CGS 3175: Internet Applications
Fall 2009

Introduction To JavaScript – Part 2

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Triggering A Script

- In the examples from part 1 of the JavaScript notes, the scripts were triggered automatically. In other words, the visitor didn't need to do anything for the script to execute.
- These were "automatically triggered" scripts. Sometimes you do not want the script to run until the visitor does something to trigger it. For example, you might want to run a script when the visitor mouses over a particular image or link, or when a page is loaded.
- These actions – mousing over or loading a page – are called intrinsic events.
- There are currently 18 predefined intrinsic events you can use as triggers to determine when a script will run. The table on the next couple of pages list these intrinsic events and which elements they work with.

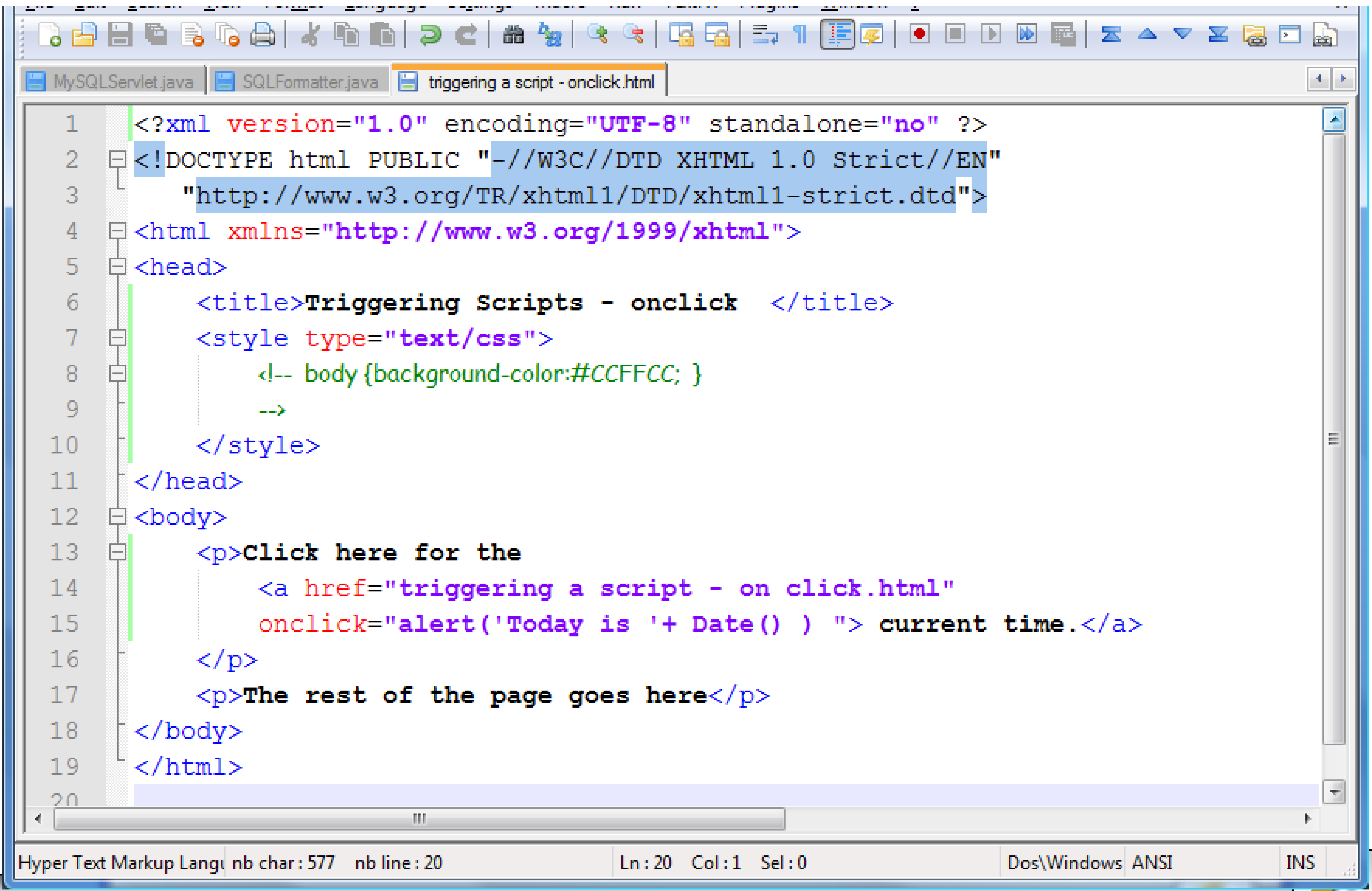
Table of Intrinsic Events

Event	Works With	When
onblur	`<a>, <area>,<button>,<input>, <label>, <select>, <textarea>`	The visitor leaves an element that was previously in focus (see onfocus below).
onchange	`<input>, <select>, <textarea>`	The visitor modifies the value or contents of the element.
onclick	All elements *except* `<applet>, <base>, <basefont>, <br>, <font>, <frame>, <frameset>, <head>, <html>, <iframe>, <meta>, <param>, <script>, <style>, <title>`	The visitor clicks on the specified area.
ondblclick	Same as for `onclick`	The visitor double clicks the specified area.
onfocus	`<a>, <area>,<button>,<input>, <label>, <select>, <textarea>`	The visitor selects, clicks, or tabs to the specified element.
onkeydown	`<input>` (of type name or password), `<textarea>`	The visitor types something in the specified element.
onkeypress	`<input>` (of type name or password), `<textarea>`	The visitor types something in the specified element.
onkeyup	`<input>` (of type name or password), `<textarea>`	The visitor lets go of the key after typing in the specified element.

Table of Intrinsic Events (continued)

Event	Works With	When
onload	`<body>, <frameset>`	The page is loaded in the browser.
onmousedown	Same as for `onclick`	The visitor presses the mouse button down over the element.
onmousemove	Same as for `onclick`	The visitor moves the mouse over the specified element after having pointed at it.
onmouseout	Same as for `onclick`	The visitor moves the mouse away from the specified element after having been over it.
onmouseover	Same as for `onclick`	The visitor points the mouse at the element.
onmouseup	Same as for `onclick`	The visitor lets the mouse button go after having clicked on the element.
onreset	`form` (not input of type `reset`)	The visitor clicks the form's reset button.
onselect	`<input>` (of type name or password), `<textarea>`	The visitor selects one or more characters or words in the element.
onsubmit	`form` (not input of type `submit`)	The visitor clicks the form's submit button.
onunload	`<body>, <frameset>`	The browser loads a different page after the specified page had been loaded.

Using An Intrinsic Event – `onclick`

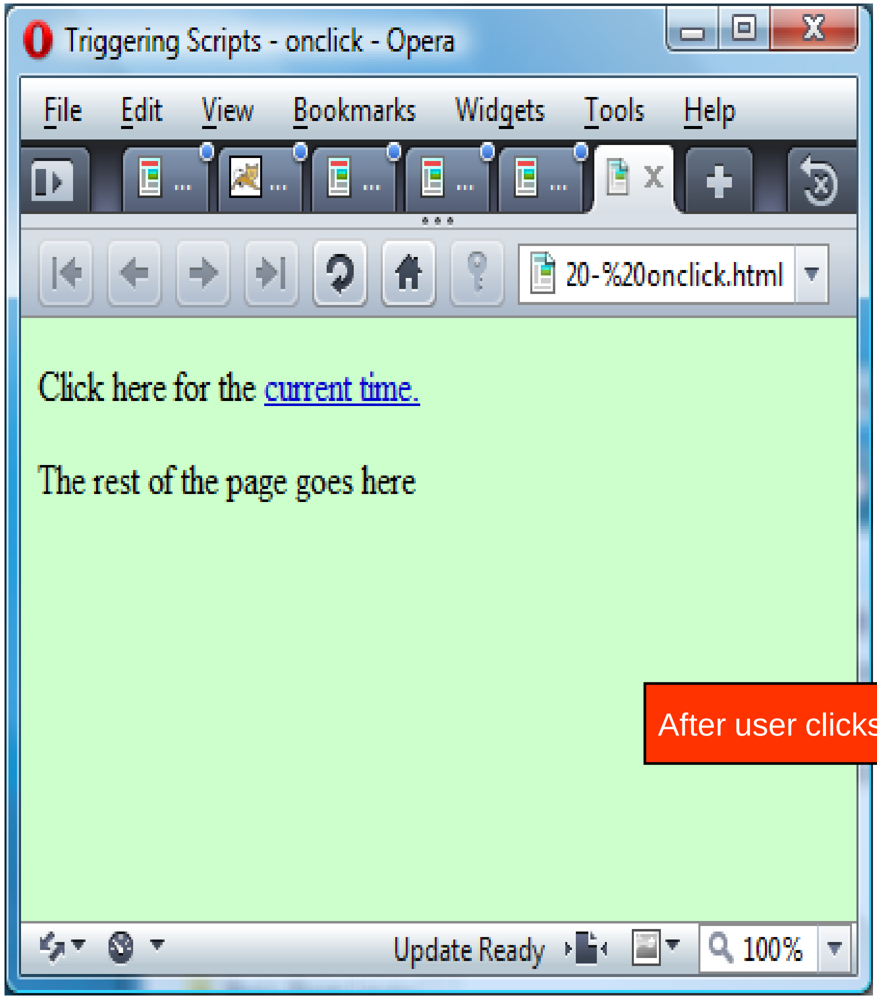


MySQLServlet.java | SQLFormatter.java | triggering a script - onclick.html

```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<!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>Triggering Scripts - onclick  </title>
    <style type="text/css">
        <!-- body {background-color:#CCFFCC; }
        -->
    </style>
</head>
<body>
    <p>Click here for the
        <a href="triggering a script - on click.html"
        onclick="alert('Today is '+ Date() ) "> current time.</a>
    </p>
    <p>The rest of the page goes here</p>
</body>
</html>
```

Hyper Text Markup Langu nb char : 577 nb line : 20 Ln : 20 Col : 1 Sel : 0 Dos\Windows ANSI INS

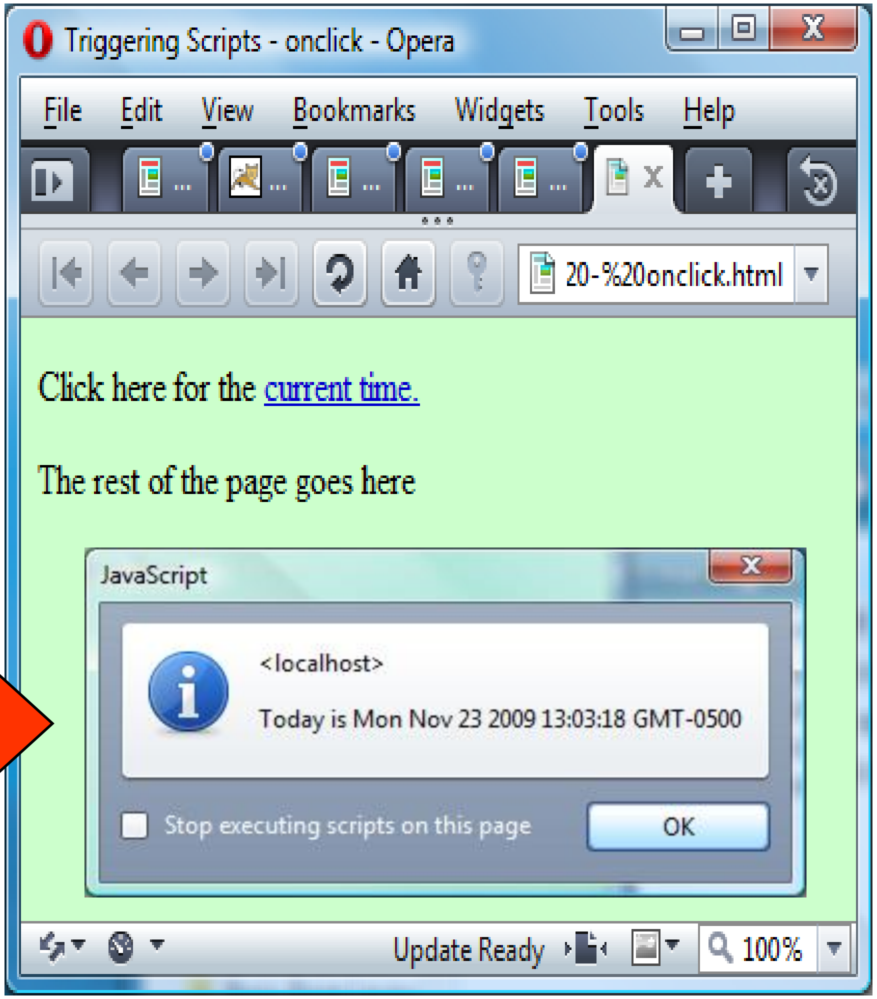
Using An Intrinsic Event – `onclick`


Triggering Scripts - onclick - Opera
File Edit View Bookmarks Widgets Tools Help
20-%20onclick.html
Update Ready
100%

Click here for the current time.

The rest of the page goes here

After user clicks link


Triggering Scripts - onclick - Opera
File Edit View Bookmarks Widgets Tools Help
20-%20onclick.html
JavaScript
Stop executing scripts on this page
OK
Update Ready
100%

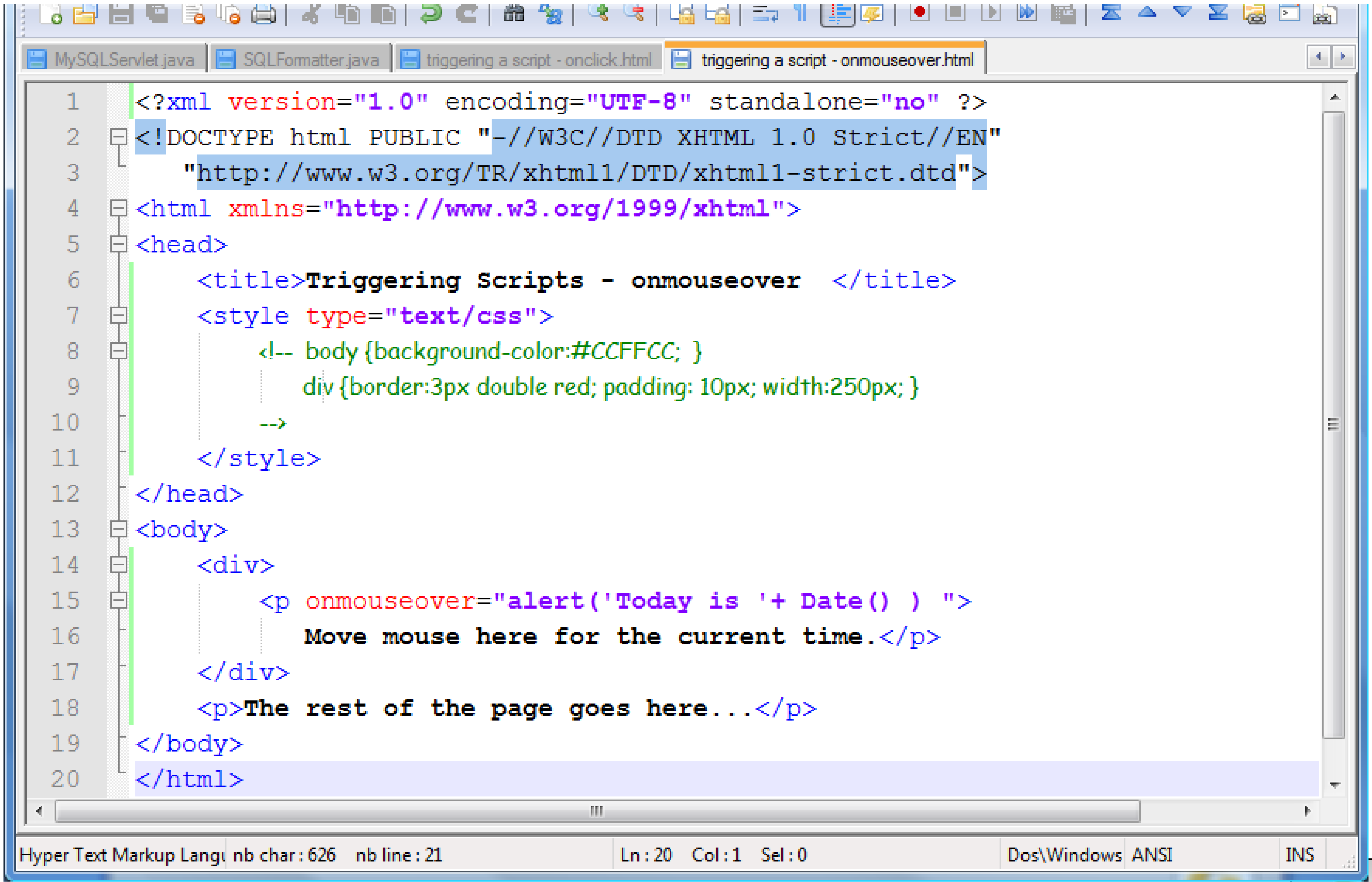
Click here for the current time.

The rest of the page goes here

<localhost>

Today is Mon Nov 23 2009 13:03:18 GMT-0500

Using An Intrinsic Event – `onmouseover`

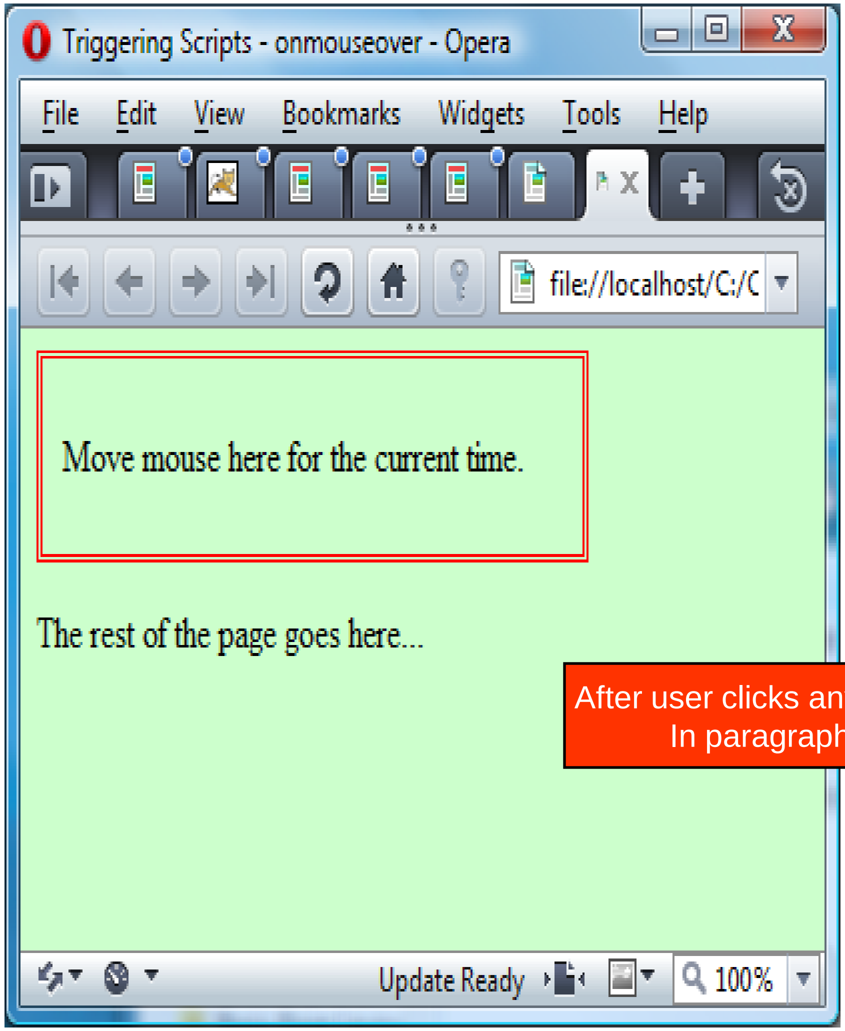


MySQLServlet.java | SQLFormatter.java | triggering a script - onclick.html | triggering a script - onmouseover.html

```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<!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>Triggering Scripts - onmouseover  </title>
    <style type="text/css">
        <!-- body {background-color:#CCFFCC; }
           div {border:3px double red; padding: 10px; width:250px; }
        -->
    </style>
</head>
<body>
    <div>
        <p onmouseover="alert('Today is '+ Date() ) ">
           Move mouse here for the current time.</p>
    </div>
    <p>The rest of the page goes here...</p>
</body>
</html>
```

Hyper Text Markup Langu nb char : 626 nb line : 21 Ln : 20 Col : 1 Sel : 0 Dos\Windows ANSI INS

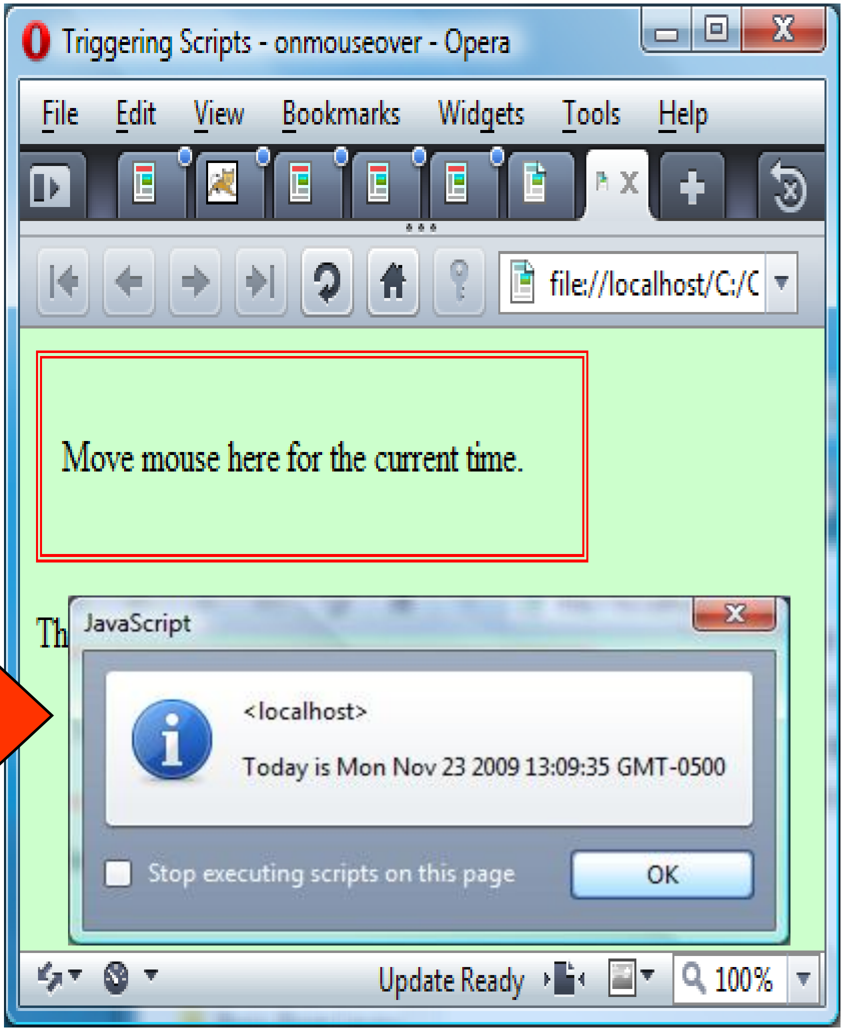
Using An Intrinsic Event – `onmouseover`


Triggering Scripts - onmouseover - Opera
File Edit View Bookmarks Widgets Tools Help
file://localhost/C:/C
Update Ready
100%

Move mouse here for the current time.

The rest of the page goes here...

After user clicks anywhere
In paragraph

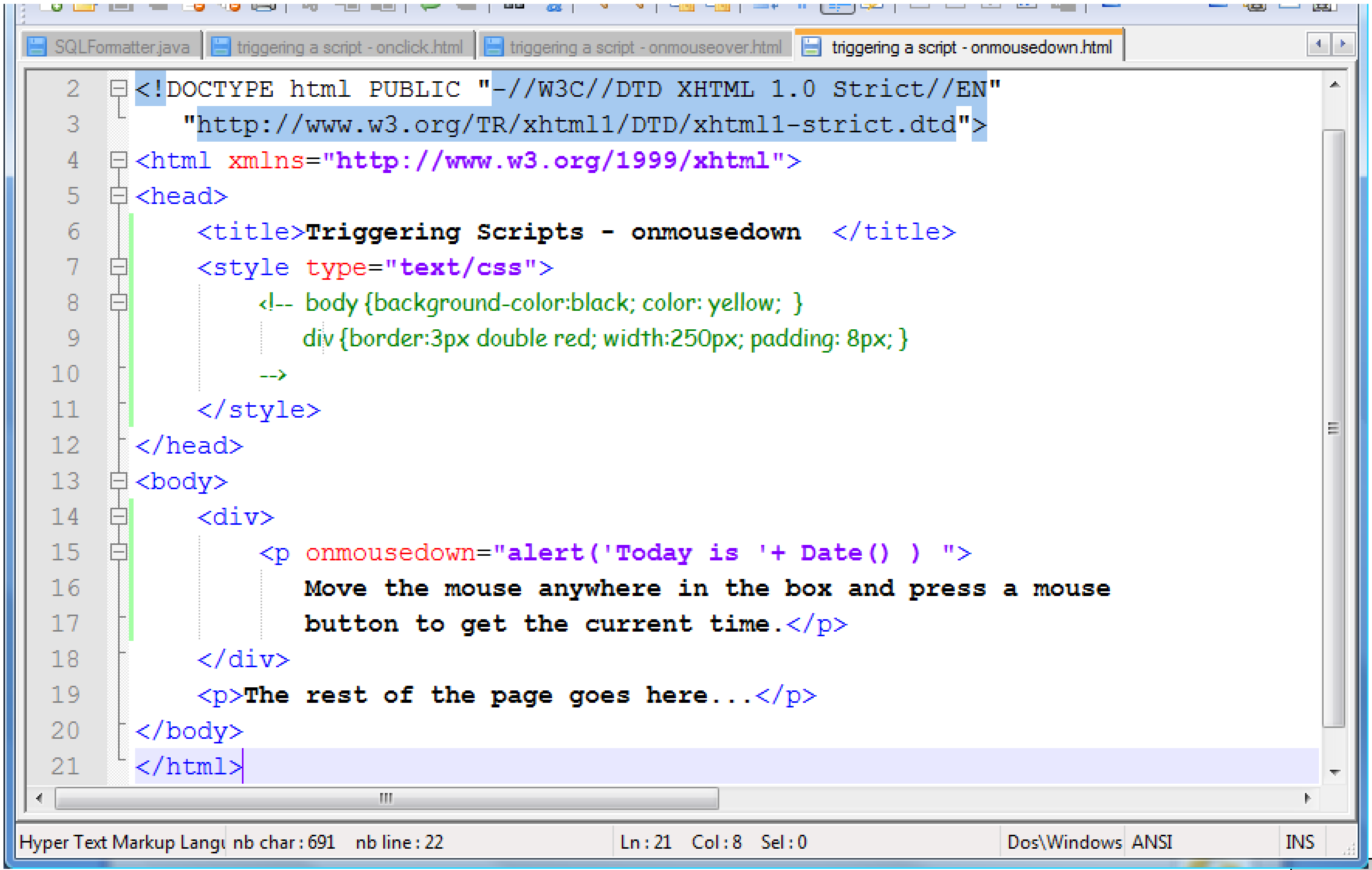

Triggering Scripts - onmouseover - Opera
File Edit View Bookmarks Widgets Tools Help
file://localhost/C:/C
JavaScript
Stop executing scripts on this page
OK
Update Ready
100%

Move mouse here for the current time.

<localhost>

Today is Mon Nov 23 2009 13:09:35 GMT-0500

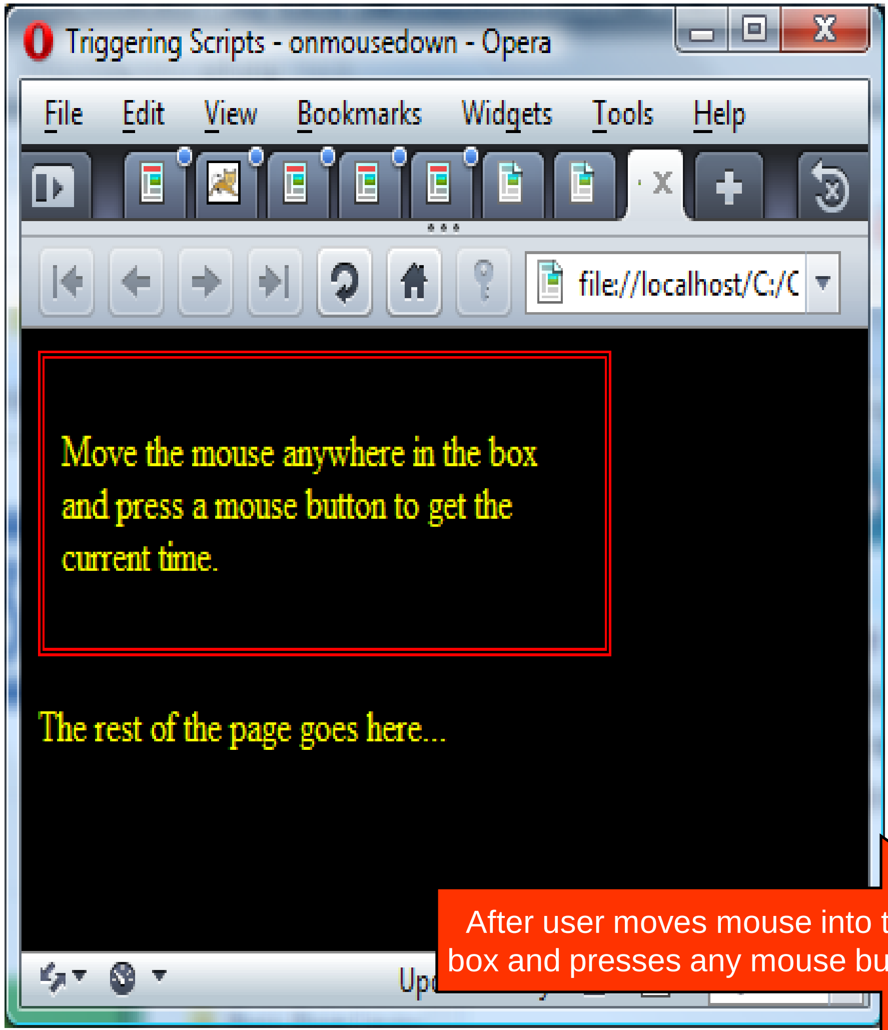
Using An Intrinsic Event – `onmousedown`


SQLFormatter.java
triggering a script - onclick.html
triggering a script - onmouseover.html
triggering a script - onmousedown.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>Triggering Scripts - onmousedown  </title>
    <style type="text/css">
        <!-- body {background-color:black; color: yellow;  }
           div {border:3px double red; width:250px; padding: 8px; }
        -->
    </style>
</head>
<body>
    <div>
        <p onmousedown="alert('Today is '+ Date() ) ">
           Move the mouse anywhere in the box and press a mouse
           button to get the current time.</p>
    </div>
    <p>The rest of the page goes here...</p>
</body>
</html>
```

Hyper Text Markup Langu nb char : 691 nb line : 22 Ln : 21 Col : 8 Sel : 0 Dos\Windows ANSI INS

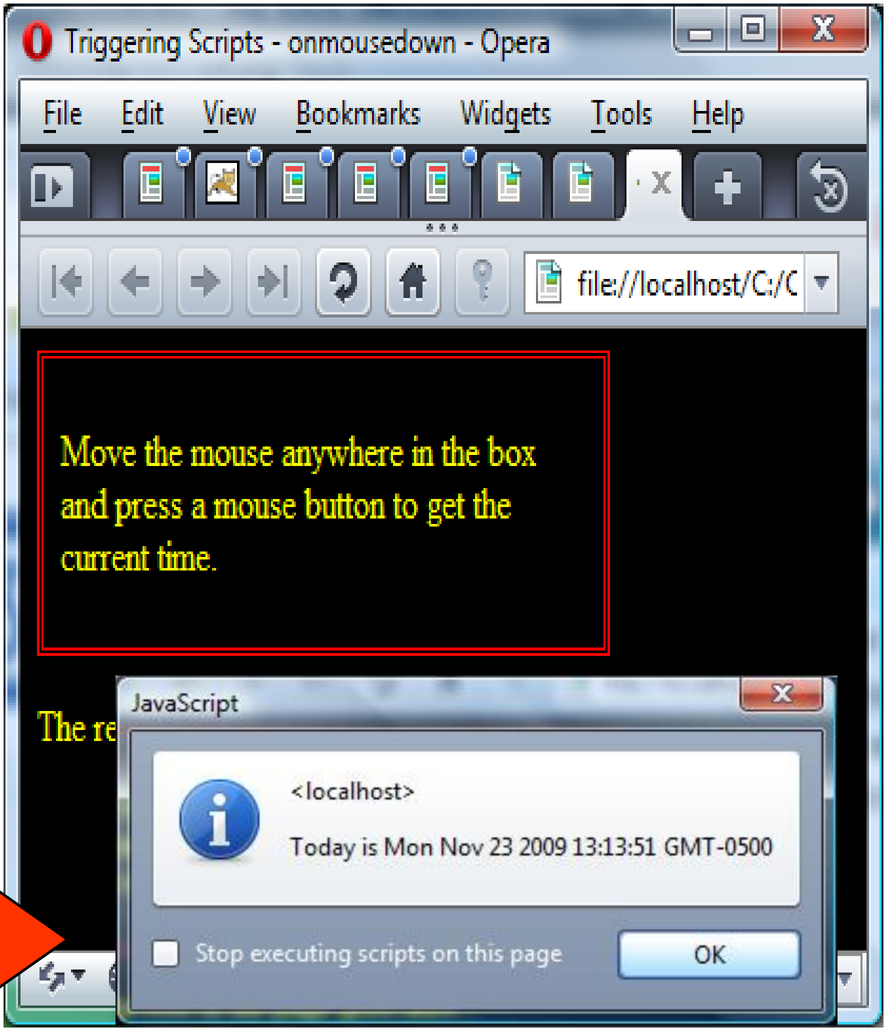
Using An Intrinsic Event – `onmousedown`


Triggering Scripts - onmousedown - Opera
File Edit View Bookmarks Widgets Tools Help
file://localhost/C:/C

Move the mouse anywhere in the box and press a mouse button to get the current time.

The rest of the page goes here...

After user moves mouse into the box and presses any mouse button


Triggering Scripts - onmousedown - Opera
File Edit View Bookmarks Widgets Tools Help
file://localhost/C:/C
JavaScript

Move the mouse anywhere in the box and press a mouse button to get the current time.

<localhost>

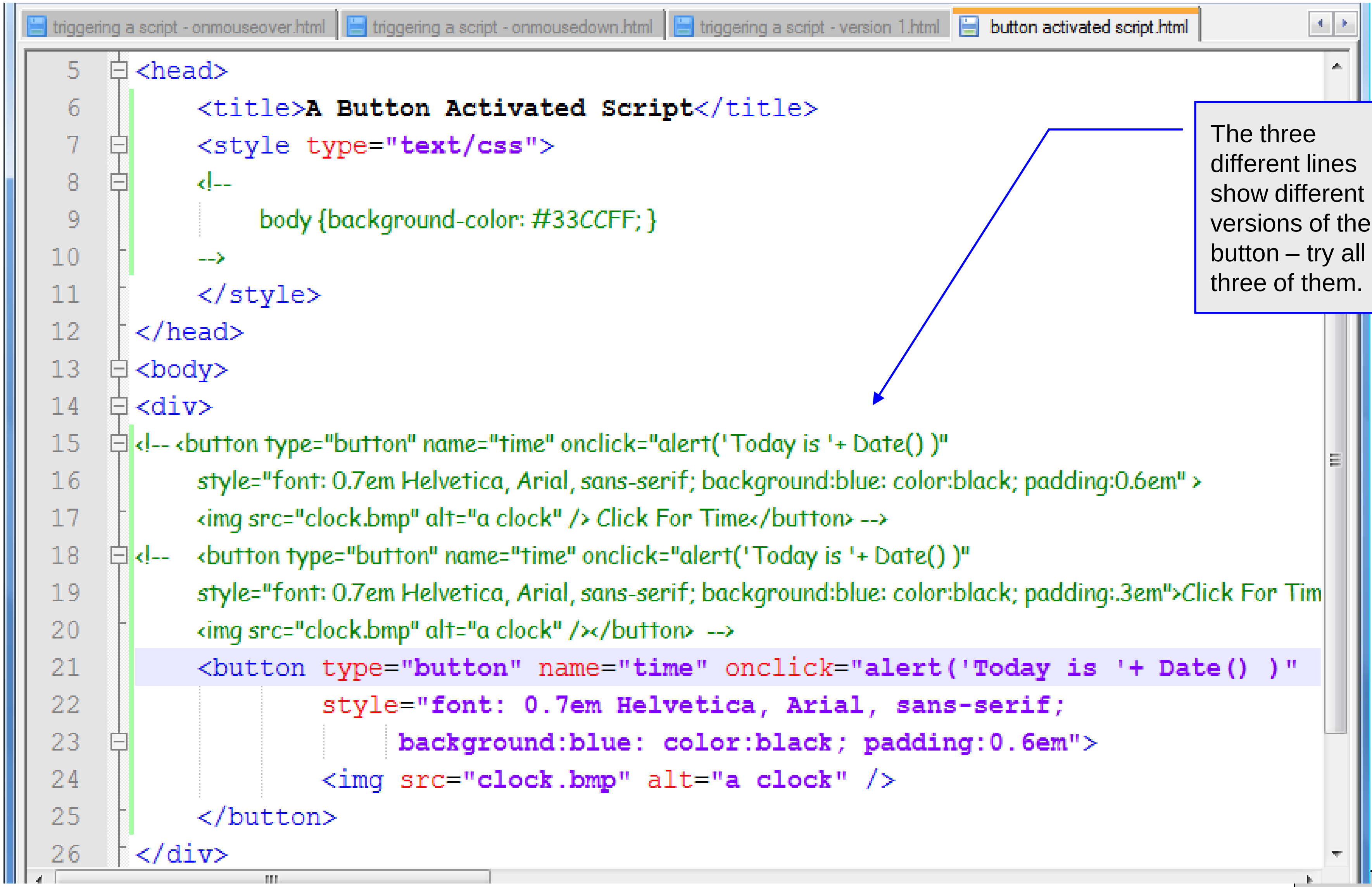
Today is Mon Nov 23 2009 13:13:51 GMT-0500

Stop executing scripts on this page
OK

Creating A Button To Trigger A Script

- You can associate a button with a script to give your visitor full control over when the script should be executed.
- As we did earlier, you simply create a button, then associate a script with the `onclick` intrinsic event. You can use any intrinsic event with a button, but `onclick` makes the most sense.
- You can also add images to buttons. Simply insert the image between the opening and closing button tags.
- The example on the next page illustrates using a button to trigger a script.

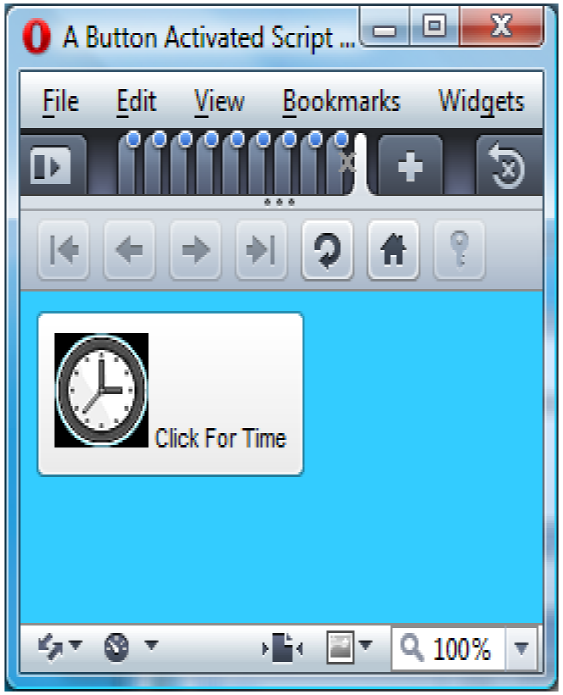
Creating A Button To Trigger A Script


triggering a script - onmouseover.html
triggering a script - onmousedown.html
triggering a script - version 1.html
button activated script.html

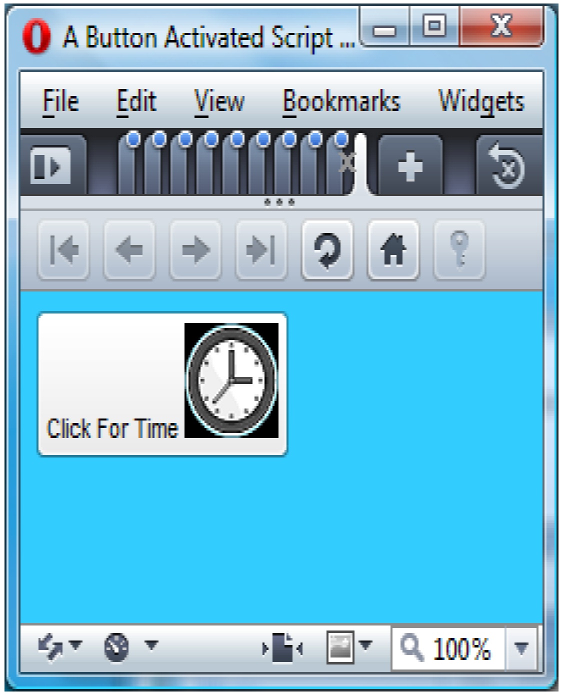
```
<head>
    <title>A Button Activated Script</title>
    <style type="text/css">
    <!--
        body {background-color: #33CCFF; }
    -->
    </style>
</head>
<body>
<div>
<!-- <button type="button" name="time" onclick="alert('Today is '+ Date() )"
    style="font: 0.7em Helvetica, Arial, sans-serif; background:blue: color:black; padding:0.6em" >
    <img src="clock.bmp" alt="a clock" /> Click For Time</button> -->
<!--    <button type="button" name="time" onclick="alert('Today is '+ Date() )"
    style="font: 0.7em Helvetica, Arial, sans-serif; background:blue: color:black; padding:.3em">Click For Tim
    <img src="clock.bmp" alt="a clock" /></button>  -->
    <button type="button" name="time" onclick="alert('Today is '+ Date() )"
        style="font: 0.7em Helvetica, Arial, sans-serif;
            background:blue: color:black; padding:0.6em">
        <img src="clock.bmp" alt="a clock" />
    </button>
</div>
```

The three different lines show different versions of the button – try all three of them.

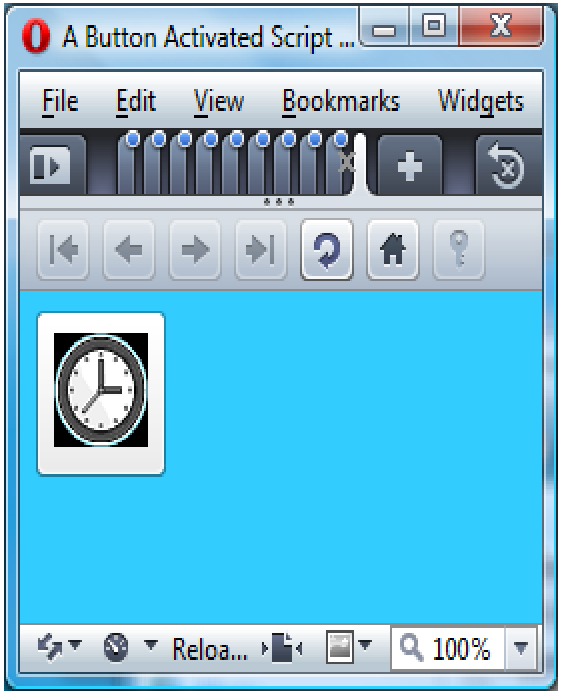
Creating A Button To Trigger A Script


A Button Activated Script ...
File Edit View Bookmarks Widgets
Click For Time
100%

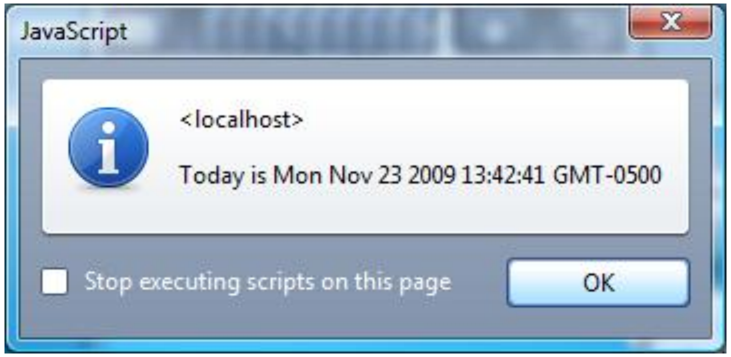
Using first line


A Button Activated Script ...
File Edit View Bookmarks Widgets
Click For Time
100%

Using second line


A Button Activated Script ...
File Edit View Bookmarks Widgets
Reloa...
100%

Using third line



JavaScript

<localhost>

Today is Mon Nov 23 2009 13:42:41 GMT-0500

Window when script executes

Writing Valid JavaScript Code

- Throughout the semester we have always validated our XHTML documents against the strict data type definition (Strict-DTD) to ensure that our XHTML documents were well-formed.

- Some JavaScript statements contain symbols such as the less-than symbol (<), the greater-than symbol (>), and the ampersand (&). As you become a more sophisticated JavaScript programmer, you will begin to use many of the features contained in the JavaScript language and will undoubtedly encounter the need to use these symbols. Unfortunately, these symbols can prevent XHTML documents from passing validation (particularly under the Strict-DTD).
  - Note that there is less of a problem with this when using the Transitional-DTD, but we do not want to relax our standards.

Writing Valid JavaScript Code

- This is not a problem at all when using HTML, because any statements inside a `<script>` element are interpreted as character data instead of markup.
  - A section of a document that is not interpreted as markup is referred to as character data, or CDATA.
- If you were to validate an HTML document that contained a `<script>` element, the document would validate successfully because the validator would ignore the script section and not attempt to interpret the text and symbols in the JavaScript statements as HTML or attributes.

Writing Valid JavaScript Code

- In contrast, with XHTML documents, the statements in a `<script>` element are treated as parsed character data, or PCDATA, which identifies a section of a document that is interpreted as markup.

- This means that if you attempt to validate an XHTML document that contains a `<script>` element, it may fail to validate.

  – Note that an XHTML document will not necessarily fail to validate under Strict-DTD just because it contains a `<script>` element. In fact, any of the examples that have appeared in the JavaScript notes thus far, will validate successfully. However, the right sequence of symbols inside the `<script>` element may cause the document not to validate.

Writing Valid JavaScript Code

- To avoid this potential problem, you can do one of two things.

- One option is to move all JavaScript code into an external file with a `.js` extension (i.e., create a JavaScript library file) as we saw in Part 1 and will see in more detail later in this section of notes. This of course prevents the validator from attempting to parse the JavaScript statements.

- The second option, and will be a requirement for embedded JavaScript, is to enclose the JavaScript within a `<script>` element within a CDATA section.

- The next page illustrates this technique.

Writing Valid JavaScript Code

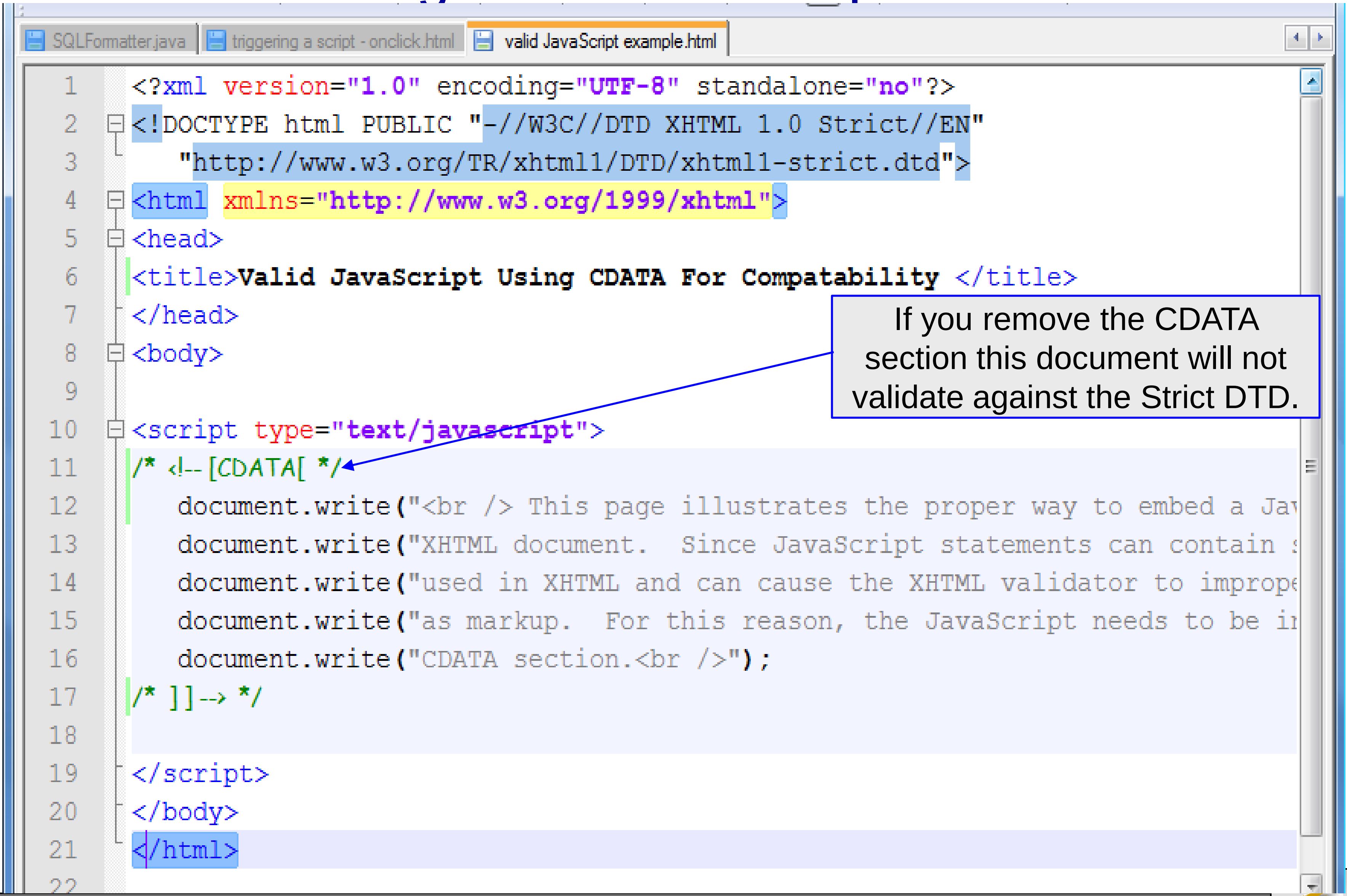
- The syntax for a CDATA section of an XHTML document is as follows:

```
/*  <!--[CDATA [   */
         statements to mark as CDATA
/*  ] ] -->    */
```

- Note that the block comments on the opening and closing portions of the CDATA section prevent the JavaScript interpreter from attempting to parse the `<!--[CDATA[` and `]]-->` lines as JavaScript!

- The example on the following page illustrates a CDATA section in an XHTML document. From here on, for embedded JavaScript we'll use this format to ensure validation.

Writing Valid JavaScript Code

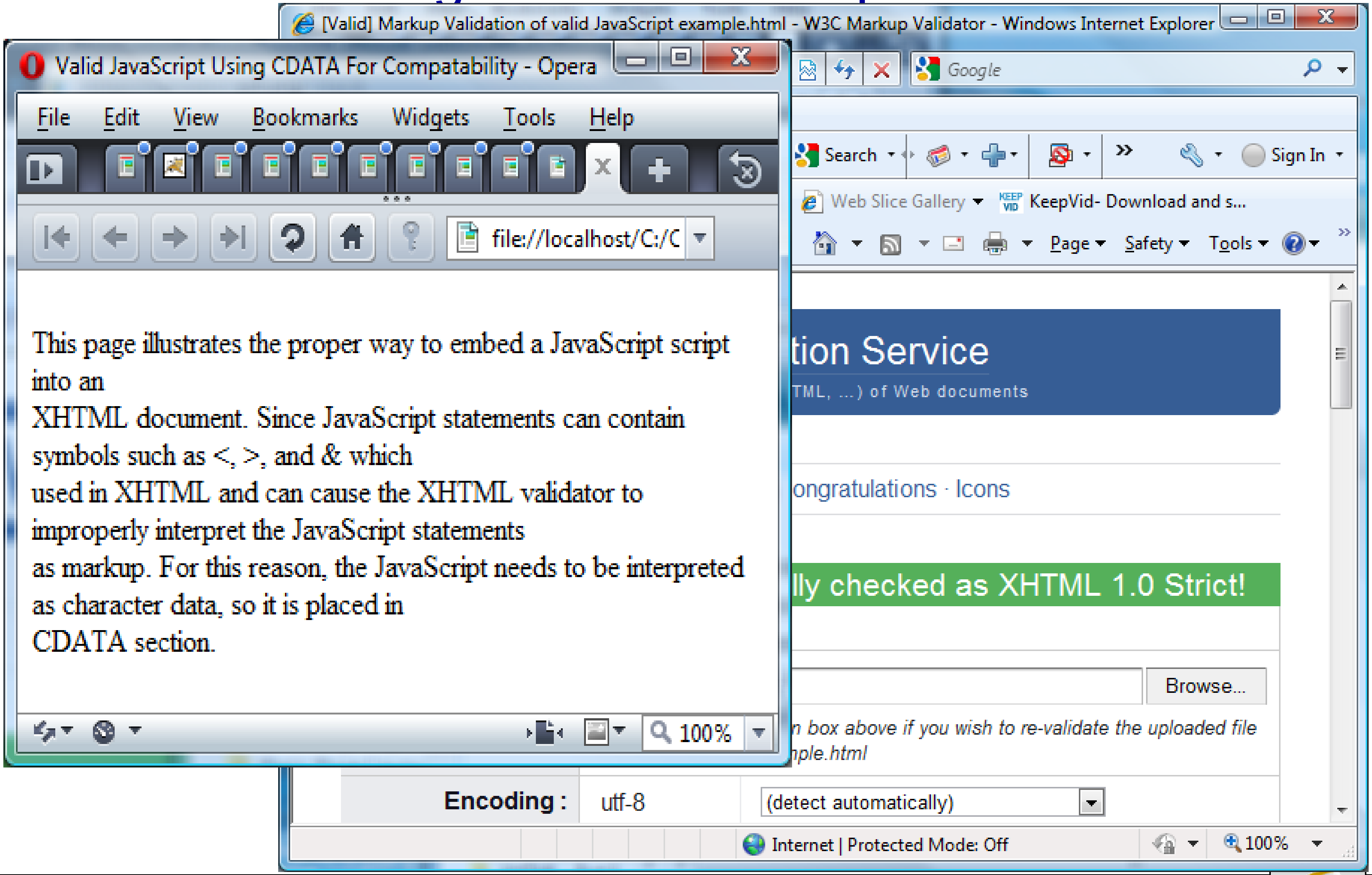


SQLFormatter.java | triggering a script - onclick.html | valid JavaScript example.html

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<!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>Valid JavaScript Using CDATA For Compatability </title>
</head>
<body>

<script type="text/javascript">
/* <!-- [CDATA[ */
   document.write("<br /> This page illustrates the proper way to embed a Jav
   document.write("XHTML document.  Since JavaScript statements can contain s
   document.write("used in XHTML and can cause the XHTML validator to imprope
   document.write("as markup.  For this reason, the JavaScript needs to be in
   document.write("CDATA section.<br />");
/* ]]--> */

</script>
</body>
</html>
```

If you remove the CDATA section this document will not validate against the Strict DTD.

Writing Valid JavaScript Code



[Valid] Markup Validation of valid JavaScript example.html - W3C Markup Validator - Windows Internet Explorer
Valid JavaScript Using CDATA For Compatability - Opera
File Edit View Bookmarks Widgets Tools Help
file://localhost/C:/C
100%
Google
Search
Sign In
Web Slice Gallery
KeepVid- Download and s...
Page Safety Tools
Browse...
Internet | Protected Mode: Off
100%

This page illustrates the proper way to embed a JavaScript script into an
XHTML document. Since JavaScript statements can contain symbols such as <, >, and & which
used in XHTML and can cause the XHTML validator to improperly interpret the JavaScript statements
as markup. For this reason, the JavaScript needs to be interpreted as character data, so it is placed in
CDATA section.

tion Service
TML, ...) of Web documents
ongratulations · Icons
lly checked as XHTML 1.0 Strict!
n box above if you wish to re-validate the uploaded file
nple.html

Encoding :	utf-8	(detect automatically)

Creating A JavaScript Library

- As we saw in Part 1 of the JavaScript notes, it is quite common to create a library (a file) of JavaScript scripts which provides any of your Web pages access to the scripts without having to repeat the writing of the scripts in either the head or body sections of each document.

- Unless the JavaScript code you intend to use in a document is very short or specific to only one page, it is usually preferred to place the scripts in a library file for the following reasons:

  – Your document will be neater. Lengthy JavaScript code in a document can be confusing and makes understanding (“reading”) and maintaining the XHTML that more difficult. You might not be able to tell at a glance where the XHTML code ends and the JavaScript code begins.

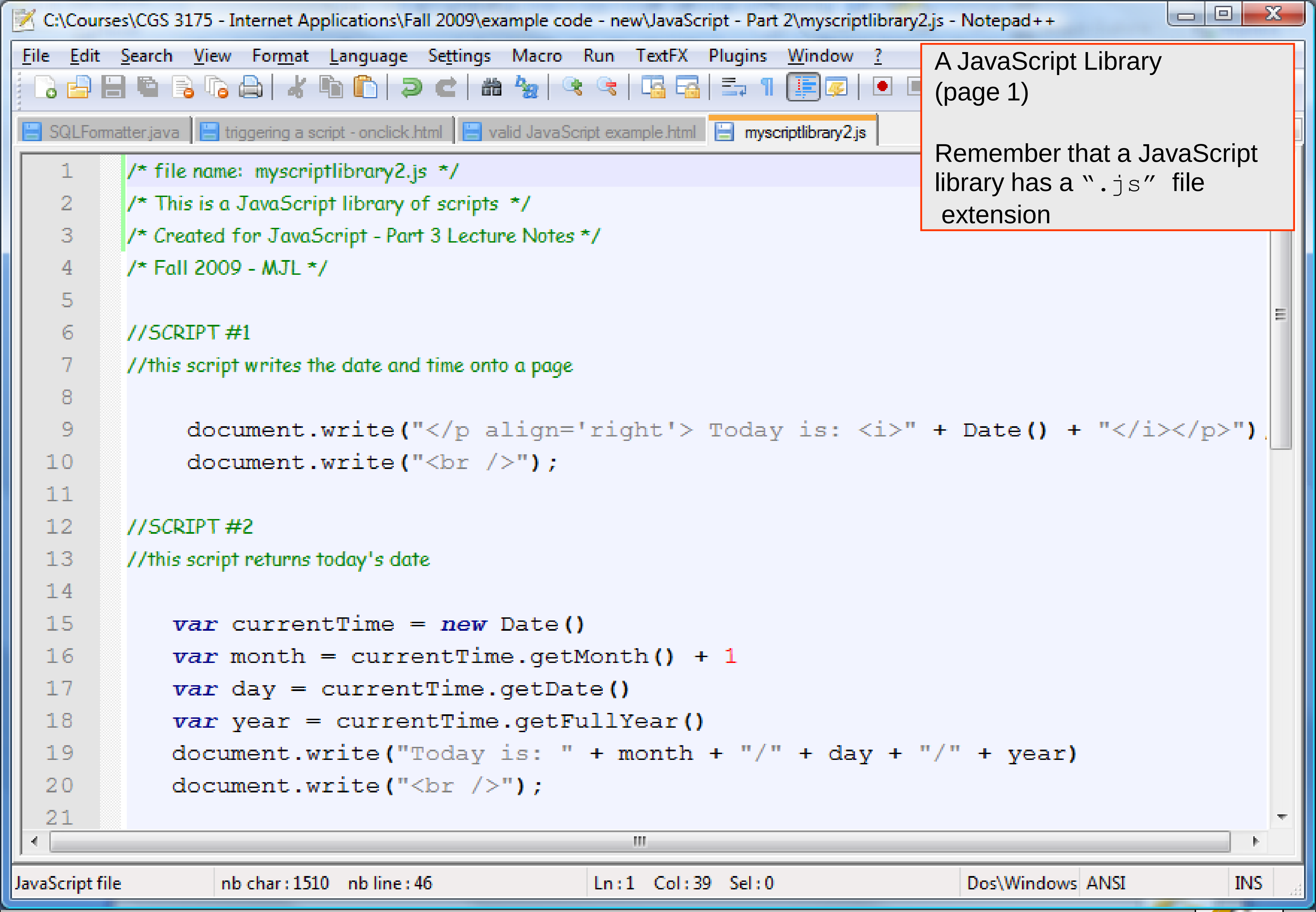
Creating A JavaScript Library

– The JavaScript code can be shared among multiple Web pages. For example, an e-commerce site may contain several pages that allow a user to order an item. Each such page displays a different item but can use the same JavaScript code to gather order information. Instead of recreating the JavaScript order information code within each document, the various pages can share a central JavaScript source file. Sharing a single source file reduces the requirements for disk space and reduces system overhead since only one copy of the same code needs to be in memory.

– JavaScript libraries hide JavaScript code from incompatible browsers. If your document contains JavaScript code, an incompatible browser displays that code as if it were standard text. In contrast, if the code is contained in a library, the incompatible browser simply ignores it.

Creating A JavaScript Library

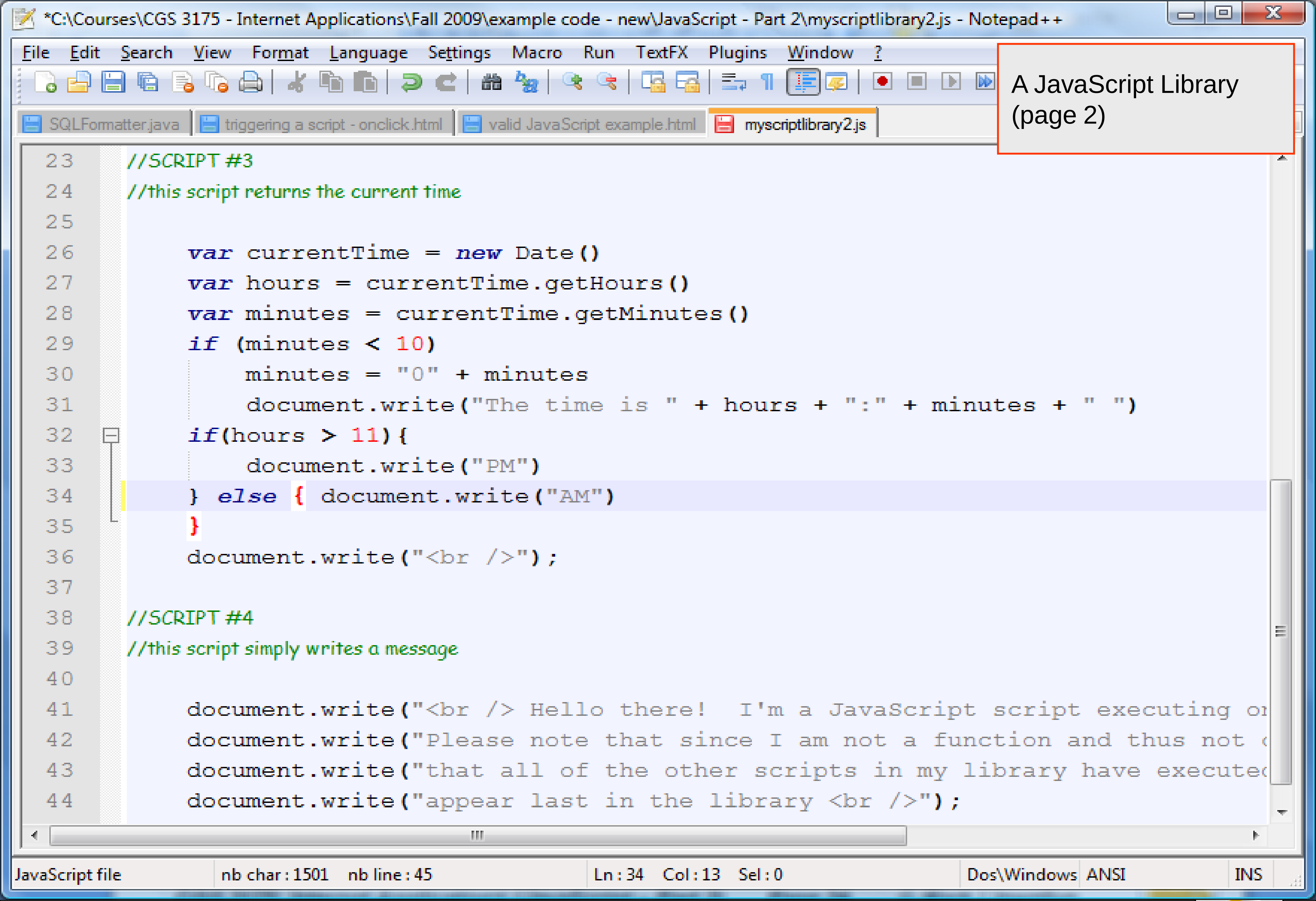
- While JavaScript libraries are quite common, it is also quite common to see both libraries and embedded JavaScript code in Web documents, so you need to be familiar with both forms.
- Recall that the `<script>` tag can appear within the `<head>` tag and/or the `<body>` tag.
- As we will see in the next section of notes, the more common form of a script to be included in a library is a function. The following example illustrates the effect of using a JavaScript library without functions.


C:\Courses\CGS 3175 - Internet Applications\Fall 2009\example code - new\JavaScript - Part 2\myscriptlibrary2.js - Notepad++
File Edit Search View Format Language Settings Macro Run TextFX Plugins Window ?
SQLFormatter.java
triggering a script - onclick.html
valid JavaScript example.html
myscriptlibrary2.js
JavaScript file
nb char : 1510 nb line : 46
Ln : 1 Col : 39 Sel : 0
Dos\Windows ANSI
INS

```
/* file name:  myscriptlibrary2.js */
/* This is a JavaScript library of scripts */
/* Created for JavaScript - Part 3 Lecture Notes */
/* Fall 2009 - MJL */

//SCRIPT #1
//this script writes the date and time onto a page

    document.write("</p align='right'> Today is: <i>" + Date() + "</i></p>")
    document.write("<br />");

//SCRIPT #2
//this script returns today's date

   var currentTime = new Date()
   var month = currentTime.getMonth() + 1
   var day = currentTime.getDate()
   var year = currentTime.getFullYear()
   document.write("Today is:  " + month + "/" + day + "/" + year)
   document.write("<br />");

```

A JavaScript Library (page 1)

Remember that a JavaScript library has a ".js" file extension

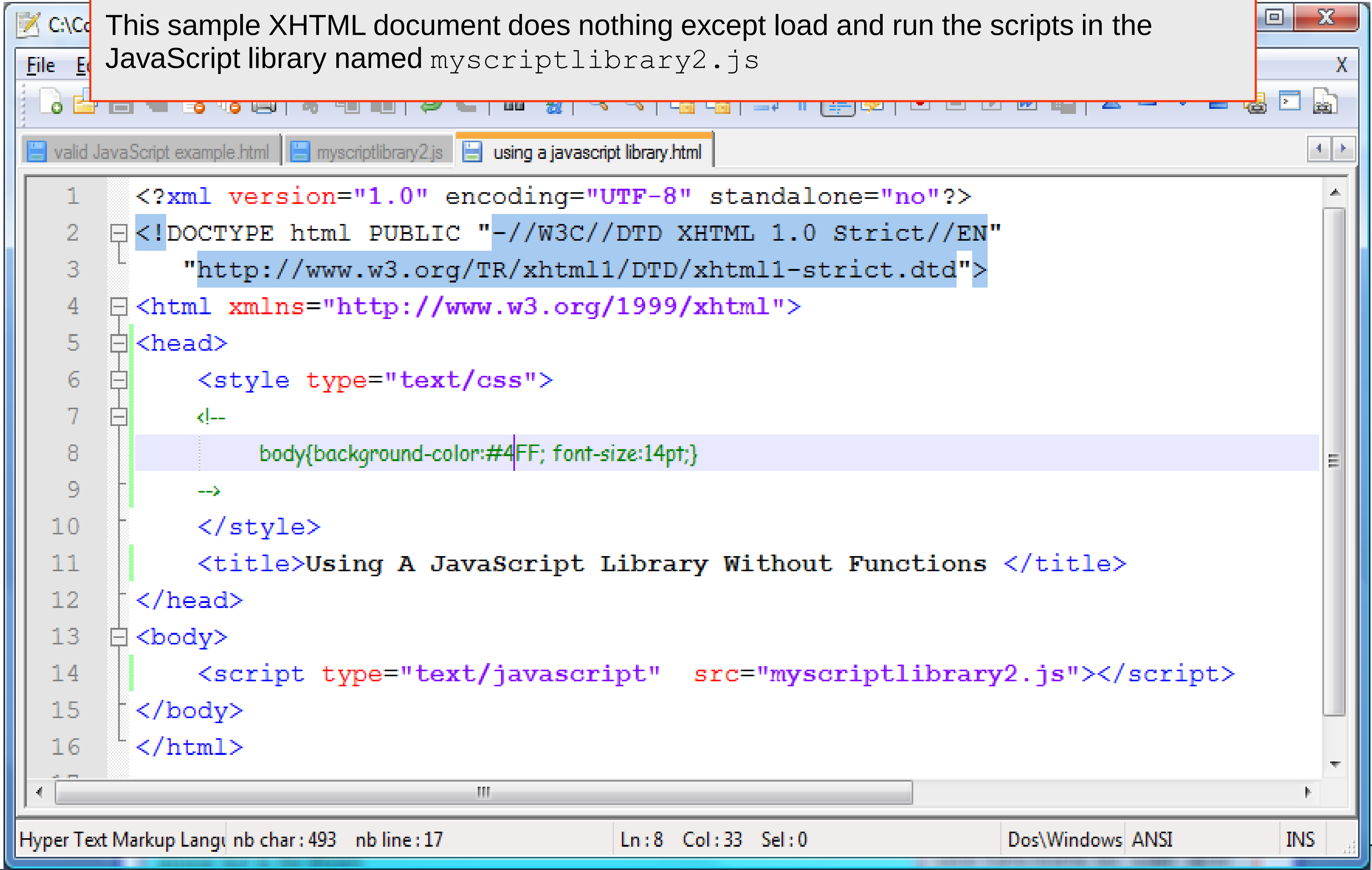

*C:\Courses\CGS 3175 - Internet Applications\Fall 2009\example code - new\JavaScript - Part 2\myscriptlibrary2.js - Notepad++
File Edit Search View Format Language Settings Macro Run TextFX Plugins Window ?
SQLFormatter.java
triggering a script - onclick.html
valid JavaScript example.html
myscriptlibrary2.js

A JavaScript Library (page 2)

```
//SCRIPT #3
//this script returns the current time

    var currentTime = new Date()
    var hours = currentTime.getHours()
    var minutes = currentTime.getMinutes()
    if (minutes < 10)
        minutes = "0" + minutes
        document.write("The time is " + hours + ":" + minutes + " ")
    if(hours > 11){
        document.write("PM")
    } else { document.write("AM")
    }
    document.write("<br />");

//SCRIPT #4
//this script simply writes a message

    document.write("<br /> Hello there!  I'm a JavaScript script executing o
    document.write("Please note that since I am not a function and thus not 
    document.write("that all of the other scripts in my library have execute
    document.write("appear last in the library <br />");
```

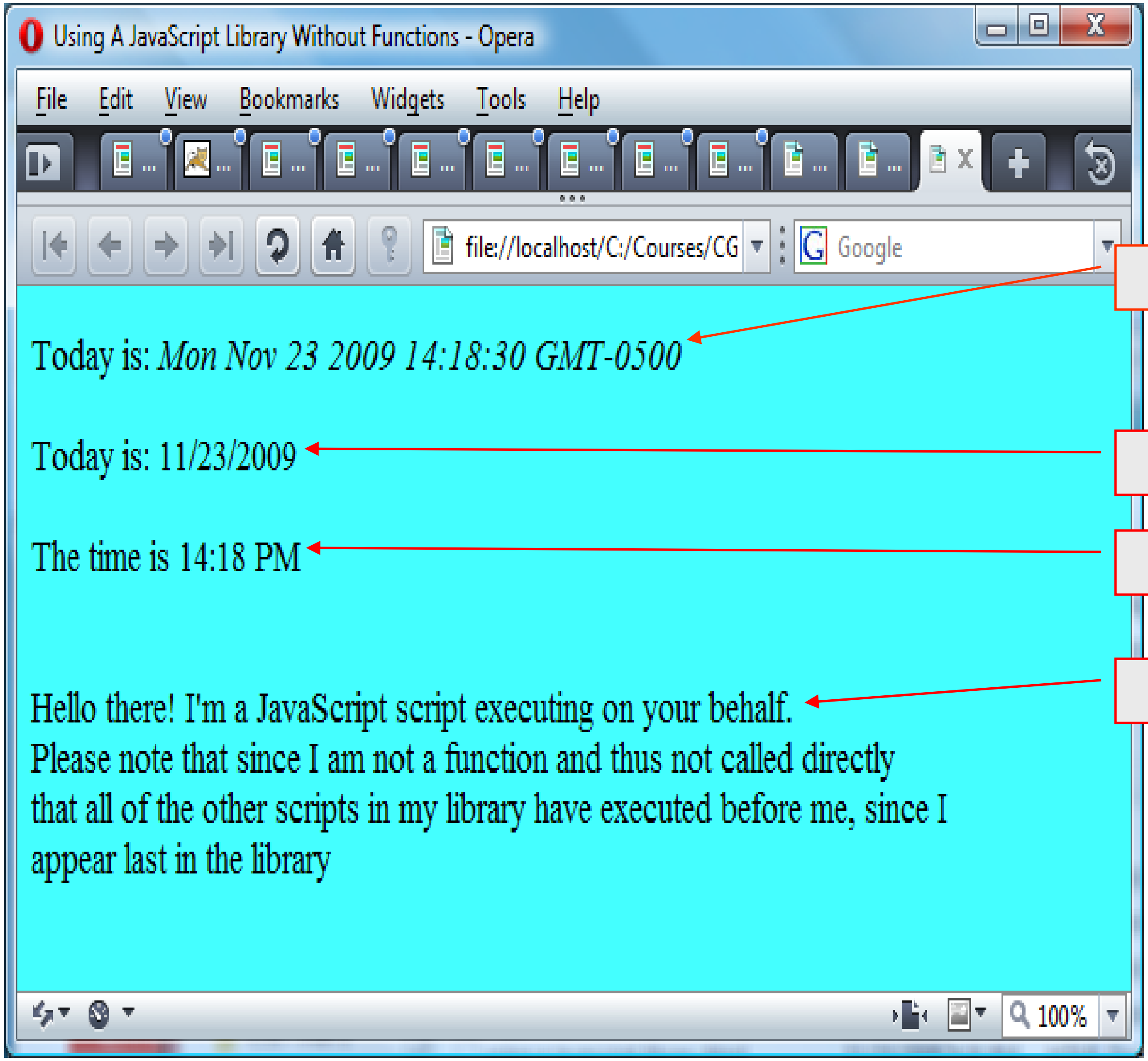
Execution Using A JavaScript Library

This sample XHTML document does nothing except load and run the scripts in the JavaScript library named `myscriptlibrary2.js`


valid JavaScript example.html | myscriptlibrary2.js | using a javascript library.html

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<!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>
    <style type="text/css">
    <!--
        body{background-color:#4FF; font-size:14pt;}
    -->
    </style>
    <title>Using A JavaScript Library Without Functions </title>
</head>
<body>
    <script type="text/javascript"  src="myscriptlibrary2.js"></script>
</body>
</html>
```

Hyper Text Markup Langu nb char : 493 nb line : 17 Ln : 8 Col : 33 Sel : 0 Dos\Windows ANSI INS


Using A JavaScript Library Without Functions - Opera
File Edit View Bookmarks Widgets Tools Help
file://localhost/C:/Courses/CG
Google
100%

Today is: *Mon Nov 23 2009 14:18:30 GMT-0500*

Today is: 11/23/2009

The time is 14:18 PM

Hello there! I'm a JavaScript script executing on your behalf.
Please note that since I am not a function and thus not called directly
that all of the other scripts in my library have executed before me, since I
appear last in the library

Execution of SCRIPT #1

Execution of SCRIPT #2

Execution of SCRIPT #3

Execution of SCRIPT #4