Course: Web Application Development
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Lab 6 - JavaScript (April 28th, 2023)

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
  - 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
  - A named layer can be accessed via *document.layers["layer name"]* rather than by using an index, or simply by using *document.layerName*
  - LAYER only supported Netscape 4
  - 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
    - Accessing forms:

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

    - 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
    - Using document.cookies

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

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

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

    - Giving a frame the input focus, ex:

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

- Accessing Java from JavaScript:
    - Calling java methods directly

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

    - 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>
```

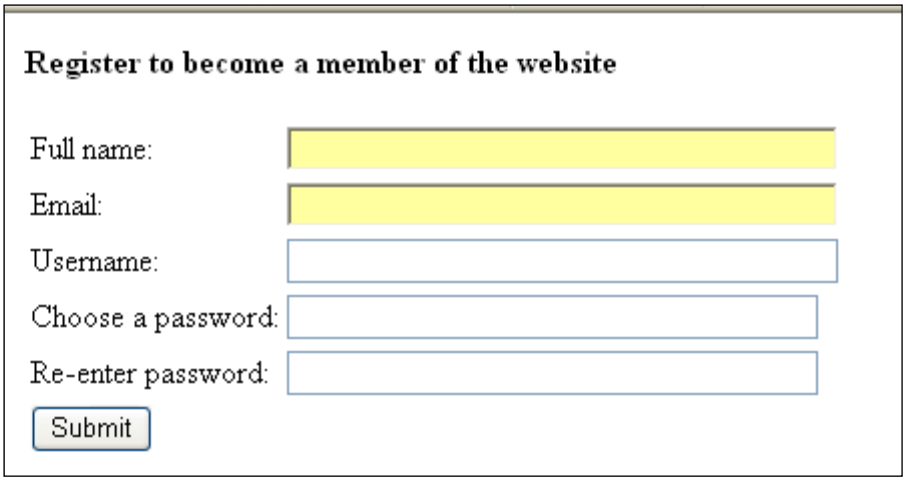
```
<BODY BGCOLOR="#C0C0C0">
<H1>Mold Propagation Simulation</H1>

<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:
    - Obtain and install the JSObject class.
    - Import the class in your applet.
    - From the applet, obtain a JavaScript reference to the current window.
    - Read the JavaScript properties of interest.
    - Set the JavaScript properties of interest.
    - Call the JavaScript methods of interest.
    - 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

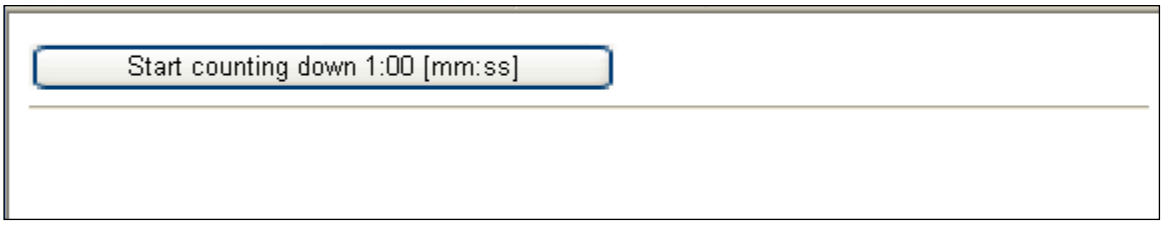
1. Write a web page as below:



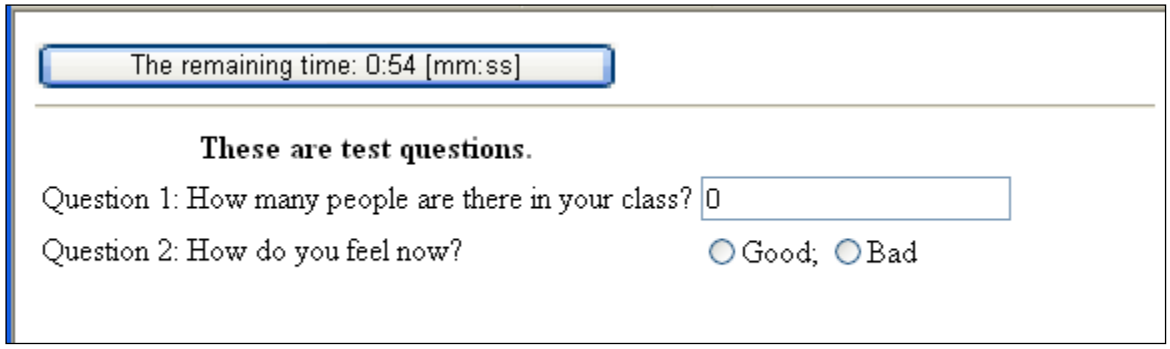
- Focus on full name on loading
- Check input values:
  - "Full name" is not empty.
  - "Email" is valid, ex: email@gmail.com
  - "Username" is not empty.
  - Passwords match.
- Store the values into cookies when submitting and can show them again on loading

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

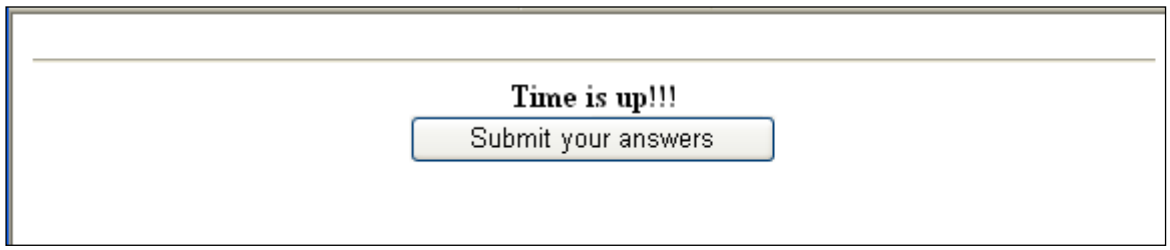
- A button used to count down from 60 seconds is displayed on loading page



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



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



Example:

The following code displays the current time in a `Text` object. In the `startclock` function, 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>
```

3. Refer and implement all exercises in chapter 9 (Vietnamese-Book).