

Lecture 9 – Javascript and DOM

INLS 760
Web Databases
Spring 2013
Rob Capra

What is Javascript?

- Client-side scripting language
 - Developed by Netscape
 - https://developer.mozilla.org/En/Core_JavaScript_1.5_Reference
 - <http://www.w3schools.com/JS/default.asp>
 - <http://www.cs.brown.edu/courses/bridge/1998/res/javascript/javascript-tutorial.html>
 - Standardized by the European Computer Manufacturers Assoc. (ECMA)
 - Supported by all major web browsers
 - Differences among browsers
 - Has some similarity to Java, but not really

Simple Javascript Example

lect9/js-ex1.html

```
<html>
<form>
  <input type="button" value="Hello world!"
        onclick="alert('Hello world!');">
</form>
</html>
```

Javascript Example #2

```
<html>
<head>
  <script type="text/javascript">
    function hello(x)
    {
      alert(x);
    }
  </script>
</head>
<body>
<form>
  <input type="button" value="Hello world!"
    onclick="hello('Hello world!');">
</form>
</body>
</html>
```

lect9/js-ex2.html

Document Object Model (DOM)

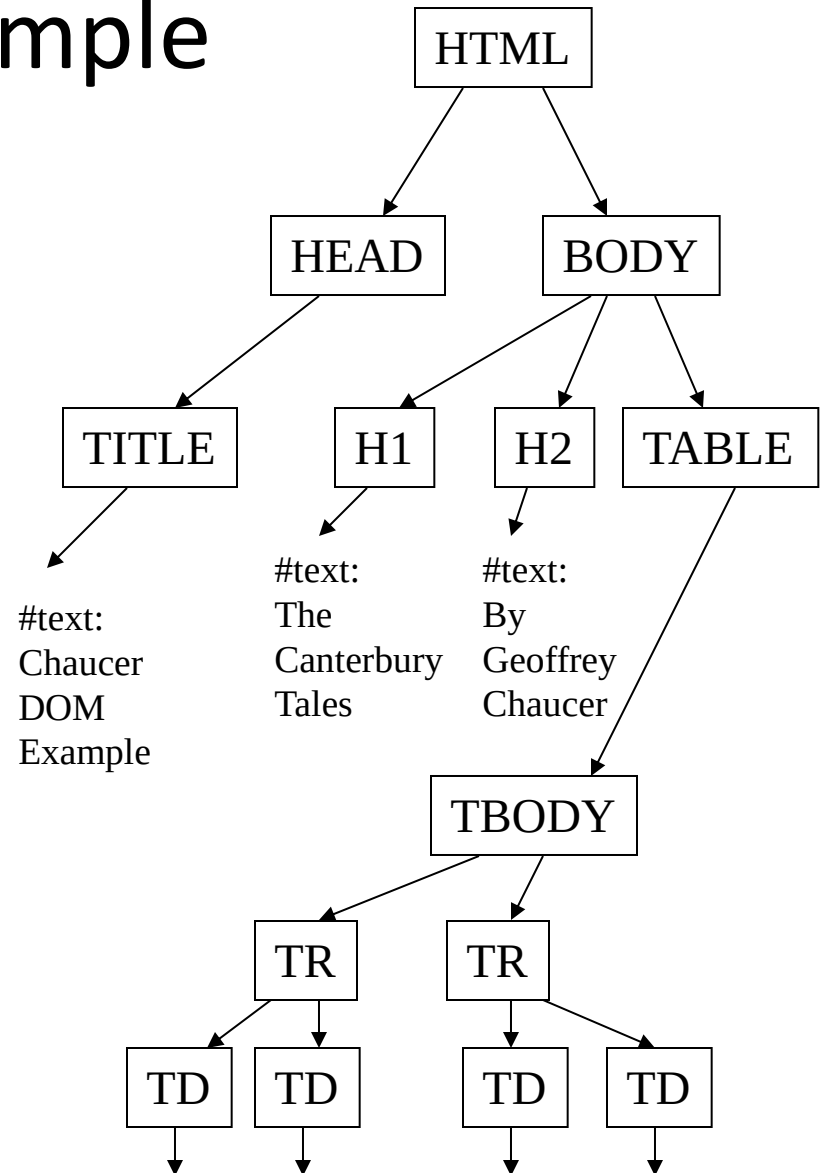
- Main ideas:
 - Give access to the structure of a web document through programming languages
 - Access on the client-side, so no additional server access needed
 - Treat the web document as an object

DOM History/Evolution

- W3C – <http://www.w3.org/DOM/>
- Netscape
- Microsoft IE
- Levels 0, 1, 2, 3
 - <http://xml.coverpages.org/dom.html>

DOM Example

```
<html>
<head>
<title>Chaucer DOM Example</title>
</head>
<body>
<h1>The Canterbury Tales</h1>
<h2>by Geoffrey Chaucer</h2>
  <table border="1">
    <tr>
      <td>Whan that Aprill</td>
      <td>with his shoures soote</td>
    </tr>
    <tr>
      <td>The droghte of March</td>
      <td>hath perced to the roote</td>
    </tr>
  </table>
</body>
</html>
```



DOM Inspect

- Firefox

Web Developer → Inspect

Also: Firefox add-on DOM Inspector

Related Javascript Objects

- Javascript has some built-in bindings to objects
 - window
 - navigator
 - screen
 - history
 - location

W3 Schools is a good resource:

http://www.w3schools.com/js/js_obj_htmlDOM.asp

Javascript DOM bindings

- Javascript has built-in bindings DOM objects
 - document
 - Is part of the window object
 - window.document

W3 Schools is a good resource: http://www.w3schools.com/js/js_obj_htmlDOM.asp

Using the Javascript Objects

lect9/js-ex3.html

```
<html>
<head>
  <script type="text/javascript">
    function fred()
    {
      window.location = "http://sils.unc.edu/";
    }
  </script>
</head>
<body>
<form>
  <input type="button" value="Go to SILS" onclick="fred();">
</form>
</body>
</html>
```

Accessing DOM Elements

- Using the document object + object names

```
<html>
<form name="fred">
  <input type="text" name="left">
  <input type="text" name="right">
  <input type="button" value="click me" onclick="hello();">
</form>
</html>
```

document.fred.left – refers to the input text box on the left

document.fred.right – refers the input text box on the right

Manipulating the current DOM

```
<html>
<head>
<script type="text/JavaScript">
    function hello()
    {
        document.fred.left.value = "hello";
        document.fred.right.value = "world";
    }
</script>
</head>
<form name="fred">
    <input type="text" name="left">
    <input type="text" name="right">
    <input type="button" value="click me" onclick="hello();">
</form>
</html>
```

lect9/js-ex4.html

http://www.w3schools.com/html/dom/dom_obj_text.asp

Javascript Calculator

- In-class example

Accessing DOM Elements

- `getElementById()`
- `getElementsByName()`

getElementById and getElementsByName

lect9/js-ex5.html

```
<html>
<head>
<script type="text/JavaScript">
    function hello() {
        document.getElementById("left").value = "hello";
        document.getElementsByName("right")[0].value = "world";
    }
</script>
</head>
<form name="fred">
    <input type="text" value="" id="left">
    <input type="text" value="" name="right">
    <input type="button" value="click me" onclick="hello();">
</form>
</html>
```

http://www.w3schools.com/HTMLDOM/dom_nodes_access.asp

Writing to the DOM

<h2>Writing to the DOM example</h2>

Whan that Aprill with his shoures soote

The droghte of March hath perced to the roote,

And bathed every veyne in swich licour

Of which vertu engendred is the flour;

<script language="JavaScript">

```
function ethel() {
```

```
    nrows = parseInt(document.form1.numrows.value);
```

```
    ncols = parseInt(document.form1.numcols.value);
```

```
    t = document.createElement("table");
```

```
    for (i=0; i<nrows; i++) {
```

```
        r = document.createElement("tr");
```

```
        for (j=0; j<ncols; j++) {
```

```
            d = document.createElement("td");
```

```
            tx = document.createTextNode("r"+i+"c"+j);
```

```
            d.appendChild(tx);
```

```
            r.appendChild(d);
```

```
        }
```

```
        t.appendChild(r);
```

```
    }
```

```
    document.body.appendChild(t);
```

```
    document.body.appendChild(document.createElement("br"));
```

```
}
```

</script> <p>

<form name="form1">

Num rows:<input type="text" name="numrows" size="3">

Num cols:<input type="text" name="numcols" size="3">

<input type="button" value="create table" onclick="ethel();">

</form>

lect9/writetodom.html

Do example in
DOM Inspector

Changing the DOM

lect9/changedom.html

```
<h1 id="fred">Title</h1>
<script>
  function foo(x)
  {
    document.getElementById("ethel").innerHTML = x;
    document.getElementById("fred").innerHTML = x;
  }
</script>
<div class="fred" id="ethel">Nothing yet</div>
<form>
  <input type="button" value="one"
  onclick="foo('one')">
  <input type="button" value="two"
  onclick="foo('two')">
</form>
```

Do example in
DOM Inspector

Row Highlighting

- Idea:
 - Highlight rows as user moves the mouse
 - Helps user see items in that row
- Real-world example:
<http://www.subway.com/applications/NutritionInfo/nutritionlist.aspx?id=sandwich>
<http://www.subway.com/applications/NutritionInfo/scripts/nutritionlist.js>
- Reference:
http://www.w3schools.com/html/dom/dom_obj_style.asp

Row Highlighting

```
<h1>Table Highlighting</h1>
```

```
<script type="text/JavaScript">
  function highlight(row)
  {
    row.style.backgroundColor = "yellow";
  }

  function unhighlight(row)
  {
    row.style.backgroundColor = "";
  }
</script>
```

lect9/rowhighlighting.html

Based on WS, Ch. 20, p. 286

QTP: How to do
for columns?

```
<table border="1">
  <tr id="r1" onmouseover="highlight(r1)" onmouseout="unhighlight(r1)">
    <td>r1c1</td> <td>r1c2</td> <td>r1c3</td> <td>r1c4</td>
  </tr>
  <tr id="r2" onmouseover="highlight(r2)" onmouseout="unhighlight(r2)">
    <td>r2c1</td> <td>r2c2</td> <td>r2c3</td> <td>r2c4</td>
  </tr>
  <tr id="r3" onmouseover="highlight(r3)" onmouseout="unhighlight(r3)">
    <td>r3c1</td> <td>r3c2</td> <td>r3c3</td> <td>r3c4</td>
  </tr>
  <tr id="r4" onmouseover="highlight(r4)" onmouseout="unhighlight(r4)">
    <td>r4c1</td> <td>r4c2</td> <td>r4c3</td> <td>r4c4</td>
  </tr>
</table>
```

Limiting Text Input

- Idea:
 - Limit the amount of text that can be entered
 - Show a count of the number of characters
- Real-world example:
<http://www.vtext.com>
- Reference:
Web Standards book, Chapter 23, Example 8, p. 341-342
http://www.w3schools.com/html/dom/dom_obj_style.asp

Limiting Text Input

```
<h1>Text Input Counting</h1>
```

lect9/textcount.html

Based on WS, Ch. 23, p. 341-342

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

```
  function updatecount()
```

```
  {
```

```
    form1.fred.value = form1.ethel.value.length;
```

```
  }
```

```
</script>
```

```
<form name="form1" onkeyup="updatecount()">
```

```
  Characters entered:  <input name="fred" type="text" size="4"
  disabled="disabled">
```

```
  <br>
```

```
  <textarea name="ethel" cols="40" rows="3"></textarea>
```

```
</form>
```

QTP: How do you stop
input after 80 chars?

Client-Side Form Validation

- Idea:
 - Catch input errors on forms before they are sent to the server
 - Save time and frustration
- Real-world example:

Many sign-up forms
- Reference:

Web Standards book, Chapter 23, Example 9 & 10, p. 343-351
http://www.w3schools.com/html/dom/dom_obj_style.asp

Form Validation

```
<h1>Form Validation</h1>
<script type="text/JavaScript">
  function validate_email()
  {
    ev = document.form1.email.value;
    if (ev.indexOf('@') == -1) {
      document.getElementById("emailerror").className="ethel";
    } else {
      document.getElementById("emailerror").className="fred";
    }
  }
</script>
<style>
.fred { visibility: hidden; }
.ethel { visibility: visible; color: red; }
</style>
<form name="form1">
  <table>
    <tr>
      <td>Email address:</td>
      <td><input type="text" name="email" size="20"
        onblur="validate_email();"></td>
      <td>
        <div class="fred" id="emailerror">
          <-- there is a problem here, please fix
        </div>
      </td>
    </tr>
  </table>
</form>
```

lect9/formvalidation.html

This example
uses onblur

In-class exercise:
add two password
fields and verify
that the user inputs
the same value for
each

document.getSelection()

lect9/getselection.html

```
<h2>document.getSelection() example</h2>
```

```
Whan that Aprill with his shoures soote  
The droghte of March hath perced to the roote,  
And bathed every veyne in swich licour  
Of which vertu engendred is the flour;
```

```
<script language="JavaScript">  
  function ethel() {  
    var s = document.getSelection();  
    document.form1.fred.value = s;  
  }  
</script>
```

```
<form name="form1">  
  <input name="fred" type="text" value="foo">  
  <input type="button" value="show selection" onclick="ethel();">  
</form>
```

Bookmarklets

- Idea:
 - Bookmark/Favorites can store JavaScript code
- Real-world example:
del.icio.us
- Reference:
<http://www.bookmarklets.com/>
- Example:
`javascript:alert(document.getSelection());`

Javascript and PHP

- PHP can output Javascript just as easily as html

Lots of possibilities / examples

- JavaScript
- DOM
- Dynamic HTML
 - Drop down menus
 - Animation (use with restraint)
 - Moves away from web pages toward web applications
- http://www.w3schools.com/dhtml/dhtml_examples.asp

JavaScript Libraries

- YUI – Yahoo! User Interface Library
 - <http://developer.yahoo.com/yui/>
- script.aculo.us
 - <http://script.aculo.us/>
- jQuery
 - <http://jquery.com/>

YUI Drag and Drop

```
<!-- Based on YUI demo code -->
<!-- at http://developer.yahoo.com/yui/examples/dragdrop/dd-basic_clean.html -->
<script type="text/javascript"
  src="http://yui.yahooapis.com/2.5.0/build/yahoo-dom-event/yahoo-dom-event.js"></script>
<script type="text/javascript"
  src="http://yui.yahooapis.com/2.5.0/build/dragdrop/dragdrop-min.js"></script>
<style type="text/css">
.dd-demo      { position:relative; border:4px solid #666; text-align:center;
                color:#fff; cursor:move; height:60px; width:60px; }
.dd-demo-em { border:4px solid purple; }
#dd-demo-1   { background-color:#6D739A;top:0px; left:105px; }
#dd-demo-2   { background-color:#566F4E;top:50px; left:245px; }
#dd-demo-3   { background-color:#7E5B60;top:-150px; left:385px; }
</style>
<div id="dd-demo-1" class="dd-demo"></div>
<div id="dd-demo-2" class="dd-demo"></div>
<div id="dd-demo-3" class="dd-demo"></div>
<script type="text/javascript">
  var dd, dd2, dd3;
  YAHOO.util.Event.onDOMReady(function() {
    dd = new YAHOO.util.DD("dd-demo-1");
    dd2 = new YAHOO.util.DD("dd-demo-2");
    dd3 = new YAHOO.util.DD("dd-demo-3");

  });
</script>
```

lect9/yui-dragdrop.html

YUI Animation

```
<!-- Based on YUI demo code -->
<!-- at http://developer.yahoo.com/yui/examples/animation/motion_clean.html -->

<script src="http://yui.yahooapis.com/2.5.0/build/yahoo-dom-event/yahoo-dom-event.js">
  </script>
<script src="http://yui.yahooapis.com/2.5.0/build/animation/animation-min.js"></script>

<style type="text/css">
#demo { background:#ccc; margin-bottom:1em; height:30px; width:30px; }
</style>

<div id="demo"></div>
<button id="demo-run">run</button>

<script type="text/javascript">
  var attributes = { points: { to: [600, 10] } };
  var anim = new YAHOO.util.Motion('demo', attributes);

  YAHOO.util.Event.on('demo-run', 'click', function() {
    anim.animate();
  });
</script>
```

lect9/yui-motion.html