ISIT307 - WEB SERVER PROGRAMMING

LECTURE 7.1 – PHP - XML, PHP - AJAX

LECTURE PLAN

- Working with XML, PHP XML Parsers

- AJAX, Using AJAX with PHP

Look for additional resources:
References in subject outline,
https://www.w3schools.com/php/php_xml_parsers.asp,
https://www.w3schools.com/php/php_ajax_intro.asp

XML

- Extensible Markup Language (XML) is a syntax standard that allows for the exchange of textual information between applications

- Why XML is instrumental to Web Programming?
    - several web technologies (like RSS Feeds and Podcasts) are written in XML
    - XML is easy to create - it looks a lot like HTML
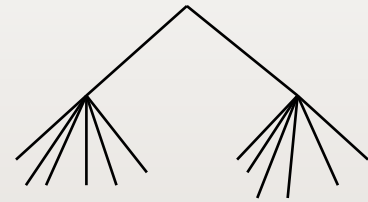   - a lot of Web Sites share data through XML

XML

- There are two big differences between XML and HTML
  - XML doesn't define a specific set of tags that we must use,
  - XML document must have strict structure

- Tags are words surrounded by "<" and ">" and come in two forms:
  - with values <tagname> value </tagname>
  - without values

XML

- Tags can have attributes.

  - <tagname attribute="attributevalue">

- A value of a tag can have other tags within it - these nested tags are called the children tags while the tag itself is the parent tag of the children.

- Example

```
<?xml version='1.0' ?>
<contact idx='37' >
<name>Tom White</name>
<category>Family</category>
<phone type='home'>301-555-1212</phone>
<meta id='x634724' />
</contact>
```

PHP XML PARSER

- To read and update, create and manipulate an XML document, we need an XML parser

- In PHP there are two major types of XML parsers:
  - Tree-Based Parsers (SimpleXML, DOM)
  - Event-Based Parsers (XMLReader, XML Expat Parser)

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PHP XML PARSER

- SimpleXML is a PHP extension

- It allows manipulation with XML data
  - transforms an XML document into a data structure (making easy to iterate through like a collection of arrays and objects)
  - if the XML document's structure or layout are known provides an easy way of getting an element's name, attributes and textual content

- Fewer lines of code needed to read text data from an element

PHP XML PARSER

- SimpleXML has:
  - simplexml_load_string() function - operates on an XML document saved into a PHP variable
  - simplexml_load_file() function - operates on a file
- These functions returns an object that replicates the XML document
  - Each XML tag becomes a property of the object, nested accordingly

SIMPLEXML - EXAMPLE (1)

```php
<?php
$myXMLData =
"<?xml version='1.0' ?>
<contact idx='37'>
<name>Tom White</name>
<category>Family</category>
<phone type='home'>301-555-1212</phone>
<meta id='x634724' />
</contact>";

if (!($xml=simplexml_load_string($myXMLData)))
        die("Error: Cannot create object");
echo "<pre>\n";
print_r($xml);
echo "</pre>\n";
?>
```

```
SimpleXMLElement Object
(
    [@attributes] => Array
        (
            [idx] => 37
        )

    [name] => Tom White
    [category] => Family
    [phone] => 301-555-1212
    [meta] => SimpleXMLElement Object
        (
            [@attributes] => Array
                (
                    [id] => x634724
                )

        )

)
```

SIMPLEXML - EXAMPLE (2)

```php
<?php
$myXMLData =
"<?xml version='1.0' ?>
<contact idx='37'>
<name>Tom White</mname>
<category>Family</category1>
<phone type='home'>301-555-1212</phone>
<meta id='x634724' />
</contact>";

libxml_use_internal_errors(true);

$xml=simplexml_load_string($myXMLData);
if ($xml===false){
    echo "Failed loading XML: ";
    foreach(libxml_get_errors() as $error)
      echo "<br>". $error->message;
}else{
    echo "<pre>\n";
    print_r($xml);
    echo "</pre>\n";
} ?>
```

SIMPLEXML - EXAMPLE (3)

```php
<?php
$xml = simplexml_load_file('contacts.xml');
echo "<ol>\n";
foreach ($xml->contact as $c) {
     // print contact's name, id, email
     // The attribute will be accesible as if it were an assoc array entry. Using the
     //entry itself, will echo it's value.
     echo '<li>' . $c->name . " - " . $c['idx'] . ", email:" . $c->email;

     // start an unordered list for contact's phone numbers
     echo '<ul>';

     // loop over every phone number for this person
     foreach ($c->phone as $p) {
          // echo out a line including the type of number.
          // The attribute will be accesible as if it were an assoc array entry.
          // Using the entry itself, will echo it's value.
          echo '<li>', ucfirst($p['type']), ': ', $p, '</li>';
     }
     echo "</ul></li>\n"; // close the phone list
}?>
```

THE XML DOM PARSER

- The DOM sees the XML as a tree structure:

    - Level 1: XML Document

    - Level 2: Root element (e.g.<to>)

    - Level 3: Text element (e.g. "Jack")

- Example

```php
<?php
$xmlDoc = new DOMDocument();
$xmlDoc->load("list.xml");
echo $xmlDoc->saveXML();
echo "<br /><br />";
$x = $xmlDoc->documentElement;
foreach ($x->childNodes AS $item) {
    echo $item->nodeName . " = "
    . $item->nodeValue . "<br />";
} ?>
```

```xml
<?xml version='1.0' ?>
<note>
    <to>Jack</to>
    <from>Anna</from>
    <heading>List</heading>
    <body>All important items</body>
</note>
```

Jack Anna List All important items

#text =
to = Jack
#text =
from = Anna
#text =
heading = List
#text =
body = All important items
#text =
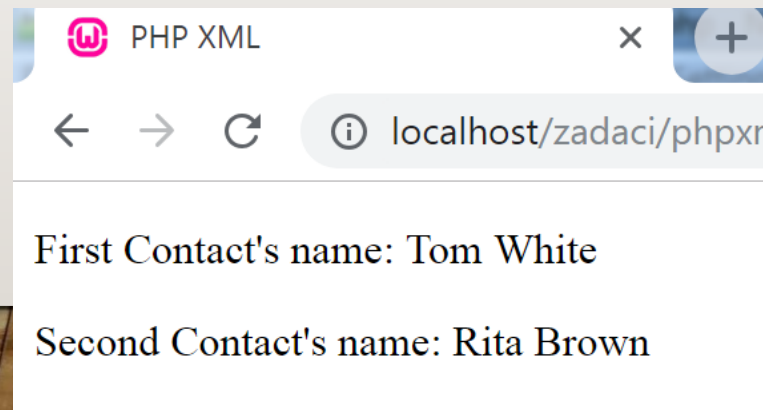?>

THE XML DOM PARSER

- Example

```php
<?php
$xmlDoc = new DOMDocument();
$xmlDoc->load("contacts.xml");
$x = $xmlDoc->documentElement;
foreach ($x->childNodes AS $item) {
  print $item->nodeName . " = " . $item->nodeValue . "<br>";
}
?>
```

```
#text =
contact = Tom White Family 301-555-1212
#text =
contact = Rita Brown Friends 240-555-1212 410-555-7676 ritab@example.com
#text =
```

THE XML DOM PARSER - EXAMPLE

```php
<?php
$xmlDoc = new DOMDocument();
$xmlDoc->load("contacts.xml");

$xml = simplexml_import_dom($xmlDoc);
echo "<p>First Contact's name: {$xml->contact[0]->name}</p>\n";
//echo "<p>First Contact's id: {$xml->contact[0]['idx']}</p>\n";
echo "<p>Second Contact's name: {$xml->contact[1]->name}</p>\n";
?>
```

PHP XML

localhost/zadaci/phpxr

First Contact's name: Tom White

Second Contact's name: Rita Brown

PERFORMING SEARCHES WITH XPATH

- Search through the document for the exact item (or items) is available with `XPath` (a standard for performing searches through XML)

- Some common XPath queries are

  - x - Matches any tag named x

  - x/y/ - Matches any tag named y, directly contained in a tag named x

  - x/y/.. - Similar to the preceding item but actually matches and returns tag x, instead of tag y

  - x//y - Matches any tag named y that is a descendant of a tag named x (any number of levels deep)

  - x[5] - Matches the fifth tag named x

  - x[last()] - Matches the last tag named x

  - x[@att] - Matches any tag named x, with an attribute named att

  - x[@att="val"] - Matches any tag named x, with an attribute named att that has the value "val"

PERFORMING SEARCHES WITH XPATH - EXAMPLE

```php
<?php
$xml = simplexml_load_file('contacts.xml'); // using SimpleXML, read
                                            //the file into memory

$meta = $xml->xpath('//meta'); // Xpath search to find all 'meta'
                               //tags no matter what the depth
foreach ($meta as $m) {
    echo "Meta - {$m['id']}<br />\n";
}
$email = $xml->xpath('/contacts/contact/email'); // find all email
     //tags within a contact tag from the root of the XML document
foreach ($email as $e) {
    echo "Email - {$e}<br />\n";
}
$cell = $xml->xpath('contact/phone[@type="cell"]/..'); // find any
                                   //contact who has a cellphone number
foreach ($cell as $c) {
    echo "Cell Contact - {$c->name}<br />\n";
}
?>
```
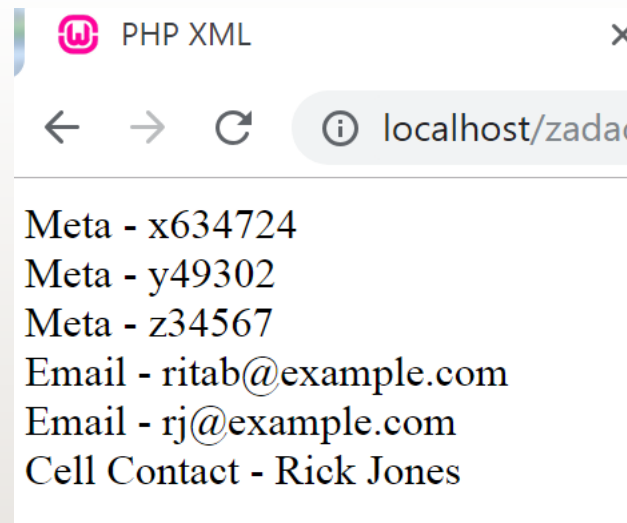
PERFORMING SEARCHES WITH XPATH – EXAMPLE OUTPUT

EXAMPLE

- Write piece of code to convert the XML string/file into an array

```php
<?php
$myXMLstr =
"<aaaa Version='1.0'>
    <bbb>
        <cccc>
            <dddd id='id-pass' />
            <eeee name='hearman' age='24'  />
        </cccc>
    </bbb>
</aaaa>";

if (($xml=simplexml_load_string($myXMLstr))){
        $json = json_encode($xml);
        $array = json_decode($json, true);
        echo "<pre>\n";
        print_r($array);
        echo "</pre>\n";
}
?>
```
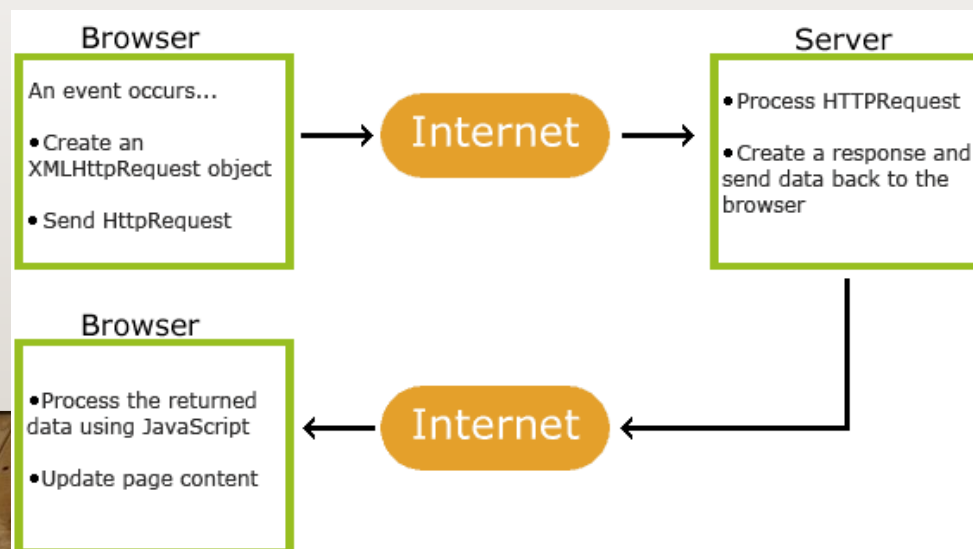
AJAX

- Ajax - Asynchronous JavaScript and XML, allows a web page, via JavaScript, to make a request back to the server, receive data, and process it without the page ever having to reload

- It allows web pages to be updated asynchronously by exchanging small amounts of data with the server behind the scenes, updating parts of a web page, without reloading the whole page

AJAX

- Ajax uses a combination of:
  - XMLHttpRequest object (to exchange data asynchronously with a server)
  - JavaScript/DOM (to display/interact with the information)
  - CSS (to style the data)
  - XML (often used as the format for transferring data)

AJAX

- Ajax in its purest form uses XML as the basis of communication
  - The requested file on the server will respond with an XML document or anything that JavaScript can parse
  - It can also return text or raw HTML as their Ajax responses if it is more convenient

AJAX AND PHP

- Ajax can call a PHP script, pass it data, and display the results back to the user

- For example, when a user types a character in the input field, a function ("showHint()") is executed - the function is triggered by the onkeyup event

AJAX AND PHP

```html
<html>
<head>
<script>
function showHint(str) {
    if (str.length == 0) {
        document.getElementById("txtHint").innerHTML = "";
        return;
    } else {
        var xmlhttp = new XMLHttpRequest();
        xmlhttp.onreadystatechange = function() {
            if (this.readyState == 4 && this.status == 200) {
                document.getElementById("txtHint").innerHTML = this.responseText;
            }
        };
        xmlhttp.open("GET", "gethint.php?q=" + str, true);
        xmlhttp.send();
    }
}
</script>
</head>
<body>

<p><b>Start typing a name in the input field below:</b></p>
<form>
First name: <input type="text" onkeyup="showHint(this.value)">
</form>
<p>Suggestions: <span id="txtHint"></span></p>
</body>
</html>
```

AJAX AND PHP

- The function ("showHint()"):
  - Create an XMLHttpRequest object
  - Create the function to be executed when the server response is ready
    - readyState (Holds the status of the XMLHttpRequest):
      - 0: request not initialized, 1: server connection established, 2: request received, 3: processing request, 4: request finished and response is ready
    - Status:
      - 200: "OK", 403: "Forbidden", 404: "Page not found", …
  - Send the request off to a PHP file (gethint.php) on the server with q parameter (gethint.php?q="+str)
  - The str variable holds the content of the input field

AJAX AND PHP

gethint.php

```php
<?php
// Array with names
$a[] = "Anna";
$a[] = "Brittany";
$a[] = "Cinderella";

// get the q parameter from URL
$q = $_GET["q"];
$hint = "";
// lookup all hints from array if $q is different from ""
if ($q !== "") {
    $q = strtolower($q);
    $len=strlen($q);
    foreach($a as $name) {
        if (stristr($q, substr($name, 0, $len))) {
            if ($hint === "") {
                $hint = $name;
            } else {
                $hint .= ", $name";
            }
        }
    }
}
// output "no suggestion" if no hint was found or output correct values
echo $hint === "" ? "no suggestion" : $hint;
?>
```

AJAX AND PHP

- AJAX can be used for interactive communication with

  - database

  - text file

  - XML file

- AJAX can be used to create more user-friendly and interactive searches

- Examples:

  https://www.w3schools.com/php/php_ajax_intro.asp