

Course: Web Application Development

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Lab 8 – Java Script

Content:

- Generating HTML Dynamically
- Monitoring User Events
- JavaScript Syntax
- Using JavaScript
- Exercises

Duration: 3 hours

Part 1: Generating HTML Dynamically

- JavaScript code contained inside a `SCRIPT` element is executed as the page is loaded, with any output the code generates being inserted into the document at the place the `SCRIPT` occurred.
- Template for generating HTML with JavaScript:

```
<BODY>
Regular HTML

<SCRIPT TYPE="text/javascript">
<!--
Build HTML Here
// -->
</SCRIPT>

More Regular HTML
</BODY>
```

Part 2: Monitoring User Events

Use Various `onXxxx` Attributes:

- `onClick`
- `onLoad`

- onMouseOver
- onFocus
- ...

Example:

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML>
<HEAD>
  <TITLE>Simple JavaScript Button</TITLE>

  <SCRIPT TYPE="text/javascript">
  <!--
function dontClick() {
  alert("I told you not to click!");
}
  // -->
</SCRIPT>

</HEAD>
<BODY BGCOLOR="WHITE">
<H1>Simple JavaScript Button</H1>

<FORM>
  <INPUT TYPE="BUTTON"
        VALUE="Don't Click Me"
        onClick="dontClick()">
</FORM>

</BODY>
</HTML>
```

Part 3: JavaScript syntax

- Function declaration:

```
Function funcName(...) {
  //...
  [return ...]
}
```

Functions can be passed and assigned to variables

- Fields can be added On-the-Fly, ex:

```
var test = new Object();
```

```
test.field1 = "value 1";
```

```
test.field2 = 7;
```

- Can create objects using a shorthand “literal” notation of the form

```
var obj = { field1:val1, field2:val2, ... , fieldN:valN }
```

- The “for/in” statement iterates over properties:

```
for(fieldName in object) {  
    doSomethingWith(fieldName);  
}
```

- A “Constructor” is just a function that assigns to “this”.

```
function Ship(x, y, speed, direction) {  
    this.x = x;  
    this.y = y;  
    this.speed = speed;  
    this.direction = direction;  
}
```

- Arrays:

```
var squares = new Array(5);  
for(var i=0; i<squares.length; i++) {  
    vals[i] = i * i;  
}  
  
// Or, in one fell swoop:  
var squares = new Array(0, 1, 4, 9, 16);  
var array1 = new Array("fee", "fie", "fo", "fum");  
// Literal Array notation for creating an array.  
var array2 = [ "fee", "fie", "fo", "fum" ];
```

Part 4: Using JavaScript:

- Adjusting to the browser window size: `window.innerWidth` and `window.innerHeight` (supported by Netscape 4.0)

- Using JavaScript to make pages dynamic, ex:

```
<IMG SRC="cool-image.jpg" NAME="cool"
      WIDTH=75 HEIGHT=25>

function improveImage() {
    document.images["cool"].src = "way-cool.jpg";
}
```

- Making pages dynamic: moving layers
 - o JavaScript 1.2 lets you access layers via the *document.layers* array, each element of which is a Layer object with properties corresponding to the attributes of the LAYER element
 - o A named layer can be accessed via *document.layers["layer name"]* rather than by using an index, or simply by using *document.layerName*
 - o LAYER only supported Netscape 4
 - o Example: Camps.html

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML>
<HEAD>
    <TITLE>Camps on K-3</TITLE>

<SCRIPT TYPE="text/javascript">
<!--

function hideCamps() {
    // Netscape 4 document model.
    document.layers["baseCamp"].visibility = "hidden";
    document.layers["highCamp"].visibility = "hidden";
    // Or document.baseCamp.visibility = "hidden";
}

function moveBaseCamp() {
    baseCamp.moveBy(1, 3);
    if (baseCamp.pageX < 130) {
        setTimeout("moveBaseCamp()", 10);
    }
}

// Hide camps, position base camp near top-left corner,
// make it visible, then have it slowly drift down to
// final position.

function showBaseCamp() {
    hideCamps();
    baseCamp = document.layers["baseCamp"];
    baseCamp.moveToAbsolute(0, 20);
    baseCamp.visibility = "show";
}
```

```

    moveBaseCamp();
}

function moveHighCamp() {
    highCamp.moveBy(2, 1);
    if (highCamp.pageX < 110) {
        setTimeout("moveHighCamp()", 10);
    }
}

// Hide camps, position high camp near top-left corner,
// make it visible, then have it slowly drift down to
// final position.

function showHighCamp() {
    hideCamps();
    highCamp = document.layers["highCamp"];
    highCamp.moveToAbsolute(0, 65);
    highCamp.visibility = "show";
    moveHighCamp();
}

// -->
</SCRIPT>
</HEAD>
<BODY>

<IMG SRC="images/peak4.gif" WIDTH=511 HEIGHT=600 ALIGN="LEFT">
<H1>Camps on K-3</H1>
The High Peaks Tours trip to the summit:
<UL>
    <LI>Day 1: Travel to Base Camp
    <LI>Day 2: Climb to High Camp
    <LI>Day 3: Ascend summit, return to High Camp
    <LI>Day 4: Descend to Base Camp
    <LI>Day 5: Return Home
</UL>
<BR CLEAR="ALL">

<!--          LAYER only supported Netscape 4          -->
<LAYER id="highCamp" PAGEX=50 PAGEY=100 VISIBILITY="hidden">
    <TABLE>
        <TR><TH BGCOLOR="WHITE" WIDTH=50>
            <FONT SIZE="+2">High Camp</FONT>
            <TD><IMG SRC="images/Arrow-Right.gif">
        </TABLE>
    </LAYER>

<!--          LAYER only supported Netscape 4          -->
<LAYER id="baseCamp" PAGEX=50 PAGEY=100 VISIBILITY="hidden">
    <TABLE>
        <TR><TH BGCOLOR="WHITE" WIDTH=50>
            <FONT SIZE="+3">Base Camp</FONT>
            <TD><IMG SRC="images/Arrow-Right.gif">
        </TABLE>
    </LAYER>

```

```

<FORM>
  <INPUT TYPE="Button" VALUE="Show Base Camp"
        onClick="showBaseCamp()">
  <INPUT TYPE="Button" VALUE="Show High Camp"
        onClick="showHighCamp()">
  <INPUT TYPE="Button" VALUE="Hide Camps"
        onClick="hideCamps()">
</FORM>

</BODY>
</HTML>

```

- Using JavaScript to validate CGI forms

- o Accessing forms:

```

var firstForm = document.forms[0];
// Assumes <FORM NAME="orders" ...>
var orderForm = document.forms["orders"];
// Assumes <FORM NAME="register" ...>
var registrationForm = document.register;

```

- o Accessing elements within forms

```

var firstElement = firstForm.elements[0];
// Assumes <INPUT ... id="quantity">
var quantityField = orderForm.elements["quantity"];
// Assumes <INPUT ... id="submitSchedule">
var submitButton = register.submitSchedule;

```

- Using JavaScript to store and examine Cookies

- o Using document.cookies

```

document.cookie = "name1=val1";
document.cookie = "name2=val2; expires=" + someDate;
document.cookie = "name3=val3; path=/; domain=test.com";

```

- o Parsing Cookies

```

function cookieVal(cookieName, cookieString) {
  var startLoc = cookieString.indexOf(cookieName);
  if (startLoc == -1) {
    return(""); // No such cookie
  }
  var sepLoc = cookieString.indexOf("=", startLoc);
  var endLoc = cookieString.indexOf(";", startLoc);
  if (endLoc == -1) { // Last one has no ";"

```

```
        endLoc = cookieString.length;
    }
    return(cookieString.substring(sepLoc+1, endLoc));
}
```

- Using JavaScript to interact with Frames

- o Displaying a URL in a particular frame, ex:

```
parent.displayFrame.location = url;
```

- o Giving a frame the input focus, ex:

```
parent.displayFrame.focus();
```

- Accessing Java from JavaScript:

- o Calling java methods directly

```
java.lang.System.out.println("Hello Console");
```

- o Controlling Applets from JavaScript.

Example: MoldSimulation.html

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML>
<HEAD>
    <TITLE>Mold Propagation Simulation</TITLE>

<SCRIPT TYPE="text/javascript">
<!--

// Start simulation for all applets in document.

function startCircles() {
    for(var i=0; i<document.applets.length; i++) {
        document.applets[i].startCircles();
    }
}

// Stop simulation for all applets in document.

function stopCircles() {
    for(var i=0; i<document.applets.length; i++) {
        document.applets[i].stopCircles();
    }
}

// -->
```

```

</SCRIPT>
</HEAD>
<BODY BGCOLOR="#C0C0C0">
<H1>Mold Propagation Simulation</H1>

<APPLET CODE="RandomCircles.class" WIDTH=100 HEIGHT=75>
</APPLET>
<P>
<APPLET CODE="RandomCircles.class" WIDTH=300 HEIGHT=75>
</APPLET>
<P>
<APPLET CODE="RandomCircles.class" WIDTH=500 HEIGHT=75>
</APPLET>
<FORM>
<INPUT TYPE="BUTTON" VALUE="Start Simulations"
      onClick="startCircles()">
<INPUT TYPE="BUTTON" VALUE="Stop Simulations"
      onClick="stopCircles()">
</FORM>

</BODY>
</HTML>

```

- Accessing JavaScript from Java, steps:
 - o Obtain and install the JSObject class.
 - o Import the class in your applet.
 - o From the applet, obtain a JavaScript reference to the current window.
 - o Read the JavaScript properties of interest.
 - o Set the JavaScript properties of interest.
 - o Call the JavaScript methods of interest.
 - o Give the applet permission to access its Web page.

(Note: you can run examples from the eBook Core Web Programming, 2nd Edition to check results)

Part 5: Exercises

1. Write a web page like below:

Register to become a member of the website

Full name:

Email:

Username:

Choose a password:

Re-enter password:

- Focus on full name on loading
- Check input values:
 - o “Full name” is not empty.
 - o “Email” is valid, ex: email@xxx.xx
 - o “Username” is not empty.
 - o Passwords match.
- Store the values into cookies when submitting and can show them again on loading

2. Using method `window.setInterval` to implement the following web page:

- A button used to count down from 60 seconds is displayed on loading page

- The clock starts counting down after clicking the button; and content of questions are showed like below

The remaining time: 0:54 [mm:ss]

These are test questions.

Question 1: How many people are there in your class?

Question 2: How do you feel now? ☐ Good; ☐ Bad

- When time is up, the content disappears and the submit button is displayed

Time is up!!!

Submit your answers

Example:

The following code displays the current time in a Text object. In the `startclock` function, the call to the `setInterval` method causes the `showtime` function to be called every second to update the clock. Notice that the `startclock` function and `setInterval` method are each called only one time.

```
<SCRIPT LANGUAGE="JavaScript">
var timerID = null
var timerRunning = false

function stopclock(){
    if(timerRunning)
        clearInterval(timerID)
    timerRunning = false
}
function startclock(){
    // Make sure the clock is stopped
    stopclock()
    timerID = setInterval("showtime()",1000)
    timerRunning = true
}

function showtime(){
    var now = new Date()
    var hours = now.getHours()
    var minutes = now.getMinutes()
    var seconds = now.getSeconds()
    var timeValue = "" + ((hours > 12) ? hours - 12 : hours)
    timeValue += ((minutes < 10) ? ":0" : ":") + minutes
```

```
        timeValue += ((seconds < 10) ? ":0" : ":") + seconds
        timeValue += (hours >= 12) ? " P.M." : " A.M."
        document.clock.face.value = timeValue
    }
</SCRIPT>

<BODY onLoad="startclock()">
<FORM NAME="clock" onSubmit="0">
    <INPUT TYPE="text" NAME="face" SIZE=12 VALUE ="">
</FORM>
</BODY>
```