	Description
onchange	An HTML element has been changed
onclick	The user clicks an HTML element
onmouseover	The user moves the mouse over an HTML element
onmouseout	The user moves the mouse away from an HTML element
onkeydown	The user pushes a keyboard key
onload	The browser has finished loading the page

JAVASCRIPT EVENTS



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

<p>Click the button to display the date.</p>

<button onmouseover="displayDate()" onmouseout="HideDate()">The time is?</button>

<script>
function displayDate() {
  document.getElementById("demo").innerHTML = Date();
}
function HideDate() {
  document.getElementById("demo").innerHTML = "";
}
</script>

<p id="demo"></p>

</body>
</html>
```

Click the button to display the date.

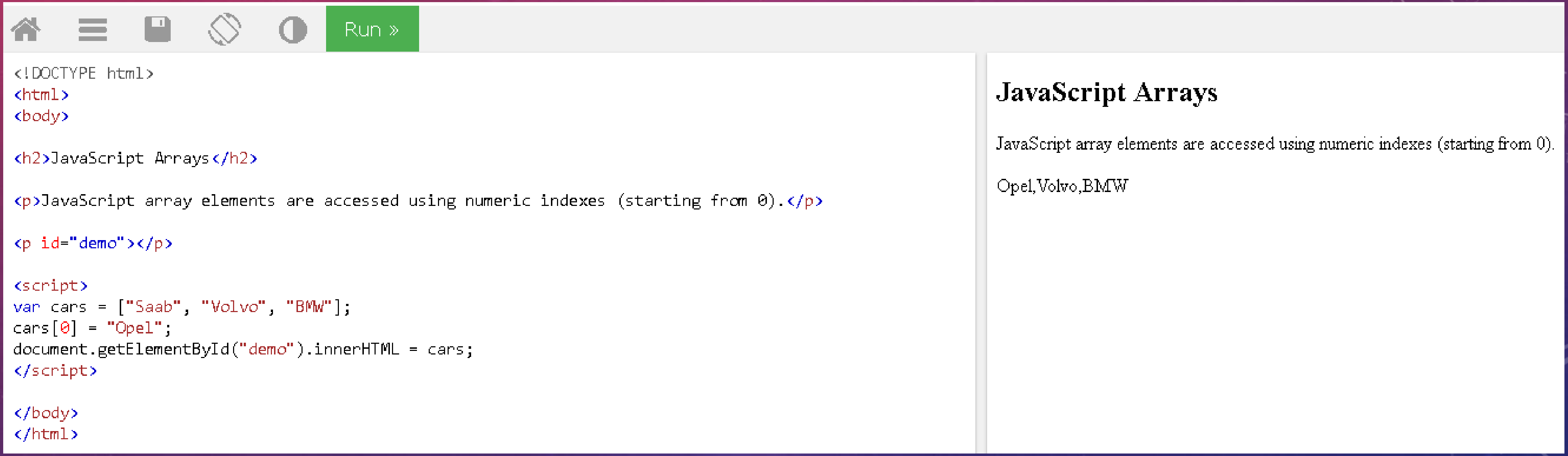
The time is?

JAVASCRIPT ARRAYS

```
var cars = [
  "Saab",
  "Volvo",
  "BMW"
];
```

```
var cars = new Array("Saab", "Volvo", "BMW");
```

JAVASCRIPT ARRAYS



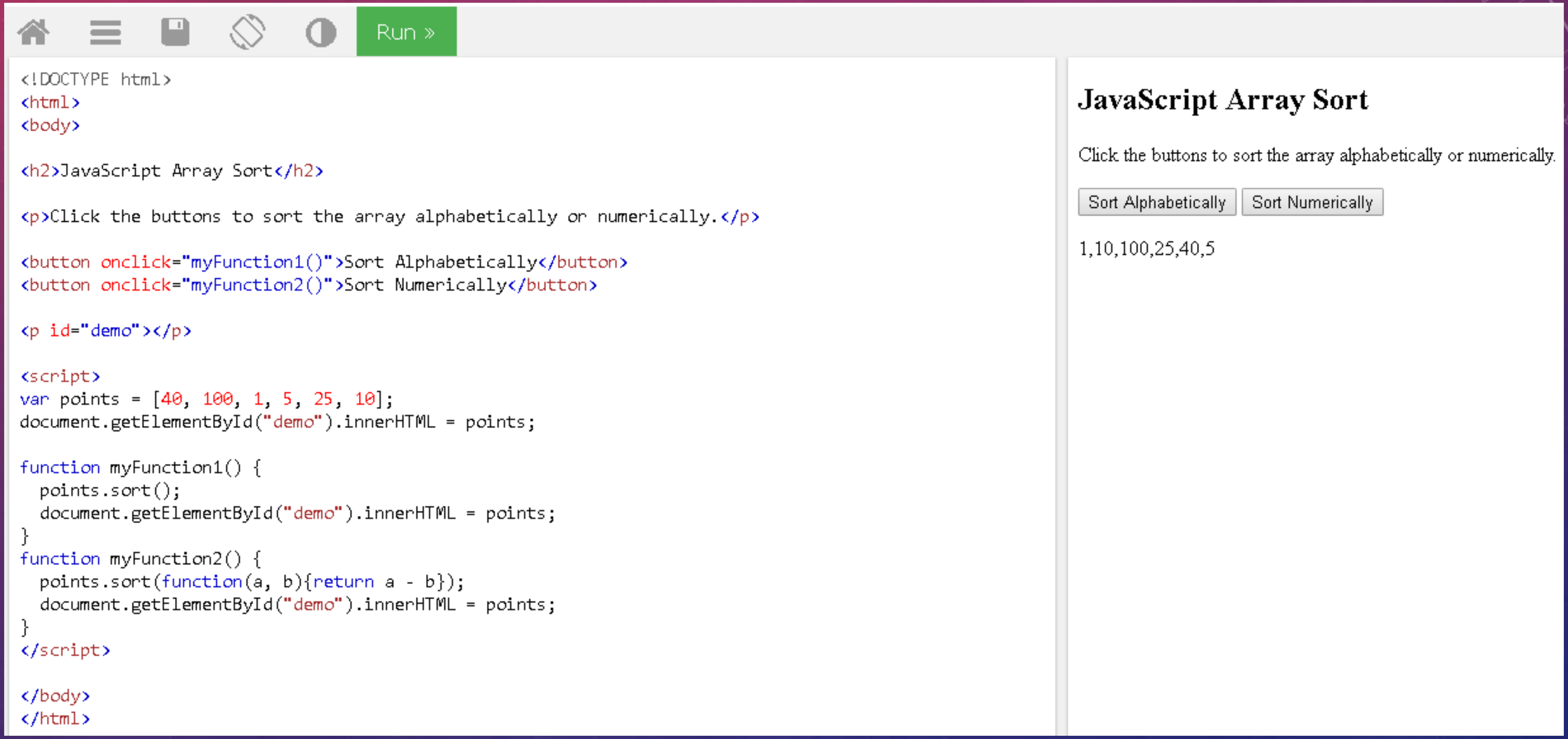
```
<!DOCTYPE html>
<html>
<body>

<h2>JavaScript Arrays</h2>

<p>JavaScript array elements are accessed using numeric indexes (starting from 0).</p>

<p id="demo"></p>

<script>
var cars = ["Saab", "Volvo", "BMW"];
cars[0] = "Opel";
document.getElementById("demo").innerHTML = cars;
</script>

</body>
</html>
```

JavaScript Arrays

JavaScript array elements are accessed using numeric indexes (starting from 0).

Opel,Volvo,BMW

JAVASCRIPT ARRAY SORT



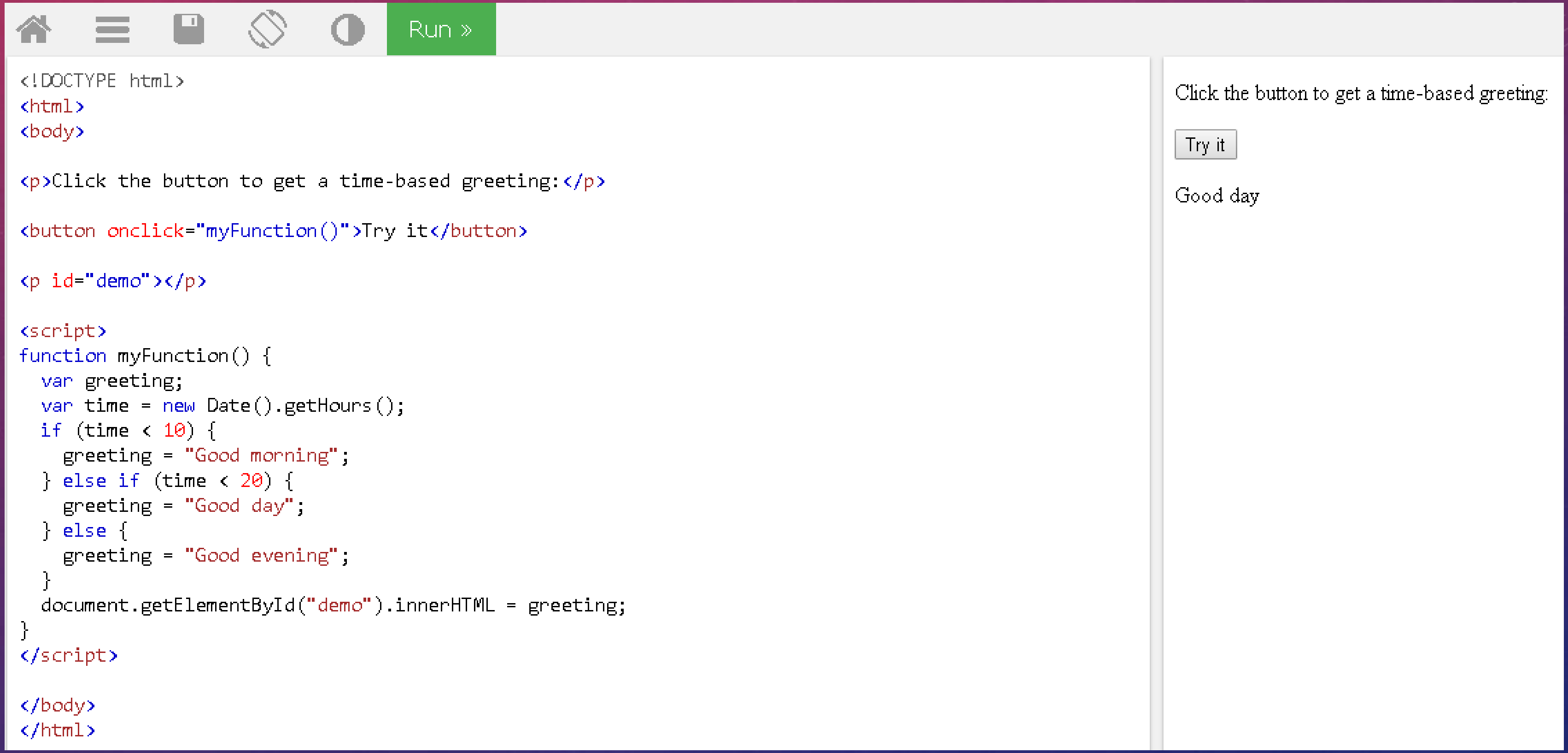
```
<!DOCTYPE html>
<html>
<body>

<h2>JavaScript Array Sort</h2>

<p>Click the buttons to sort the array alphabetically or numerically.</p>

<button onclick="myFunction1()">Sort Alphabetically</button>
<button onclick="myFunction2()">Sort Numerically</button>

<p id="demo"></p>

<script>
var points = [40, 100, 1, 5, 25, 10];
document.getElementById("demo").innerHTML = points;

function myFunction1() {
  points.sort();
  document.getElementById("demo").innerHTML = points;
}
function myFunction2() {
  points.sort(function(a, b){return a - b});
  document.getElementById("demo").innerHTML = points;
}
</script>

</body>
</html>
```

JavaScript Array Sort

Click the buttons to sort the array alphabetically or numerically.

```
1,10,100,25,40,5
```

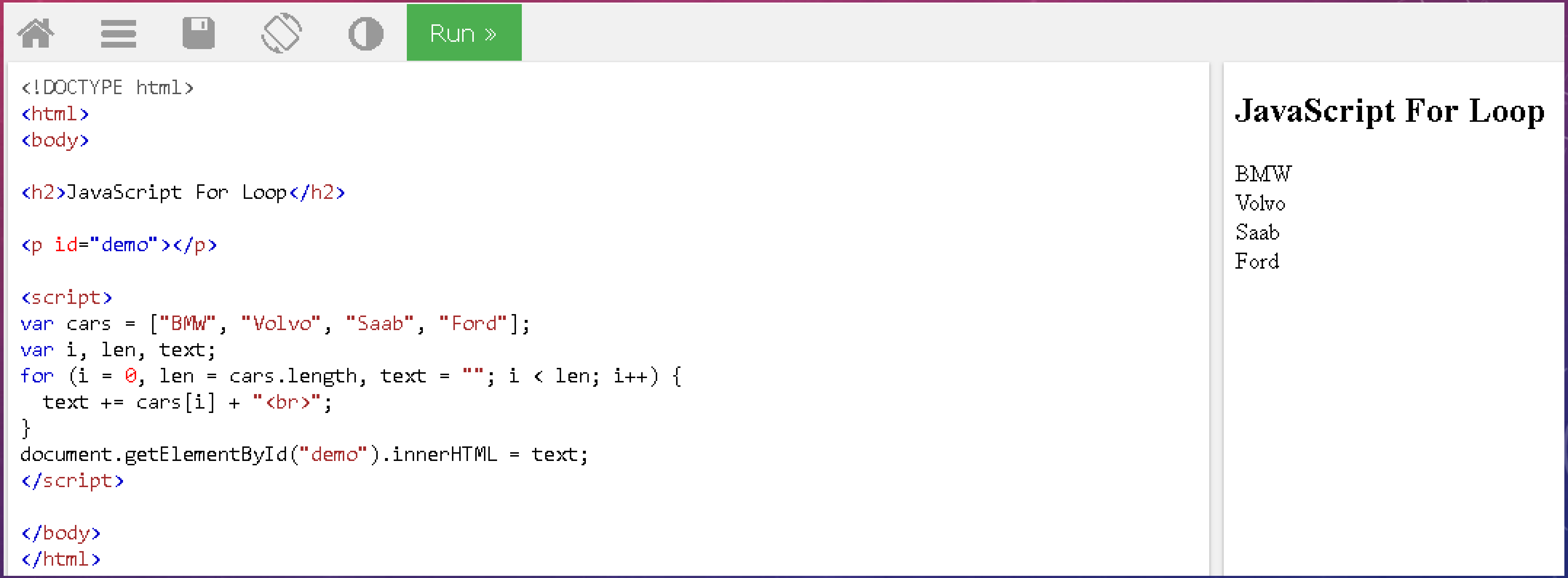
JAVASCRIPT IF...ELSE...



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

<p>Click the button to get a time-based greeting:</p>

<button onclick="myFunction()">Try it</button>

<p id="demo"></p>

<script>
function myFunction() {
  var greeting;
  var time = new Date().getHours();
  if (time < 10) {
    greeting = "Good morning";
  } else if (time < 20) {
    greeting = "Good day";
  } else {
    greeting = "Good evening";
  }
  document.getElementById("demo").innerHTML = greeting;
}
</script>

</body>
</html>
```

```
Click the button to get a time-based greeting:

Try it

Good day
```

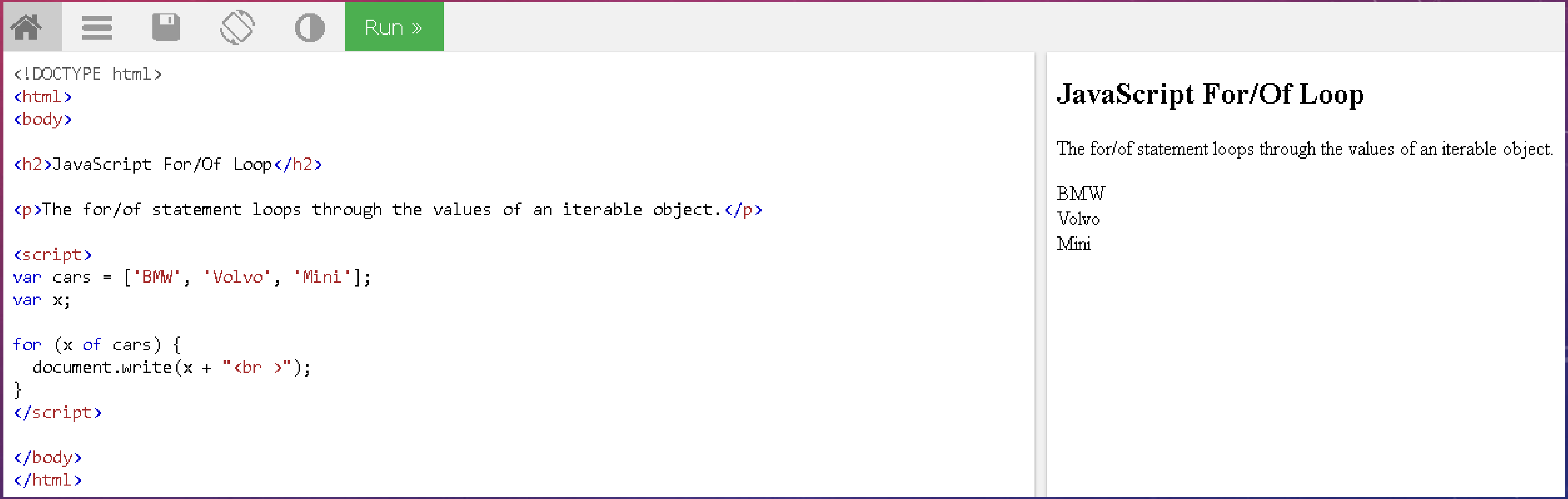
JAVASCRIPT FOR LOOP



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

<h2>JavaScript For Loop</h2>

<p id="demo"></p>

<script>
var cars = ["BMW", "Volvo", "Saab", "Ford"];
var i, len, text;
for (i = 0, len = cars.length, text = ""; i < len; i++) {
  text += cars[i] + "<br>";
}
document.getElementById("demo").innerHTML = text;
</script>

</body>
</html>
```

```
JavaScript For Loop

BMW
Volvo
Saab
Ford
```

JAVASCRIPT FOR LOOP



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

<h2>JavaScript For/Of Loop</h2>

<p>The for/of statement loops through the values of an iterable object.</p>

<script>
var cars = ['BMW', 'Volvo', 'Mini'];
var x;

for (x of cars) {
  document.write(x + "<br >");
}
</script>

</body>
</html>
```

JavaScript For/Of Loop

The for/of statement loops through the values of an iterable object.

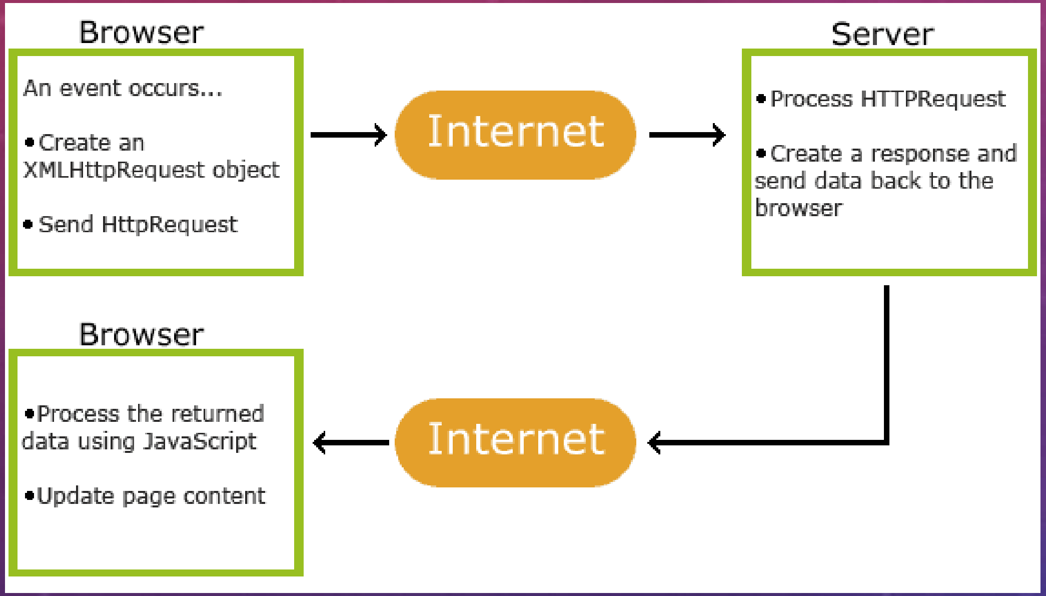
```
BMW
Volvo
Mini
```

WHAT IS AJAX?

- Asynchronous JavaScript And XML (AJAX)
  1. A browser built-in XMLHttpRequest object (to request data from a web server)
  2. JavaScript and HTML DOM (to display or use the data)

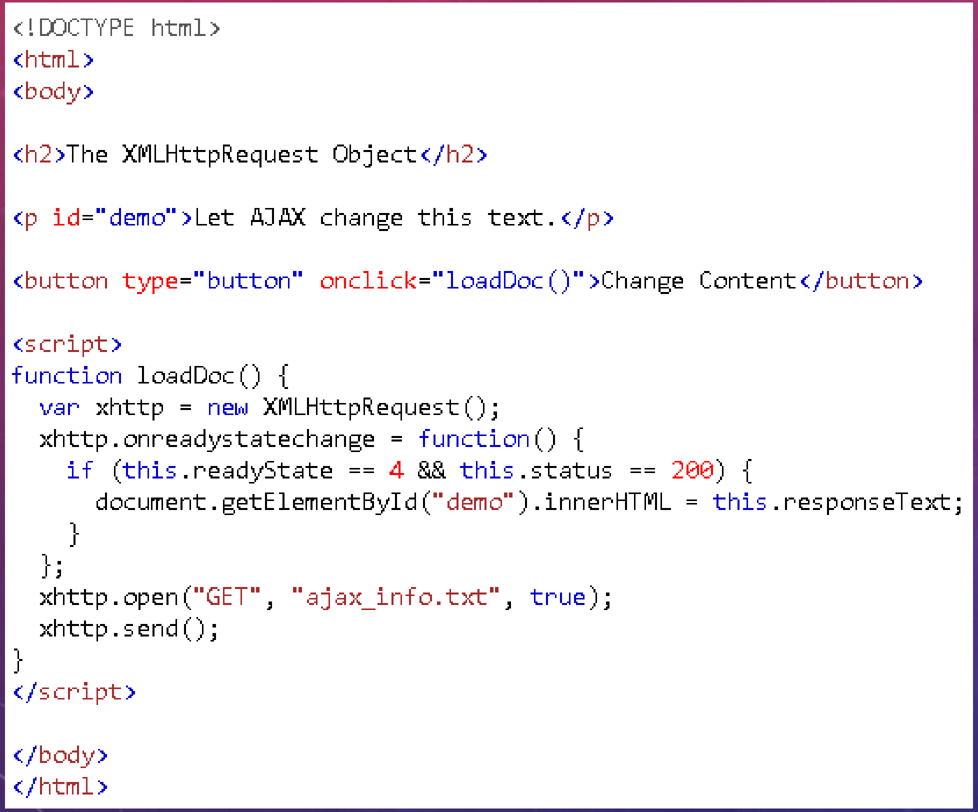
- AJAX allows web pages to be updated asynchronously by exchanging data with a web server behind the scenes. This means that it is possible to update parts of a web page, without reloading the whole page.

HOW AJAX WORKS


Browser
An event occurs...
•Create an XMLHttpRequest object
•Send HttpRequest
Internet
Server
•Process HTTPRequest
•Create a response and send data back to the browser
Internet
Browser
•Process the returned data using JavaScript
•Update page content

1. An event occurs in a web page (the page is loaded, a button is clicked)
2. An XMLHttpRequest object is created by JavaScript
3. The XMLHttpRequest object sends a request to a web server
4. The server processes the request
5. The server sends a response back to the web page
6. The response is read by JavaScript
7. Proper action (like page update) is performed by JavaScript

BASIC EXAMPLE
LOAD DATA FROM LOCAL SITE



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

<h2>The XMLHttpRequest Object</h2>

<p id="demo">Let AJAX change this text.</p>

<button type="button" onclick="loadDoc()">Change Content</button>

<script>
function loadDoc() {
  var xhttp = new XMLHttpRequest();
  xhttp.onreadystatechange = function() {
    if (this.readyState == 4 && this.status == 200) {
      document.getElementById("demo").innerHTML = this.responseText;
    }
  };
  xhttp.open("GET", "ajax_info.txt", true);
  xhttp.send();
}
</script>

</body>
</html>
```

var xhttp = new *XMLHttpRequest*();

xhttp.onreadystatechange

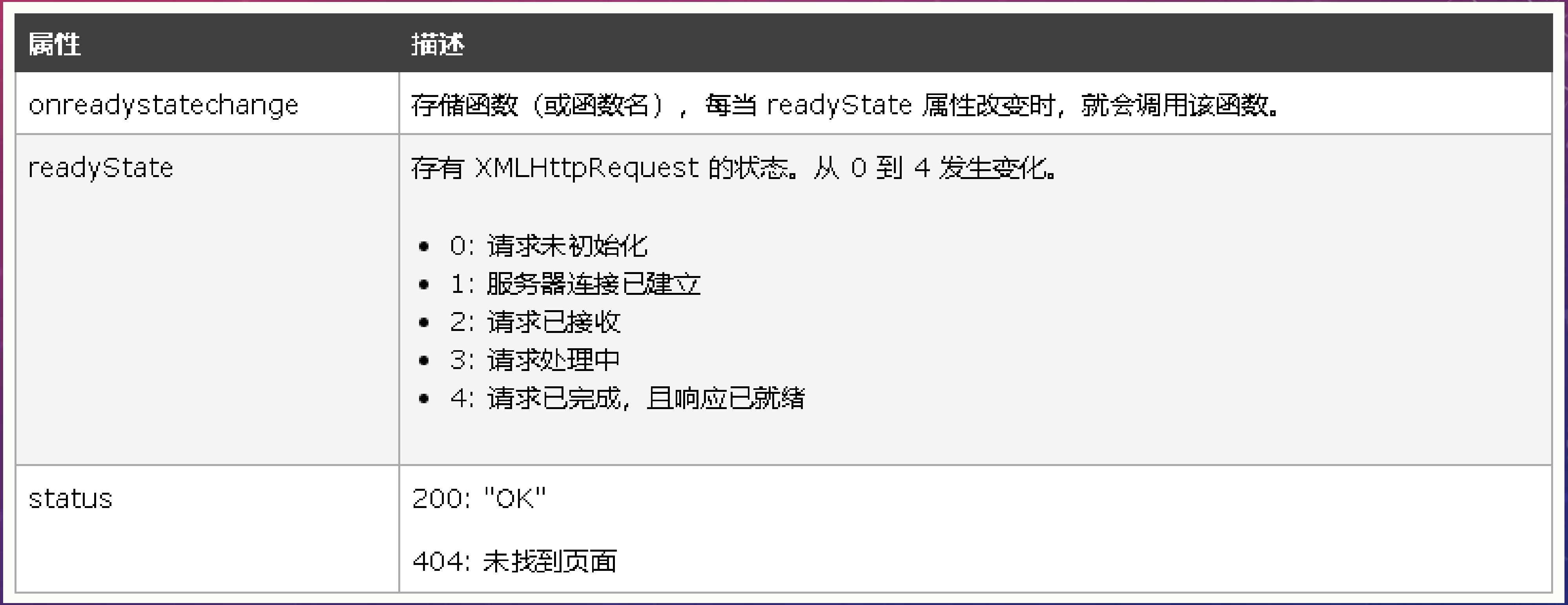
this.readyState == 4

this.status == 200

xhttp.open(*method, url, async*)

xhttp.send(*string*)

ONREADYSTATECHANGE 的三個重要屬性



属性	描述
onreadystatechange	存储函数（或函数名），每当 readyState 属性改变时，就会调用该函数。
readyState	存有 XMLHttpRequest 的状态。从 0 到 4 发生变化。 • 0: 请求未初始化 • 1: 服务器连接已建立 • 2: 请求已接收 • 3: 请求处理中 • 4: 请求已完成，且响应已就绪
status	200: "OK" 404: 未找到页面

GET OR POST

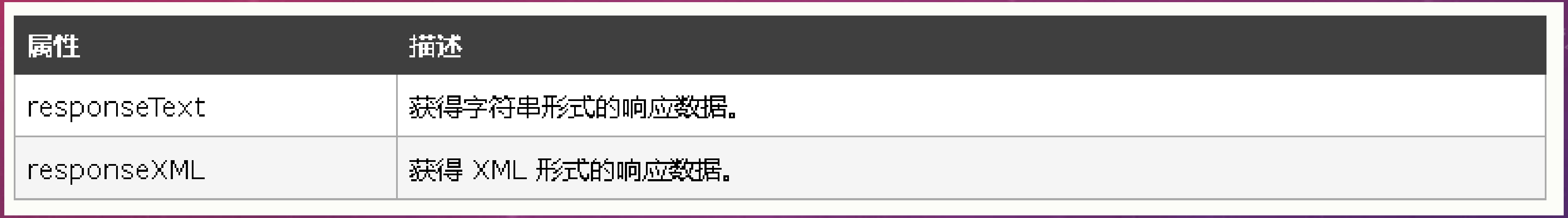
- 與POST相比，GET更簡單也更快，並且在大部分情況下都能用。
- 然而，在以下情況中，請使用POST請求：
  1. 無法使用緩存文件（更新服務器上的文件或數據庫）
  2. 向服務器發送大量數據（POST沒有數據量限制）
  3. 發送包含未知字符的用戶輸入時，POST比GET更穩定也更可靠

異步與同步

- Async 是接收到需求，不用一直等到需求完成再執行其他需求。

- Async 與 Sync 的差別在於：發送需求的人是否需要等到需求完成才可以執行其他事情。

服務器響應

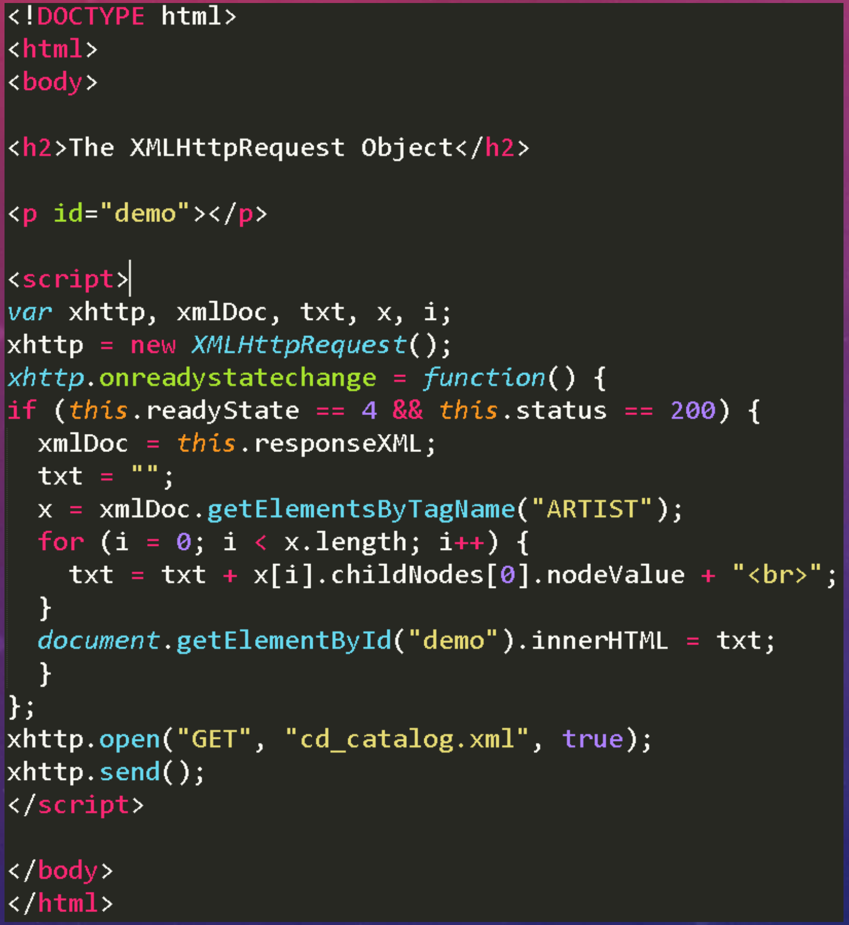


属性	描述
responseText	获得字符串形式的响应数据。
responseXML	获得 XML 形式的响应数据。

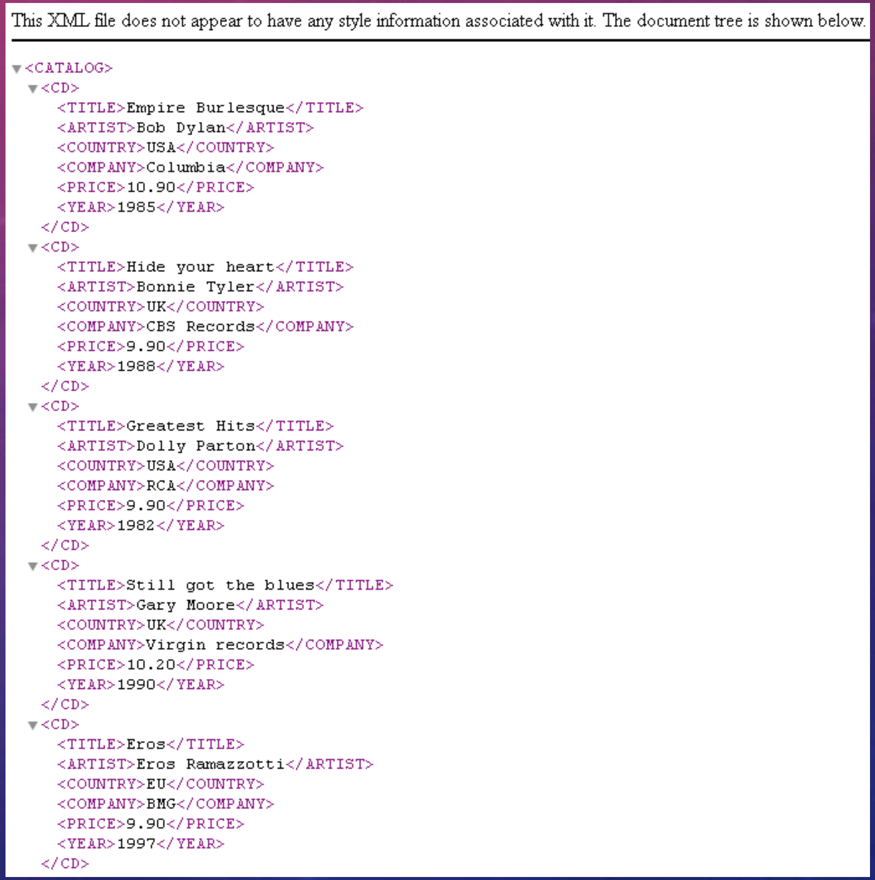
```
document.getElementById("demo").innerHTML =
this.responseText;
```

服務器響應 XML

https://www.w3schools.com/js/cd_catalog.xml



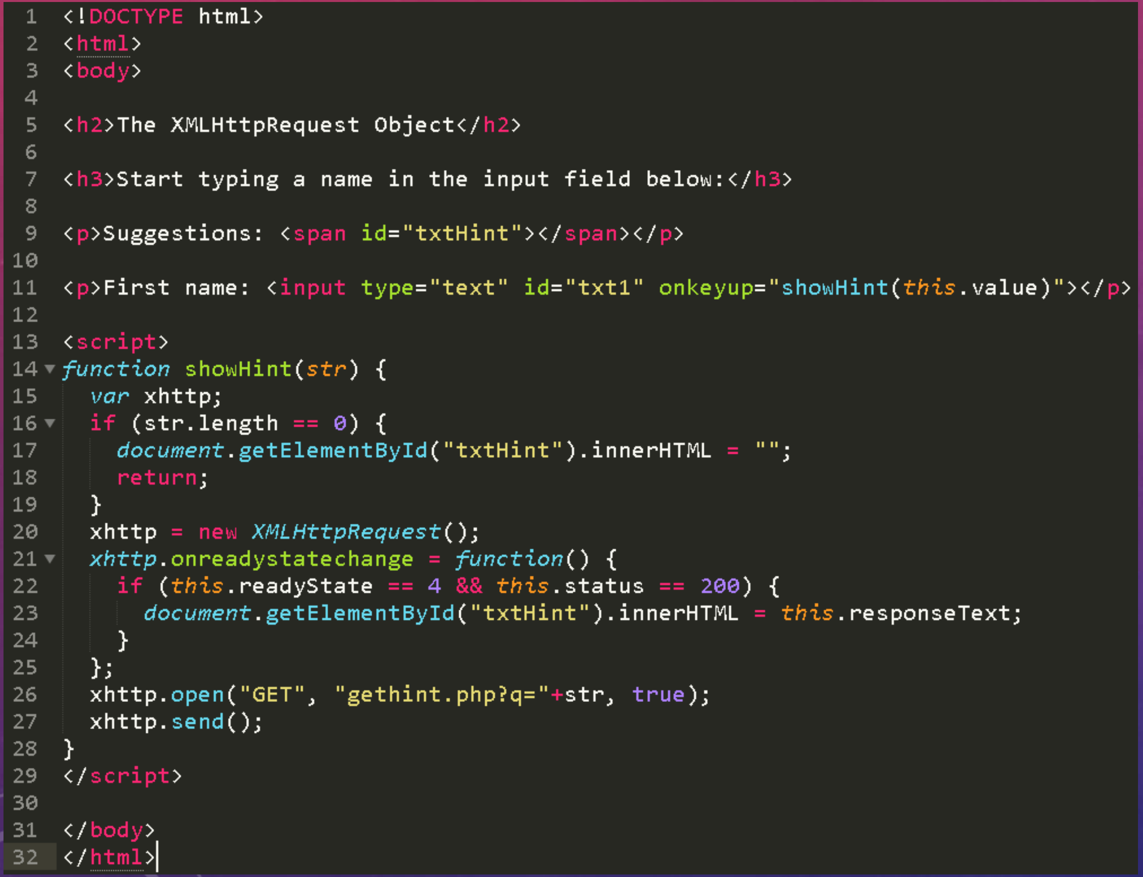
```
<!DOCTYPE html>
<html>
<body>

<h2>The XMLHttpRequest Object</h2>

<p id="demo"></p>

<script>
var xhttp, xmlDoc, txt, x, i;
xhttp = new XMLHttpRequest();
xhttp.onreadystatechange = function() {
if (this.readyState == 4 && this.status == 200) {
  xmlDoc = this.responseXML;
  txt = "";
  x = xmlDoc.getElementsByTagName("ARTIST");
  for (i = 0; i < x.length; i++) {
    txt = txt + x[i].childNodes[0].nodeValue + "<br>";
  }
  document.getElementById("demo").innerHTML = txt;
  }
};
xhttp.open("GET", "cd_catalog.xml", true);
xhttp.send();
</script>

</body>
</html>
```



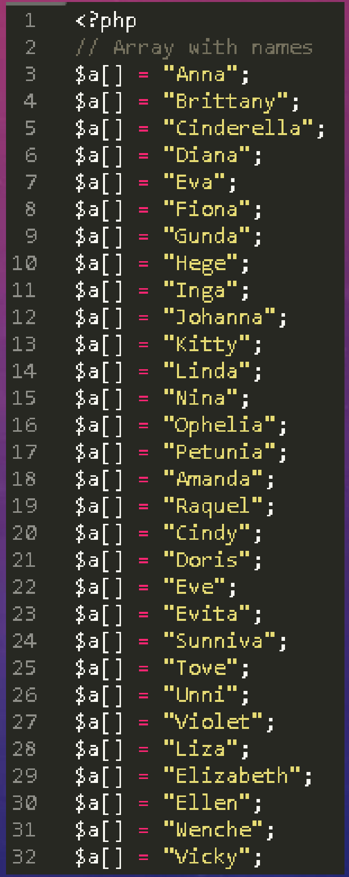
This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
▼<CATALOG>
  ▼<CD>
     <TITLE>Empire Burlesque</TITLE>
     <ARTIST>Bob Dylan</ARTIST>
     <COUNTRY>USA</COUNTRY>
     <COMPANY>Columbia</COMPANY>
     <PRICE>10.90</PRICE>
     <YEAR>1985</YEAR>
   </CD>
  ▼<CD>
     <TITLE>Hide your heart</TITLE>
     <ARTIST>Bonnie Tyler</ARTIST>
     <COUNTRY>UK</COUNTRY>
     <COMPANY>CBS Records</COMPANY>
     <PRICE>9.90</PRICE>
     <YEAR>1988</YEAR>
   </CD>
  ▼<CD>
     <TITLE>Greatest Hits</TITLE>
     <ARTIST>Dolly Parton</ARTIST>
     <COUNTRY>USA</COUNTRY>
     <COMPANY>RCA</COMPANY>
     <PRICE>9.90</PRICE>
     <YEAR>1982</YEAR>
   </CD>
  ▼<CD>
     <TITLE>Still got the blues</TITLE>
     <ARTIST>Gary Moore</ARTIST>
     <COUNTRY>UK</COUNTRY>
     <COMPANY>Virgin records</COMPANY>
     <PRICE>10.20</PRICE>
     <YEAR>1990</YEAR>
   </CD>
  ▼<CD>
     <TITLE>Eros</TITLE>
     <ARTIST>Eros Ramazzotti</ARTIST>
     <COUNTRY>EU</COUNTRY>
     <COMPANY>BMG</COMPANY>
     <PRICE>9.90</PRICE>
     <YEAR>1997</YEAR>
   </CD>
```

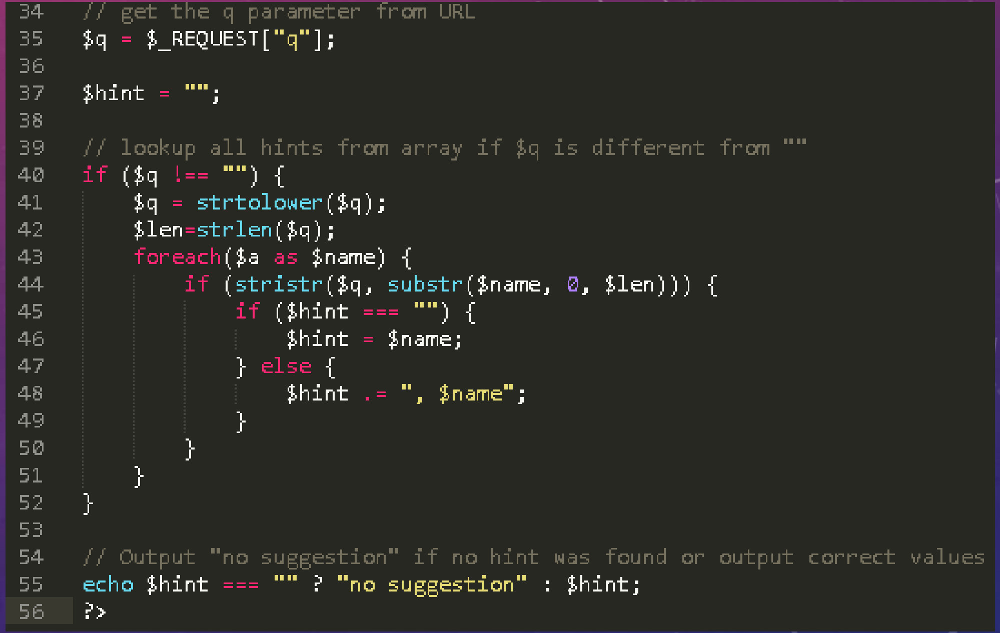
服務器響應 FROM PHP



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

<h2>The XMLHttpRequest Object</h2>

<h3>Start typing a name in the input field below:</h3>

<p>Suggestions: <span id="txtHint"></span></p>

<p>First name: <input type="text" id="txt1" onkeyup="showHint(this.value)"></p>

<script>
function showHint(str) {
  var xhttp;
  if (str.length == 0) {
    document.getElementById("txtHint").innerHTML = "";
    return;
  }
  xhttp = new XMLHttpRequest();
  xhttp.onreadystatechange = function() {
    if (this.readyState == 4 && this.status == 200) {
      document.getElementById("txtHint").innerHTML = this.responseText;
    }
  };
  xhttp.open("GET", "gethint.php?q="+str, true);
  xhttp.send();
}
</script>

</body>
</html>
```

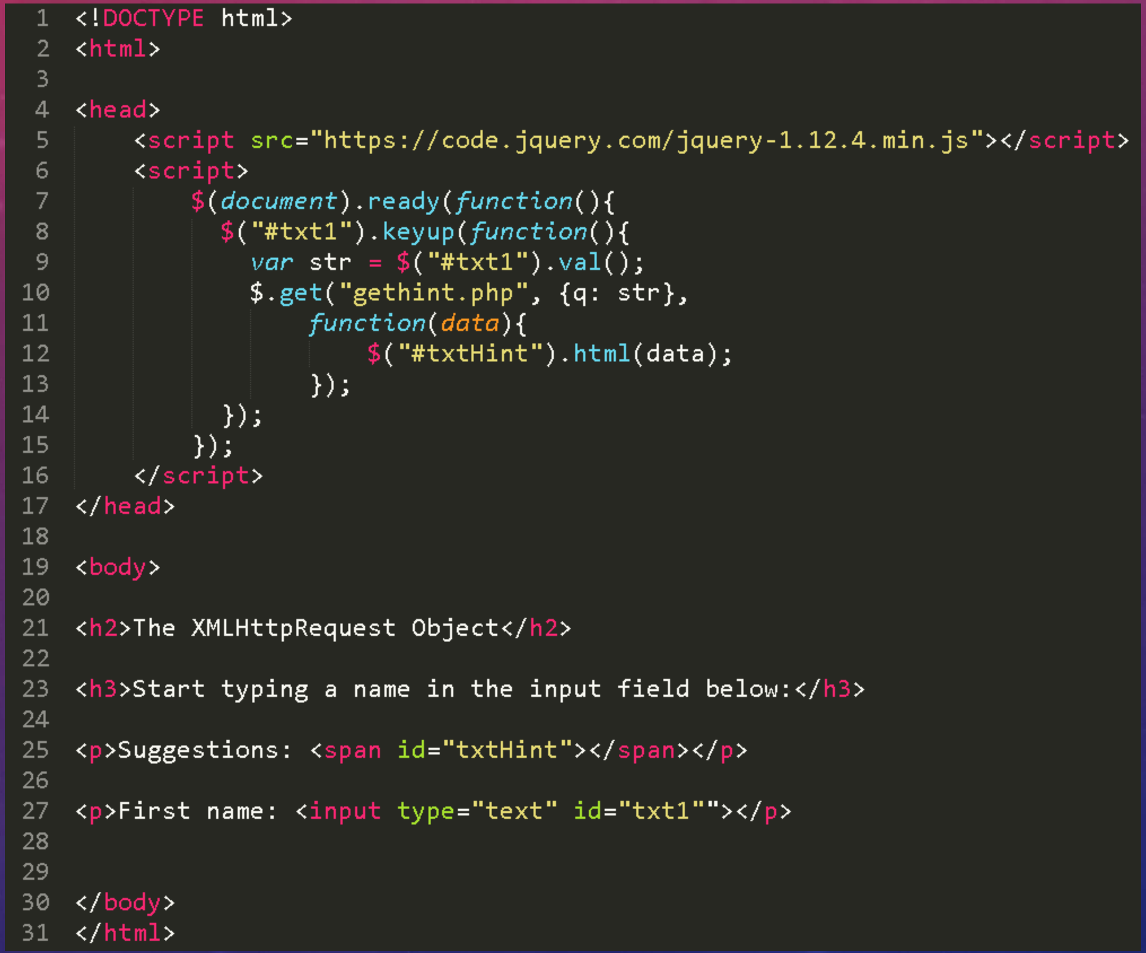


```php
<?php
// Array with names
$a[] = "Anna";
$a[] = "Brittany";
$a[] = "Cinderella";
$a[] = "Diana";
$a[] = "Eva";
$a[] = "Fiona";
$a[] = "Gunda";
$a[] = "Hege";
$a[] = "Inga";
$a[] = "Johanna";
$a[] = "Kitty";
$a[] = "Linda";
$a[] = "Nina";
$a[] = "Ophelia";
$a[] = "Petunia";
$a[] = "Amanda";
$a[] = "Raquel";
$a[] = "Cindy";
$a[] = "Doris";
$a[] = "Eve";
$a[] = "Evita";
$a[] = "Sunniva";
$a[] = "Tove";
$a[] = "Unni";
$a[] = "Violet";
$a[] = "Liza";
$a[] = "Elizabeth";
$a[] = "Ellen";
$a[] = "Wenche";
$a[] = "Vicky";
```



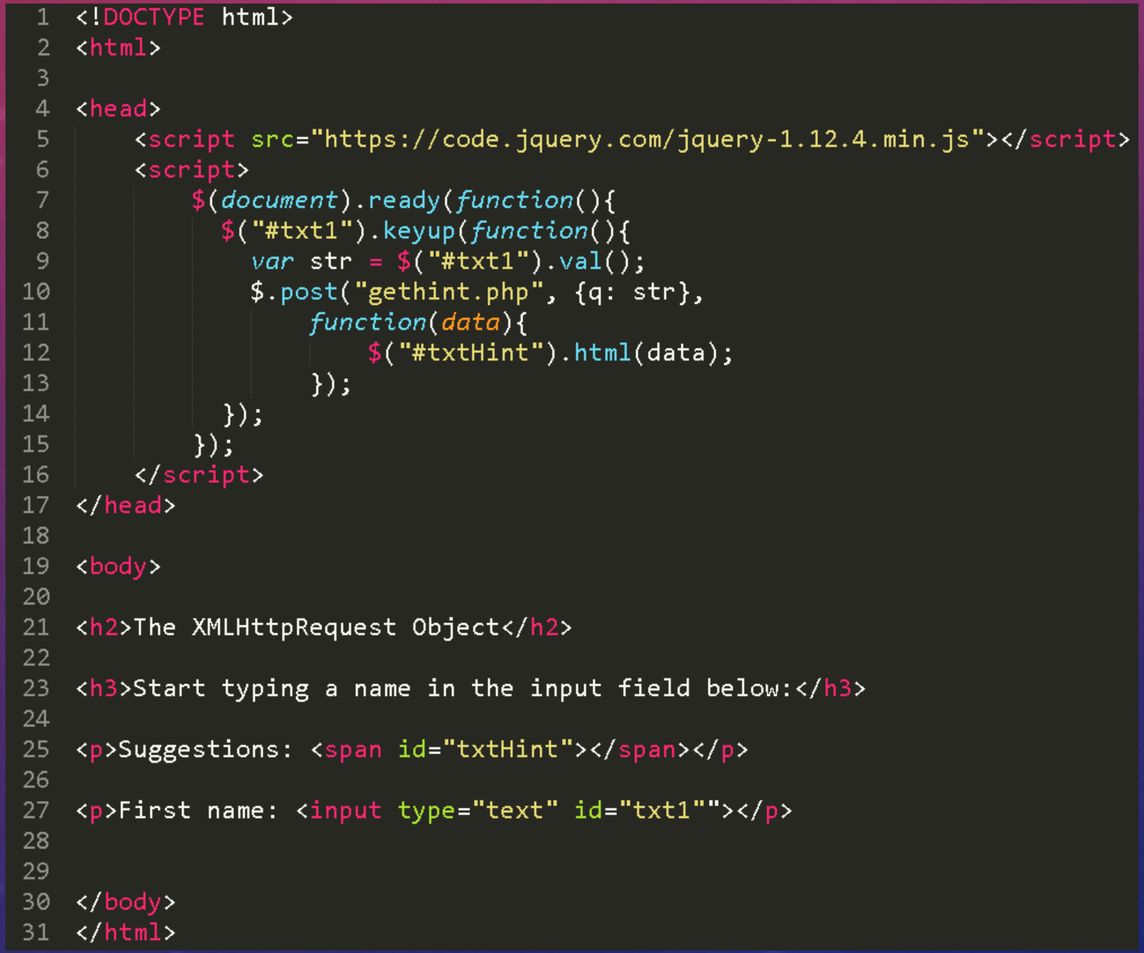
```php
// get the q parameter from URL
$q = $_REQUEST["q"];

$hint = "";

// lookup all hints from array if $q is different from ""
if ($q !== "") {
    $q = strtolower($q);
    $len=strlen($q);
    foreach($a as $name) {
        if (stristr($q, substr($name, 0, $len))) {
            if ($hint === "") {
                $hint = $name;
            } else {
                $hint .= ", $name";
            }
        }
    }
}

// Output "no suggestion" if no hint was found or output correct values
echo $hint === "" ? "no suggestion" : $hint;
?>
```

$GET



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

<head>
    <script src="https://code.jquery.com/jquery-1.12.4.min.js"></script>
    <script>
        $(document).ready(function(){
          $("#txt1").keyup(function(){
            var str = $("#txt1").val();
            $.get("gethint.php", {q: str},
                function(data){
                    $("#txtHint").html(data);
                });
          });
        });
    </script>
</head>

<body>

<h2>The XMLHttpRequest Object</h2>

<h3>Start typing a name in the input field below:</h3>

<p>Suggestions: <span id="txtHint"></span></p>

<p>First name: <input type="text" id="txt1""></p>


</body>
</html>
```

$POST



```
<!DOCTYPE html>
<html>

<head>
    <script src="https://code.jquery.com/jquery-1.12.4.min.js"></script>
    <script>
        $(document).ready(function(){
          $("#txt1").keyup(function(){
            var str = $("#txt1").val();
            $.post("gethint.php", {q: str},
                function(data){
                    $("#txtHint").html(data);
                });
          });
        });
    </script>
</head>

<body>

<h2>The XMLHttpRequest Object</h2>

<h3>Start typing a name in the input field below:</h3>

<p>Suggestions: <span id="txtHint"></span></p>

<p>First name: <input type="text" id="txt1""></p>


</body>
</html>
```

THANK YOU

自學資源

- W3SCHOOLS
- CODECADEMY