AJAX

Lecture 26

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AJAX

- AJAX = Asynchronous Javascript and XML.
- XML = Extensible Markup Language.
- We will study XML in more detail later.
- AJAX refers to the `XMLHttpRequest` class that allow us retrieve additional data from the server
  - After the web page is loaded,and
  - Without reloading the page.

AJAX

- The `XMLHttpRequest` methods allow us to
  - Open a file on the server.
  - Send a request for the content of the file.
  - Receive the content either as plain text or as an XML data structure.
- If the request is done synchronously, then our program must pause until the data are received.
- If the request is done asynchronously, then the rest of our program continues while we monitor the response.

XMLHttpRequest Methods

XMLHttpRequest Methods

```
XMLHttpRequest();
xmlhttp.open(method, file_name, is_async);
xmlhttp.send();
```

- `XMLHttpRequest()` - Constructs an XML request object.
- `open()` - Opens the file, using the specified method (`"GET"` or `"POST"`) either asynchronously or synchronously.
- `send()` - Sends the request to the web server.

Making a Request

`XMLHttpRequest` Constructor

```
var xmlhttp = new XMLHttpRequest();
```

- We begin by constructing an `XMLHttpRequest` object.

Making a Request

The `open()` and send() Functions

```
xmlhttp.open("GET", "my_file.php", true);
xmlhttp.send();
```

- Then we specify the target file and send the request.

Making a Synchronous Request

Receiving the Response

```
text = xmlhttp.responseText;
XML = xmlhttp.responseXML;
```

- The response will be either plain text or an XML data structure.
- A plain text response may be handled like any other character string.
- An XML response must be parsed using special XML functions.

Making an Asynchronous Request

- An asynchronous request goes through a sequence of five ready states.

Code	State	Meaning
0	Uninitialized	`open()` not yet called
1	Loading	`send()` not yet called
2	Loaded	`send()` called, no data received
3	Interactive	Some, but not all, data received
4	Completed	All data received

- We monitor the object until state 4 is reached.

Monitoring an Asynchronous Request

- When state 4 is reached, we then check the status to see whether the call was successful.
- The possible status codes include the following.
  - 200 - Data successfully received.
  - 301 - File moved.
  - 403 - Access denied.
  - 404 - File not found.
  - 444 - No response.
- See `http://www.w3.org/Protocols/rfc2616/rfc2616-sec10.html` for a complete description all HTML error codes.

Monitoring an Asynchronous Request

The `onreadystatechange()` Function

```
xmlhttp.onreadystatechange = function()
{
    if (xmlhttp.readyState == 4
        && xmlhttp.status == 200)
    {
        // Retrieve responseText or responseXML
    }
}
```

- We use the `onreadystatechange` member function to monitor the ready state and the status.
- This function is undefined, so we must define it.
- It will be invoked automatically whenever the ready state changes.

Handling the Response

Attaching Values

```
xmlhttp.open("GET", "my_file.php?name=John", true);
```

- If we use the `GET` method, then we may attach a sequence of values to the URL in the usual way: *`name=value`*.

Handling the Response

Attaching Values

```
var text = xmlhttp.responseText;
```

- We will discuss XML later in the course.
- For now, we will use only the text response.
- The property `responseText` is assigned the (entire) content of the specified file.
- This includes output from PHP.

Handling the Response

- Typically, we want to insert the response text into the HTML document.
- The Javascript function `getElementById()` allows us to reference a particular HTML element.
- The attribute `innerHTML` refers to the content between the opening and closing tags of the element.

Handling the Response

- For example, suppose we want to change a heading.

The Element

```
<h1 id="heading">My Heading</h1>
```

- We may assign the response text to `innerHTML`.

Changing the Element

```
$("heading").innerHTML = xmlhttp.responseText;
```

- This will replace “My Heading” with whatever text was returned by the request.

Assignment

Assignment

- Visit the W3Schools website
  - `http://www.w3schools.com/Ajax/`
  - Visit the sections labeled “AJAX HOME” through “XHR readyState.”