

# Introduction to JavaScript

Jussi Pohjolainen

Tampere University of Applied Sciences

# JavaScript

- Object-orientated scripting language
- Dialect of EcmaScript-standard
- History
  - Netscape: LiveScript to JavaScript
  - Microsoft: JScript
  - Standard: EcmaScript
- Latest version: JavaScript 1.8.1, a superset of EcmaScript

# Possibilities?

- JS was designed to add interactivity to HTML pages
- Dynamic HTML
- Can react to events: page has finished loading, user clicks..
- Data validation
- Browser detection
- Cookies

# Compatibility

- Old or rare browsers
- PDA or Mobile phones
- JavaScript execution disabled
- The use of speech browser
- Browser incompatibilities

# JavaScript Today: AJAX

- JavaScript is heavily used in AJAX-based sites
- AJAX: asynchronous JavaScript and XML
  - group of interrelated techniques used on the client-side to create rich web apps where data is retrieved from the server in the background.
- Example usage: Gmail, Google Maps

# Google Web Toolkit

- Great tool for creating AJAX/JS-based sites
- Coding is done with Java which is compiled to JavaScript
- Resolves browser incompatibilities
- See Example:
  - <http://gwt.google.com/samples/Showcase/Showcase.html>

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <title>Embed Example</title>
    <meta http-equiv="content-type" content="application/xhtml+xml; charset=utf-8" /
    >
</head>
<body>

<p>
<!-- See: http://covertprestige.info/html/script-syntax/ -->
<script type="text/javascript">
//

document.write("Hello from JS!");

//]]&gt;
&lt;/script&gt;
&lt;/p&gt;

&lt;/body&gt;
&lt;/html&gt;</pre></div>
```

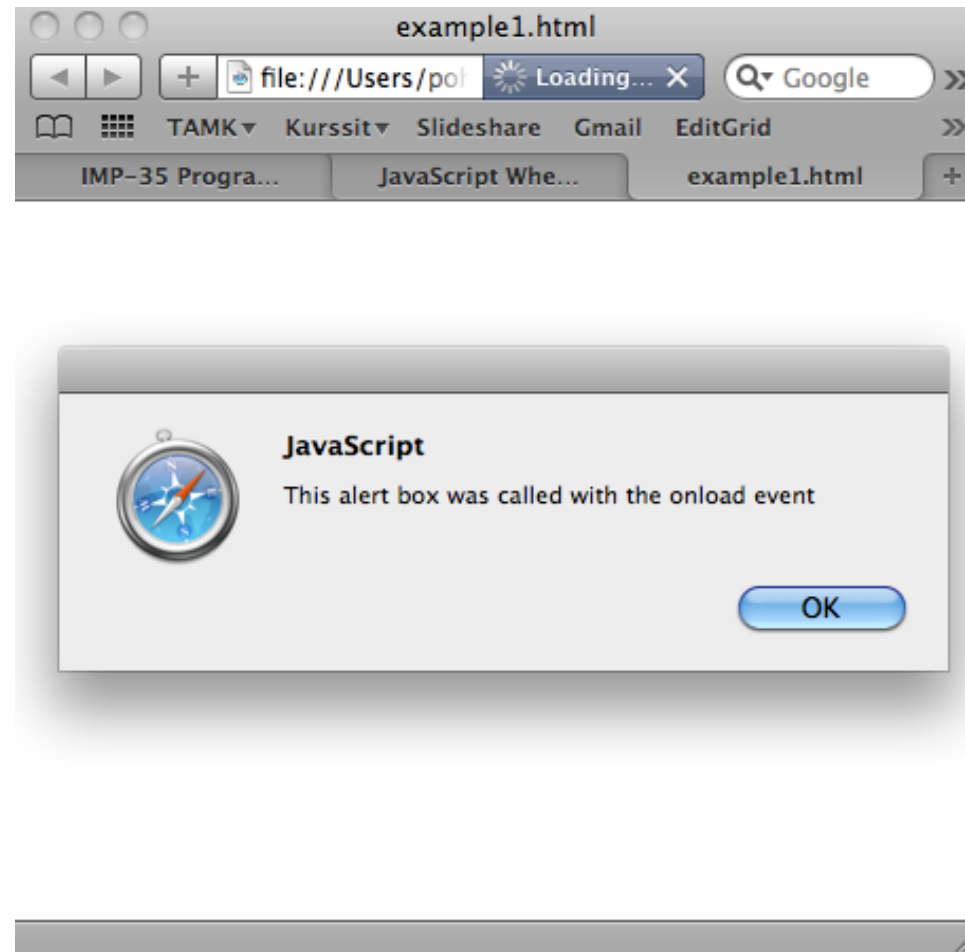
```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <title>External JS Example</title>
    <meta http-equiv="content-type" content="application/xhtml+xml; charset=utf-8" />
    <script type="text/javascript" src="event.js"></script>
</head>
<body onload="message()">

</body>
</html>
```



```
// event.js  
function message()  
{  
    alert("This alert box was called  
    with the onload event");  
}
```

# Result



# **QUICK INTRO TO PROGRAMMING WITH JS**

# Variables

- Values are stored in variables
- Variables are declared:
  - `var carname;`
- Assigning value
  - `carname = "volvo";`
- Together
  - `var carname = "volvo";`

```
...  
<body>  
  
<p>  
<script type="text/javascript">  
  //<![CDATA[  
  
    // Declaration  
    var car;  
    // Assigning  
    car = "Volvo";  
    document.write(car);  
  
  //]]>  
</script>  
</p>  
  
</body>  
</html>
```

# Comparison (w3schools)

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

var d    = new Date();
var time = d.getHours();

if ( time &lt; 10 )
{
    document.write("&lt;b&gt;Good morning&lt;/b&gt;");
}

//]]&gt;
&lt;/script&gt;</pre></div>
```

# Comparison (w3schools)

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

var d    = new Date();
var time = d.getHours();

if ( time &lt; 10 )
{
    document.write("&lt;b&gt;Good morning&lt;/b&gt;");
}
else
{
    document.write("&lt;b&gt;Good Day&lt;/b&gt;");
}
//]]&gt;
&lt;/script&gt;</pre></div>
```

# Repeat (w3schools)

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

var i=0;
while (i&lt;=5)
{
    document.write("The number is " + i);
    document.write("&lt;br /&gt;");
    i = i + 1;
}

//]]&gt;
&lt;/script&gt;</pre></div><div data-bbox="598 295 1000 465" data-label="Image"><img alt="Screenshot of a web browser window showing the output of the JavaScript code."/>A screenshot of a web browser window titled "example1.html". The address bar shows a file path: "file:///Users/pohjus/Documer". Below the address bar, there are several tabs: "IMP-35 P...", "JavaScrip...", and "example1". The browser's toolbar includes icons for a search engine, a bookshelf, and a grid of icons. The main content area of the browser displays the output of the JavaScript code: "The number is 0", "The number is 1", "The number is 2", "The number is 3", "The number is 4", and "The number is 5", each on a new line.</div><div data-bbox="606 495 750 686" data-label="Text"><p>The number is 0<br/>The number is 1<br/>The number is 2<br/>The number is 3<br/>The number is 4<br/>The number is 5</p></div>
```



# Popup Boxes

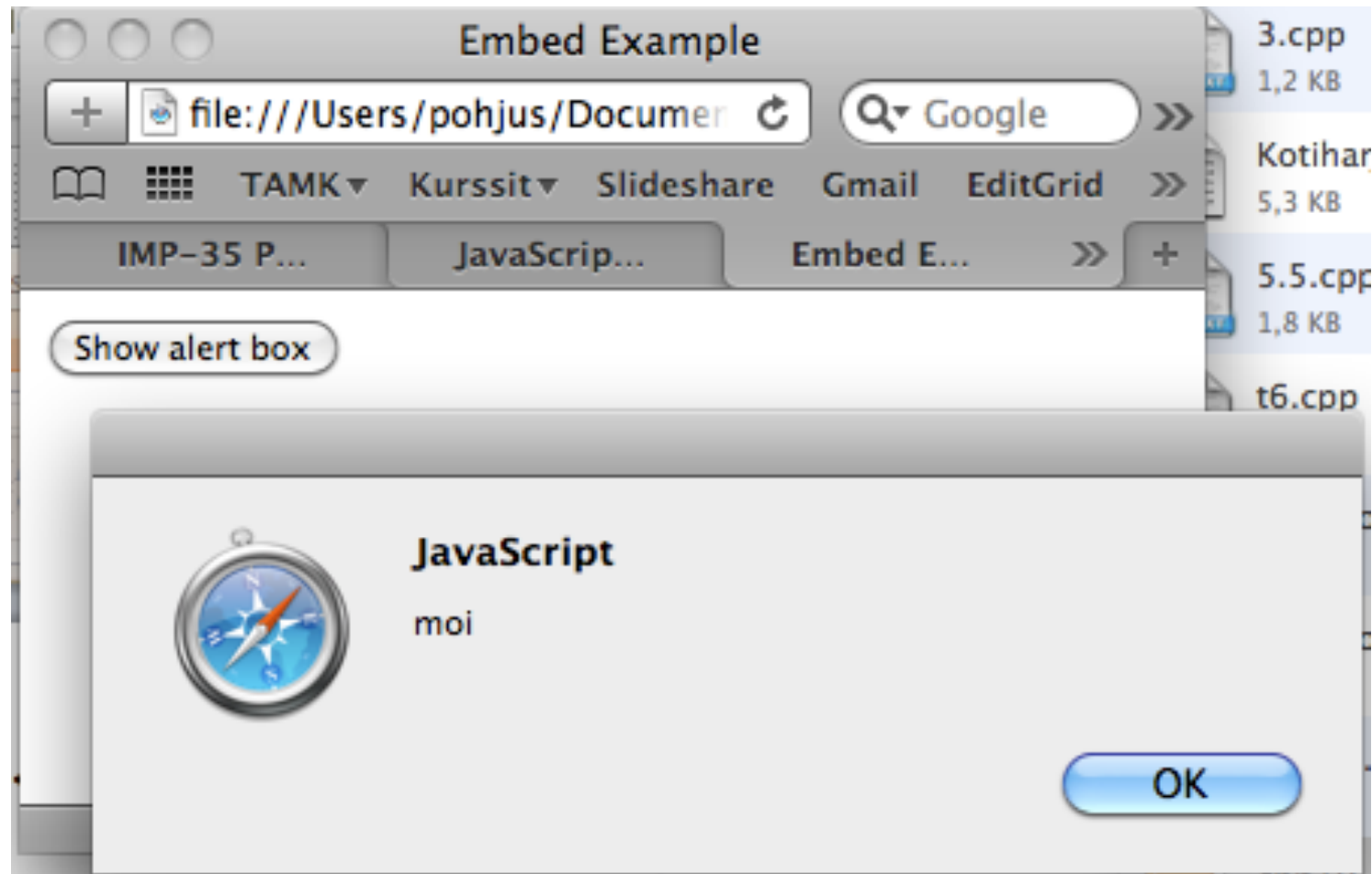
- Alert Box
  - `alert("some text");`
- Confirm Box
  - `confirm("some text");`
- Prompt Box
  - `prompt("sometext", "default value")`

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <title>Embed Example</title>
    <meta http-equiv="content-type" content="application/
xhtml+xml; charset=utf-8" />
</head>
<body>

    <input type="button" onclick="alert('moi');" value="Show
    alert box" />

</body>
</html>
```

# Result



```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <title>Embed Example</title>
    <meta http-equiv="content-type" content="application/xhtml+xml; charset=utf-8" /
    >
    <script type="text/javascript">
    //
    function showAlert()
    {
        alert("Hello World!");
    }
    //]]&gt;
    &lt;/script&gt;
&lt;/head&gt;
&lt;body&gt;

&lt;input type="button" onclick="showAlert();" value="Show alert box" /&gt;

&lt;/body&gt;
&lt;/html&gt;</pre></div>
```

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <title>Embed Example</title>
    <meta http-equiv="content-type" content="application/xhtml+xml; charset=utf-8" />
    <script type="text/javascript">
        //
        function askQuestion()
        {
            var name = prompt("Please enter your name","Harry Potter");

            if ( name!=null &amp;&amp; name!="" )
            {
                alert("Hello " + name + "! How are you today?");
            }
        }

        //]]&gt;
    &lt;/script&gt;
&lt;/head&gt;
&lt;body&gt;

    &lt;input type="button" onclick="askQuestion();" value="Question for me" /&gt;

&lt;/body&gt;
&lt;/html&gt;</pre></div>
```

# **JS EVENTS AND DOM**

# JS Events

- Mouse click (onclick)
- Web page loading (onload)
- Mousing over and out (onmouseover  
onmouseout)
- Submitting HTML form (onsubmit)

# About Events

- You may cancel some events:
  - `<a href=http://www.tamk.fi/ onclick="alert('message'); return false;">`
- Example
  - `<form name="myform" action="" onsubmit="return validate();">`



# Example

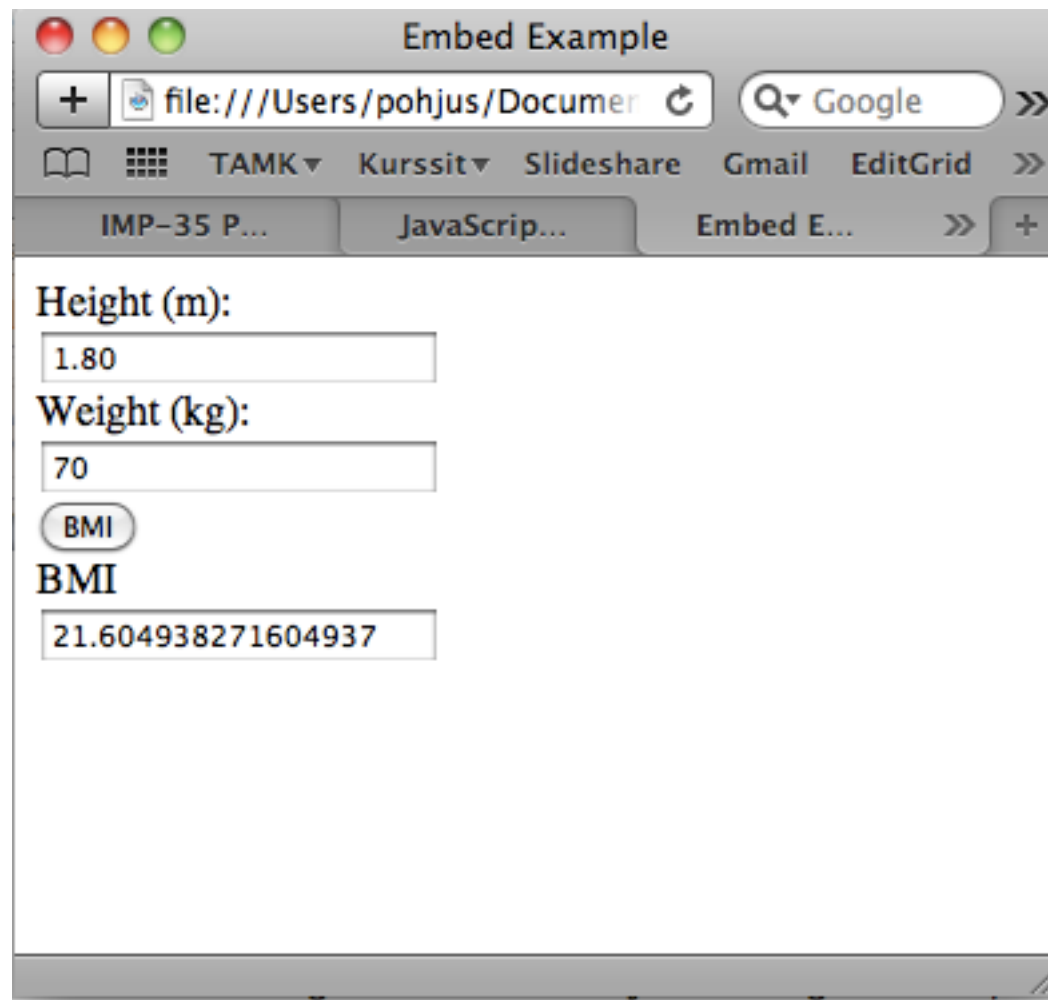
```
<form name="myform" method="post" onsubmit="return  
count()">  
  Height (m):<br/>  
    <input type="text" name="height"/><br/>  
  Weight (kg):<br/>  
    <input type="text" name="weight"/><br/>  
  
    <input type="submit" value="BMI"/><br/>  
  
  BMI<br/>  
    <input type="text" name="result"/>  
</form>
```

```
<script type="text/javascript">
  //<![CDATA[
  function count()
  {
    var height = document.myform.height.value;
    var weight = document.myform.weight.value;
    document.myform.result.value = (weight / (height*height));

    return false;
  }

  //]]>
</script>
```

# Result



The screenshot shows a web browser window with the title "Embed Example". The address bar displays a file path: "file:///Users/pohjus/Documer". The browser's tab bar shows three tabs: "IMP-35 P...", "JavaScrip...", and "Embed E...". The main content area contains a form for BMI calculation. It includes two input fields for "Height (m)" and "Weight (kg)", a "BMI" button, and a result field displaying the calculated BMI value.

Height (m):  
1.80

Weight (kg):  
70

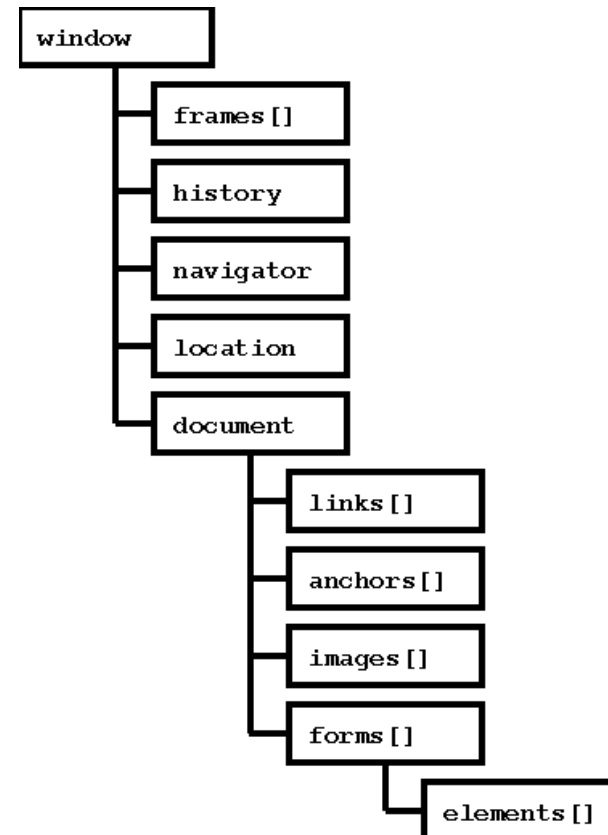
BMI

BMI  
21.604938271604937

**DOM**

# DOM?

- Specification how to access (X)Html – elements
- Different levels of DOM: 0, 1, and 2



# window - object

- Every reference to other objects is done via the window – object
- You don't have to use the reference in your code:
  - `window.document.form.height.value =`
  - `document.form.height.value`
- Window methods
  - `alert`, `close`, `confirm`, `open`, `prompt`, `setTimeout`

# Opening new Browser Window

// See:

<http://www.javascript-coder.com/window-popup/javascript-window-open.phtml>

```
window.open("http://www.tamk.fi",  
            "title",  
            "width=600, height=100");
```

# navigator - object

- navigator tells information about your browser
- Client-sniffing

```
var browser    = navigator.appName;  
var b_version  = navigator.appVersion;  
var version    = parseFloat(b_version);  
  
document.write("Browser name: "+ browser);  
document.write("<br />");  
document.write("Browser version: "+ version);
```



# document - object

- Collection of elements in the html-page
- Creating Nodes
  - createElement("element name")
  - createTextNode("text")
- Walk the Tree
  - getElementsByTagName
  - getElementById
- See: <http://www.howtocreate.co.uk/tutorials/javascript/domstructure>

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <title></title>
    <meta http-equiv="content-type" content="application/xhtml+xml; charset=utf-8" />
    <script type="text/javascript">
        //
        function change()
        {
            // Get list of ALL &lt;h1&gt; - elements
            var listOfHeading1 = window.document.getElementsByTagName("h1");

            // Find the first &lt;h1&gt; - element in the list
            var heading1      = listOfHeading1[0];

            // Get the child - element of the first &lt;h1&gt; - element (Text)
            var text          = heading1.firstChild;

            // Replace the text
            text.data = "Hello from JS!";
        }

        //]]&gt;
    &lt;/script&gt;

&lt;/head&gt;
&lt;body&gt;

&lt;h1&gt;Title&lt;/h1&gt;

&lt;input type="submit" onClick="change();" value="click!"/&gt;

&lt;/body&gt;
&lt;/html&gt;</pre></div>
```

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <title></title>
    <meta http-equiv="content-type" content="application/xhtml+xml; charset=utf-8" />
    <script type="text/javascript">
        //
        function change()
        {
            // Reference to the table - element
            var table = document.getElementById("mytable");

            var tr    = document.createElement("tr");      // &lt;tr&gt;
            var td1    = document.createElement("td");      // &lt;td&gt;
            var td1Text = document.createTextNode("New Cell"); // "New Cell"
            td1.appendChild(td1Text);                       // &lt;td&gt;New Cell&lt;/td&gt;

            var td2    = document.createElement("td");      // &lt;td&gt;
            var td2Text = document.createTextNode("New Cell"); // "New Cell"
            td2.appendChild(td2Text);                       // &lt;td&gt;New Cell&lt;/td&gt;

            tr.appendChild(td1);
            tr.appendChild(td2);

            table.appendChild(tr);
        }

        //]]&gt;
    &lt;/script&gt;

&lt;/head&gt;
&lt;body&gt;

&lt;table id="mytable" border="1"&gt;
&lt;tr&gt;&lt;td&gt;&amp;nbsp;&lt;/td&gt;&lt;td&gt;&amp;nbsp;&lt;/td&gt;&lt;/tr&gt;
&lt;tr&gt;&lt;td&gt;&amp;nbsp;&lt;/td&gt;&lt;td&gt;&amp;nbsp;&lt;/td&gt;&lt;/tr&gt;
&lt;tr&gt;&lt;td&gt;&amp;nbsp;&lt;/td&gt;&lt;td&gt;&amp;nbsp;&lt;/td&gt;&lt;/tr&gt;
&lt;/table&gt;

&lt;input type="submit" onClick="change();" value="Add Row"/&gt;

&lt;/body&gt;
&lt;/html&gt;</pre></div>
```