

Web Programming/Scripting: AJAX

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AJAX

- ◆ What is AJAX?
 - » Recalling XMLHttpRequest



- ◆ AJAX Examples
 - » Suggest
 - » XML
 - » Poll

What is AJAX?

- ◆ Asynchronous JavaScript And XML
- ◆ Uses JavaScript to send and receive data between a web browser and web server
- ◆ Based on
 - » JavaScript
 - » XML
 - » HTML
 - » CSS
- ◆ *There's nothing new for us to learn!*

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AJAX

- ◆ Made popular in 2005 by Google
 - » Google Suggest – as you type in words in the search box, suggestions for what you might be looking for appear
- ◆ Uses XMLHttpRequest
 - » which we've already discussed

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AJAX

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- ◆ AJAX Examples
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References for today's material: <http://www.w3schools.com/ajax/> and <http://www.w3schools.com/php/>

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AJAX

Remember XMLHttpRequest?

```
requests the document found at the given URL
function sendXMLHttpRequest(url)
{
  xmlhttp = new XMLHttpRequest();
  if (xmlhttp == null) {
    alert("Your browser does not support XMLHTTP.");
    return;
  }
  xmlhttp.onreadystatechange = stateChange;
  xmlhttp.open("GET", url, true);
  xmlhttp.send(null);
}
```

xmlhttp is the variable that allows us to make the request

stateChange function is called when the state of the XMLHttpRequest object changes

open() sets up a HTTP request for the URL

send() sends the request to the server

AJAX

Remember XMLHttpRequest?

```
function stateChange()
{
  if (xmlhttp.readyState == 4) {

    if (xmlhttp.status == 200) {
      // HTTP response code (200 is OK)
      doStuff(); // you must write this function
    } else {
      alert ("Problem retrieving data: " + xmlhttp.statusText);
    }
  }
}
```

<http://www.cs.odu.edu/~mweigle/cs312/js/helperFunctions.js>

readyState

0 - request is not initialized
1 - request has been set up
2 - request has been sent
3 - request is in process
4 - *request is complete*

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AJAX Suggest Example

◆ Like Google Suggest

- » start typing in textbox and suggested words/phrases appear below

First Name: <input type="text" value="jo"/>
Suggestions: John, Joe, Joseph

<http://www.cs.odu.edu/~mweigle/cs312/ajax/suggest/suggest.html>

Reference for this example: http://www.w3schools.com/php/php_ajax_suggest.asp

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AJAX Suggest Example Components

First Name: <input type="text" value="jo"/>
Suggestions: John, Joe, Joseph

◆ HTML

- » provide form with a text box for user to enter a name
- » provide named element to display suggestions

◆ JavaScript (client-side operations)

- » `showHint()`
 - ❖ take data from HTML form and send to PHP script
- » `doStuff()`
 - ❖ receive reply from PHP script
 - ❖ display result on webpage in named HTML element

◆ PHP script (server-side operations)

- » create array of available names
- » search array for those starting with data sent by JavaScript
- » return the list of matching names

AJAX Suggest Example

HTML Setup

First Name:

Suggestions: John, Joe, Joseph

- ◆ Load JavaScript helper functions
- ◆ Setup for embedded JavaScript (or the functions can be put into an external JavaScript file)

```
<head>
<title>Ajax Suggest Example</title>
<script type="text/javascript" src="http://www.cs.odu.edu/~mweigle/cs312/js/
helperFunctions.js">
</script>

<script type="text/javascript">
<!--
    put showHint() and doStuff() functions here
// -->
</script>
</head>
```

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AJAX Suggest Example

HTML

First Name:

Suggestions: John, Joe, Joseph

- ◆ Provide form with a text box for user to enter a name
- ◆ Provide named element to display suggestions

```
<body>

<form action ="">
First Name:
<input type="text" id="txt1" onkeyup="showHint(this.value)" />
</form>

<p>Suggestions: <span id="txtHint"></span></p>

</body>
```

this.value is the text currently in the box

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AJAX Suggest Example JavaScript

First Name:

Suggestions: John, Joe, Joseph

```
var xmlhttp = null; // must be outside function to be global
```

```
function showHint(str)
```

send data from HTML form to PHP script

```
{  
  // check to see if textbox is blank  
  if (str.length==0) {  
    document.getElementById("txtHint").innerHTML="";  
    return;  
  }  
}
```

```
// build request to run PHP script on server
```

```
var url = "gethint.php";
```

adds parameter 'q' to URL

```
url = url + "?q=" + str;
```

adds random number to prevent using cached file

```
url = url + "&sid=" + Math.random(); // avoid browser cache
```

```
sendXMLHttpRequest(url);
```

sendXMLHttpRequest() in helperFunctions.js

```
}
```

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AJAX Suggest Example JavaScript

First Name:

Suggestions: John, Joe, Joseph

- ◆ Receive reply from PHP script
- ◆ Display result in named HTML element

```
function doStuff()
```

```
{  
  document.getElementById("txtHint").innerHTML = xmlhttp.responseText;  
}
```

responseText holds everything printed (echo) by the PHP script

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AJAX Suggest Example PHP (gethint.php)

First Name:

Suggestions: John, Joe, Joseph

```
<?php
// Fill up array with names
$names = array ("Anna", "Brittany", "Diana", ...); rest of names omitted for space

// get the q parameter from the URL
$q = $_GET["q"];

// lookup all hints from array if length of q > 0
if (strlen ($q) > 0) {
    $hint = "";
    for ($i=0; $i<count($names); $i++) {
        if (strtolower($q) == strtolower(substr($names[$i], 0, strlen($q)))) {
            if ($hint == "") {
                $hint = $names[$i];
            } else {
                $hint = $hint . ", " . $names[$i];
            }
        }
    }
}
```

create array of available names

search for names starting with
data from JavaScript

- `count($arr)` returns number of elements in `$arr`
- `strtolower($str)` returns the lowercase version of `$str`
- `substr($str, $start, $end)` returns characters in positions `$start` to `$end` from `$str`

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AJAX Suggest Example PHP (gethint.php continued)

First Name:

Suggestions: John, Joe, Joseph

```
// Set output to "no suggestion" if no hint was found
// or to correct value
if ($hint == "") {
    $response = "no suggestion";
} else {
    $response = $hint;
}

// output the response
echo $response;

?>
```

return list of names

<http://www.cs.odu.edu/~mweigle/cs312/ajax/suggest/suggest.html>

<http://www.cs.odu.edu/~mweigle/cs312/ajax/suggest/gethint.php.txt>

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AJAX Suggest Example

Data Flow

First Name:
Suggestions: John, Joe, Joseph

Web Browser

Web Server

GET suggest.html

suggest.html

GET helperFunctions.js

helperFunctions.js

user presses/releases 'J' key in textbox

embedded function showHint() is called

sendXMLHttpRequest() in helperFunctions.js is called

GET gethint.php?q=J&sid=12345

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AJAX Suggest Example

Data Flow (*continued*)

First Name:
Suggestions: John, Joe, Joseph

Web Browser

Web Server

gethint.php executes

Joe John Joseph

event handler stateChange() in helperFunctions.js is called

embedded function doStuff() is called

reply from server is written to the webpage

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AJAX

- ◆ What is AJAX?
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- ◆ AJAX Examples
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References for today's material: <http://www.w3schools.com/ajax/> and <http://www.w3schools.com/php/>

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AJAX XML Example

- ◆ Provide drop-down box with list of plants.
- ◆ When user selects a plant, display the information from an XML file for that plant.

Select a plant:

Plant info will be listed here.

Select a plant:

COMMON: Bloodroot
BOTANICAL: Sanguinaria canadensis
ZONE: 4
LIGHT: Mostly Shady
PRICE: \$2.44
AVAILABILITY: 031599

<http://webpace.cs.odu.edu/~mweigle/cs312/ajax/plants/plants.html>

Reference for this example: http://www.w3schools.com/php/php_ajax_xml.asp

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AJAX XML Example

Components

Select a plant:

Plant info will be listed here.

- ◆ HTML form
 - » provide drop-down box
 - » provide named element for data to be written to
- ◆ XML file
 - » plant_catalog.xml
- ◆ JavaScript (embedded in HTML)
 - » showPlant() and doStuff()
 - » very similar to previous example
- ◆ PHP (getPlant.php)
 - » because we want to use PHP to load XML, we need PHP 5
 - ❖ www.cs.odu.edu server has PHP 4
 - ❖ webspace.cs.odu.edu server has PHP 5

Reference for this example: http://www.w3schools.com/php/php_ajax_xml.asp

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AJAX XML Example

HTML Setup

Select a plant:

Plant info will be listed here.

- ◆ Load JavaScript helper functions
- ◆ Setup for embedded JavaScript

```
<head>
<title>Ajax XML Example</title>
<script type="text/javascript" src="http://www.cs.odu.edu/~mweigle/cs312/js/
helperFunctions.js">
</script>

<script type="text/javascript">
<!--
    put showPlant() and doStuff() functions here
// -->
</script>
</head>
```

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AJAX XML Example

HTML

Select a plant:

Plant info will be listed here.

- ◆ Provide form with a drop-down box
- ◆ Provide named element to display information

```
<body>
<form action="">
Select a plant:
<select name="plants" onchange="showPlant(this.value)">
<option value="Bloodroot">Bloodroot</option>
<option value="Jack-In-The-Pulpit">Jack-In-The-Pulpit</option>
<option value="Phlox, Blue">Blue Phlox</option>
<option value="Phlox, Woodland">Woodland Phlox</option>
<option value="Spring-Beauty">Spring-Beauty</option>
<option value="Trout Lily">Trout Lily</option>
<option value="Black-Eyed Susan">Black-Eyed Susan</option>
</select>
</form>

<div id="plantInfo"><strong>Plant info will be listed here.</strong></div>
```

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AJAX XML Example

JavaScript

Select a plant:

Plant info will be listed here.

```
var xmlhttp = null;
```

very similar to previous
example (suggest)

```
function showPlant(str)
{
    // build request to run PHP script on server
    var url = "getPlant.php";
    url = url + "?q=" + str;
    url = url + "&sid=" + Math.random(); // avoid browser cache

    // send request to PHP script
    sendXMLHttpRequest(url);
}
```

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AJAX XML Example

JavaScript

Select a plant:

Plant info will be listed here.

- ◆ Receive reply from PHP script
- ◆ Display result in named HTML element

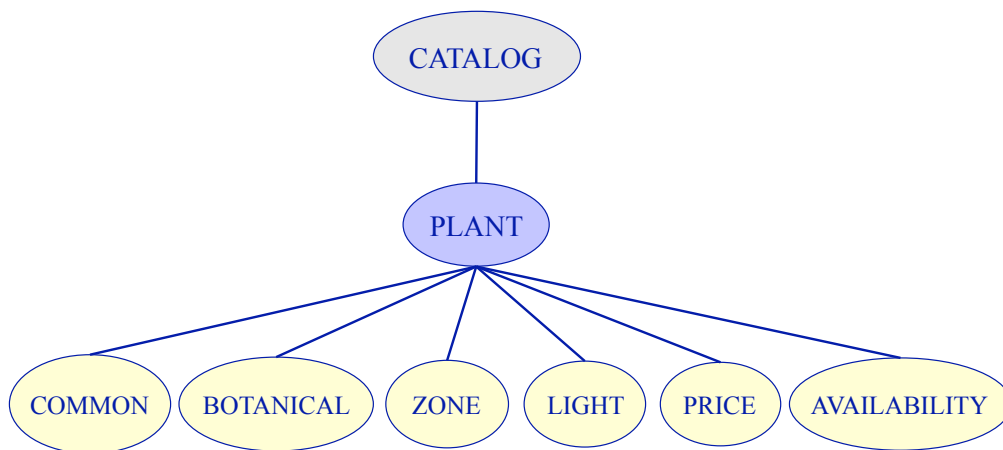
almost exactly the same as
previous example (suggest)

```
function doStuff()
{
    document.getElementById("plantInfo").innerHTML = xmlhttp.responseText;
}
```

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AJAX XML Example

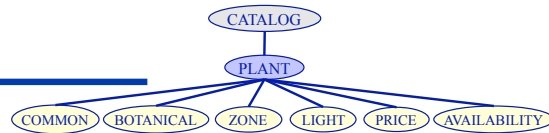
plant_catalog.xml



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AJAX XML Example

getPlant.php



```
<?php
$q=$_GET["q"]; // get the parameters sent in the URL

// load the XML file
$xml = simplexml_load_file ("/home/mweigle/public_html/cs312/
xml/plant_catalog.xml");

// find the appropriate plant
$plant = $xml->xpath ("//PLANT [COMMON='$q']");

foreach ($plant[0]->children() as $child) {
    // print each child of the plant
    echo $child->getName() . ": " . $child . "<br />";
} http://webspace.cs.odu.edu/~mweigle/cs312/ajax/plants/plants.html
http://webspace.cs.odu.edu/~mweigle/cs312/ajax/plants/getPlant.php.txt
```

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AJAX

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- ◆ AJAX Examples
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 - » Poll

References for today's material: <http://www.w3schools.com/ajax/> and <http://www.w3schools.com/php/>

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AJAX Poll Example

- ◆ Ask the user a question.
- ◆ Provide a radio button for their response.
- ◆ After they make a choice, display a graph of responses.

Do you like PHP and AJAX so far?

Yes: ☒
No: ☐

Result:

Yes:  57%
No:  43%

<http://www.cs.odu.edu/~mweigle/cs312/ajax/poll/poll.html>

Reference for this example: http://www.w3schools.com/php/php_ajax_poll.asp

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AJAX Poll Example Components

Do you like PHP and AJAX so far?

Yes: ☒
No: ☐

- ◆ HTML form
 - » ask question
 - » provide radio button for choice
 - » display graph
- ◆ JavaScript (embedded in HTML)
 - » getVote() and doStuff()
 - » very similar to previous examples
- ◆ PHP script (poll_vote.php)
 - » update results
 - » send back entire webpage with graph
- ◆ writeable (chmod 777) text file
 - » to store the results
- ◆ GIF image file (poll.gif)
 - » for creating the graph



Reference for this example: http://www.w3schools.com/php/php_ajax_poll.asp

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AJAX Poll Example

HTML Setup

Do you like PHP and AJAX so far?

Yes: ☒
No: ☐

- ◆ Load JavaScript helper functions
- ◆ Setup for embedded JavaScript

```
<head>
<title>Ajax Poll Example</title>
<script type="text/javascript" src="http://www.cs.odu.edu/~mweigle/cs312/js/
helperFunctions.js">
</script>

<script type="text/javascript">
<!--
    put getVote() and doStuff() functions here
// -->
</script>
</head>
```

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AJAX Poll Example

HTML

Do you like PHP and AJAX so far?

Yes: ☒
No: ☐

- ◆ Provide radio buttons for making a choice.
- ◆ Provide named element for displaying graph

```
<body>

<div id="poll">
<h2>Do you like PHP and AJAX so far?</h2>

<form action = "">
Yes:
<input type="radio" name="vote" value="0" onclick="getVote(this.value)" />
<br />No:
<input type="radio" name="vote" value="1" onclick="getVote(this.value)" />
</form>
</div>
</body>
```

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AJAX Poll Example

JavaScript

Do you like PHP and AJAX so far?

Yes: ☒
No: ☐

very similar to previous examples

```
var xmlhttp = null;
```

```
function getVote(int)
{
    // build request to run PHP script on server
    var url = "poll_vote.php";
    url = url + "?vote=" + int;
    url = url + "&sid=" + Math.random(); // avoid browser cache

    // send request to PHP script
    sendXMLHttpRequest(url);
}
```

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AJAX Poll Example

JavaScript

Do you like PHP and AJAX so far?

Yes: ☒
No: ☐

- ◆ Receive reply from PHP script
- ◆ Display result in named HTML element

very similar to previous examples

```
function doStuff()
{
    document.getElementById("poll").innerHTML = xmlhttp.responseText;
}
```

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AJAX Poll Example

poll_vote.php

```
<?php
$vote = $_REQUEST['vote'];



// read content of textfile into an array
$filename = "poll_result.txt";
$content = file($filename);

// separate yes and no votes
$array = explode("||", $content[0]);
$yes = $array[0];
$no = $array[1];

// tally yes or no
if ($vote == 0) {
    $yes = $yes + 1;
}
if ($vote == 1) {
    $no = $no + 1;
}
```

array explode (string \$delimiter, string \$string)
Splits \$string into multiple strings delimited by \$delimiter

Result:

Yes:  57%
No:  43%

poll_result.txt

no votes || yes votes

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AJAX Poll Example

poll_vote.php

```
// insert new tally to txt file
$insertvote = $yes . "||" . $no;
$fp = fopen($filename, "w");
fputs ($fp, $insertvote);
fclose ($fp);
?>
```

```
<h2>Result:</h2>
<table>
<tr>
<td>Yes:</td>
<td>
' height='20'
alt="yes" />
<?php echo(100*round($yes/($no+$yes),2)); ?>%
</td>
</tr>
```

Result:

Yes:  57%
No:  43%

poll_result.txt



no votes || yes votes

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AJAX Poll Example

poll_vote.php

Result:

Yes:  57%
No:  43%

```
<tr>
<td>No:</td>
<td>
'
height='20' alt="no" />
<?php echo(100*round($no/($no+$yes),2)); ?>%
</td>
</tr>
</table>
```

<http://www.cs.odu.edu/~mweigle/cs312/ajax/poll/poll.html>

http://www.cs.odu.edu/~mweigle/cs312/ajax/poll/poll_vote.php.txt

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AJAX

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