CS 1520: Recitation 9

AJAX

AJAX

- Asynchronous Javascript and XML
- Used to insert contents to a website from a server or a database without refreshing the browser each time.
- Example: Seeing a reply to your Facebook chat without having to refresh the browser every time

XMLHttpRequest object

- Used to Exchange data with the server behind the scenes
- Can be used to update parts of the webpage without reloading the whole page

XMLHttpRequest Object Methods

Method	Description
new XMLHttpRequest()	Creates a new XMLHttpRequest object
abort()	Cancels the current request
getAllResponseHeaders()	Returns header information
getResponseHeader()	Returns specific header information
open(*method,url,async,user,psw*)	Specifies the request *method*: the request type GET or POST *url*: the file location *async*: true (asynchronous) or false (synchronous) *user*: optional user name *psw*: optional password
send()	Sends the request to the server Used for GET requests
send(*string*)	Sends the request to the server. Used for POST requests
setRequestHeader()	Adds a label/value pair to the header to be sent

https://www.w3schools.com/xml/dom_http.asp

XMLHttpRequest Object Properties

Property	Description
onreadystatechange	Defines a function to be called when the readyState property changes
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
responseText	Returns the response data as a string
responseXML	Returns the response data as XML data
status	Returns the status-number of a request 200: "OK" 403: "Forbidden" 404: "Not Found" For a complete list go to the Http Messages Reference
statusText	Returns the status-text (e.g. "OK" or "Not Found")

https://www.w3schools.com/xml/dom_http.asp

XMLHttpRequest.onreadystatechange

- Contains the event handler to be called when the *readyState* property of the XMLHttpRequest changes
- Example:

```
var xhr = new XMLHttpRequest(),
xhr.open(“GET”, "https://developer.mozilla.org/", true);
xhr.onreadystatechange = function () {
  if(xhr.readyState === 4 && xhr.status === 200) {
    console.log(xhr.responseText);
  }
};
xhr.send();
```

https://developer.mozilla.org/en-US/docs/Web/API/XMLHttpRequest/onreadystatechange

Parsing XMLHttpRequest.responseText

- XMLHttpRequest.responseText can be returned as an XML
- Example:

```
<employees>
  <employee>
    <firstName>John</firstName> <lastName>Doe</lastName>
  </employee>
  <employee>
    <firstName>Anna</firstName> <lastName>Smith</lastName>
  </employee>
  <employee>
    <firstName>Peter</firstName> <lastName>Jones</lastName>
  </employee>
</employees>
```

https://www.w3schools.com/js/js_json_xml.asp

Parsing XML data using JS

- Consider the following XML data stored in a variable named *txt*

```
<address>
  <street>Roble Ave</street>
  <mtfcc>S1400</mtfcc>
  <streetNumber>649</streetNumber>
  <lat>37.45127</lat>
  <lng>-122.18032</lng>
  <distance>0.04</distance>
  <postalcode>94025</postalcode>
  <placename>Menlo Park</placename>
  <adminCode2>081</adminCode2>
  <adminName2>San Mateo</adminName2>
  <adminCode1>CA</adminCode1>
  <adminName1>California</adminName1>
  <countryCode>US</countryCode>
</address>
```

https://stackoverflow.com/questions/17604071/parse-xml-using-javascript

Parsing XML data using JS

- Parsing XML with JS DOM:

```
if (window.DOMParser)
{
    parser = new DOMParser();
    xmlDoc = parser.parseFromString(txt, "text/xml");
}
else //older versions of Internet Explorer
{
    xmlDoc = new ActiveXObject("Microsoft.XMLDOM");
    xmlDoc.async = false;
    xmlDoc.loadXML(txt);
}
```

https://stackoverflow.com/questions/17604071/parse-xml-using-javascript

Parsing XML data using JS

- Getting specific values from the nodes:

```
//Gets house address street number
xmlDoc.getElementsByTagName("streetNumber")[0].childNodes[0].nodeValue;

//Gets Street name
xmlDoc.getElementsByTagName("street")[0].childNodes[0].nodeValue;

//Gets Postal Code
xmlDoc.getElementsByTagName("postalcode")[0].childNodes[0].nodeValue;
```

https://stackoverflow.com/questions/17604071/parse-xml-using-javascript

Problems with XML

- Using XML
  - Fetch an XML document
  - Use the XML DOM to loop through the document
  - Extract values and store in variables

- Too verbose
  - To represent data
  - To parse with DOM

https://www.w3schools.com/js/js_json_xml.asp

Solution – Use JSON

- JavaScript Object Notation
- JSON is text, with JavaScript object notation
- JSON is easier to parse than XML
- Data is parsed into a JS object using JSON.parse()

JSON Example

- JSON equivalent of XML data from slide 7

```
{"employees":[
   { "firstName":"John", "lastName":"Doe" },
   { "firstName":"Anna", "lastName":"Smith" },
   { "firstName":"Peter", "lastName":"Jones" }
]}
```

https://www.w3schools.com/js/js_json_xml.asp

JSON Parsing – Example 1

index.html code

```
<html>
<body>
<p id="demo"></p>
<script>
var xmlhttp = new XMLHttpRequest();
xmlhttp.onreadystatechange = function() {
    if (this.readyState == 4 && this.status == 200) {
        var myArr = JSON.parse(this.responseText);
        document.getElementById("demo").innerHTML = myArr.name;
    }
};
xmlhttp.open("GET", "www.abc.com/json.text", true);
xmlhttp.send();
</script>

<p>Click <a href="www.abc.com/json.text"
target="_blank">Link</a></p>

</body>
</html>
```

www.abc.com/json.text

```
{
   "name":"John",
   "age":31,
   "pets":[
      { "animal":"dog", "name":"Fido" },
      { "animal":"cat", "name":"Felix" },
      { "animal":"hamster", "name":"Lightning" }
   ]
}
```

index.html page

John
Click Link

https://www.w3schools.com/js/js_json_parse.asp

JSON Parsing – Example 2

index.html code

```
<html>
<body>
<p id="demo"></p>
<script>
var xmlhttp = new XMLHttpRequest();
xmlhttp.onreadystatechange = function() {
    if (this.readyState == 4 && this.status == 200) {
        var myArr = JSON.parse(this.responseText);
        document.getElementById("demo").innerHTML = myArr[1];
    }
};
xmlhttp.open("GET", "www.abc.com/json.text
", true);
xmlhttp.send();
</script>

<p>Click <a href="www.abc.com/json.text"
target="_blank">Link</a></p>

</body>
</html>
```

www.abc.com/json.text

```
[ "Ford", "BMW", "Audi", "Fiat" ]
```

index.html page

BMW
Click Link

https://www.w3schools.com/js/js_json_parse.asp