CSIT128

AJAX

Joseph Tonien

The example code used in this lecture is available at

`http://www.uow.edu.au/~dong/w3/example/AJAX`

Review: Array

```
var arrayName = [item0, item1, ...];
       var emptyArray = [];
```

```
var subjects = ["ISIT206", "MATH121", "CSCI301"];

subjects[1] = "LOGIC101";

subjects[6] = "LAW201"; // this will create holes in array


// loop through an array

for(var i = 0; i < subjects.length; i++){

  alert(subjects[i]);

}
```

Review: Object

Object is defined by a list of `property:value`

`var objectName = {property1:value1, property2:value2, ...};`

`var emptyObject = {};`

```
var info = {
  name: "John",
  dob: new Date("1996-01-20"),
  year: 2
};
```

Object values can be obtained by **two ways**:

`obj.property`

`obj["property"]`

```
// two ways:
info.year
info["year"]
```

Review: Array vs Object

```
var arrayName = [item0, item1, ...];

var objectName = {property1:value1, property2:value2, ...};
```

Arrays use numbered index:

```
arrayName[0] = "LOGIC101";

arrayName[1] = "CSCI111";
```

Objects use named index:

```
objectName["firstName"] = "John";

objectName.lastName = "Lee";
```

AJAX: **asynchronous J**avaScript and **X**ML

Suppose we want to build a website about Wollongong.
We want to display information about

- Accommodation

- Attractions

- Events

- Restaurants

- Timetable

- Weather

AJAX: **asynchronous J**ava**S**cript and **X**ML

AJAX: **asynchronous J**avaScript and **X**ML

Wollongong

Restaurants
loading restaurants information...

loading weather information...

Accommodation
loading accommodation information...

loading train timetable...

Events
loading events information...

AJAX: **asynchronous J**avaScript and **X**ML

if we use synchronous calls to load informations
- loading info 1…
- loading info 2…
- loading info 3…
- …

then the webpage will froze and is not responsive during the loading.

What happen if one of these calls fails?

AJAX: **asynchronous J**avaScript and **X**ML

asynchronous allows us to send all the requests simultaneously and register **callback functions**

- sending request 1… if success then do this callback1
- sending request 2… if success then do this callback2
- sending request 3… if success then do this callback3
- …
- request 2 success -> evoke callback2 function
- request 3 success -> evoke callback3 function
- request 1 success -> evoke callback1 function
- ...

AJAX: **asynchronous J**avaScript and **X**ML

With Ajax we can

- update a web page without reloading the page

- request data from a server - after the page has loaded

- receive data from a server - after the page has loaded

- send data to a server - in the background

Despite the name, the use of XML is not required, we can also use JSON as an alternative.

Ajax example 1: Receipt

Assume that there is an XML file, called `receipt.xml`. Write HTML and JavaScript codes that do the following:

There is a button "Click here to view receipt". When the user clicks on this button, make an Ajax call to get the receipt information from the xml file and display them in a table. Under the table, there is a summary statement that reports the total amount.

← → C ⟂ http://www.uow.edu.au/~dong/w3/example/AJAX/shopping/receipt.html

Click here to view receipt

Ajax example 1: Receipt

This is the content of the XML file `receipt.xml`

```
<?xml version="1.0" encoding="UTF-8" ?>
<receipt customerRef="2015ABKJ5" paymentDate="04-12-2015">
  <item>
    <productName>Automatic Card Shuffler</productName>
    <quantity>1</quantity>
    <unitPrice>19.95</unitPrice>
  </item>
  <item>
    <productName>Chuggington Fish Card Game</productName>
    <quantity>2</quantity>
    <unitPrice>5.50</unitPrice>
  </item>
</receipt>
```
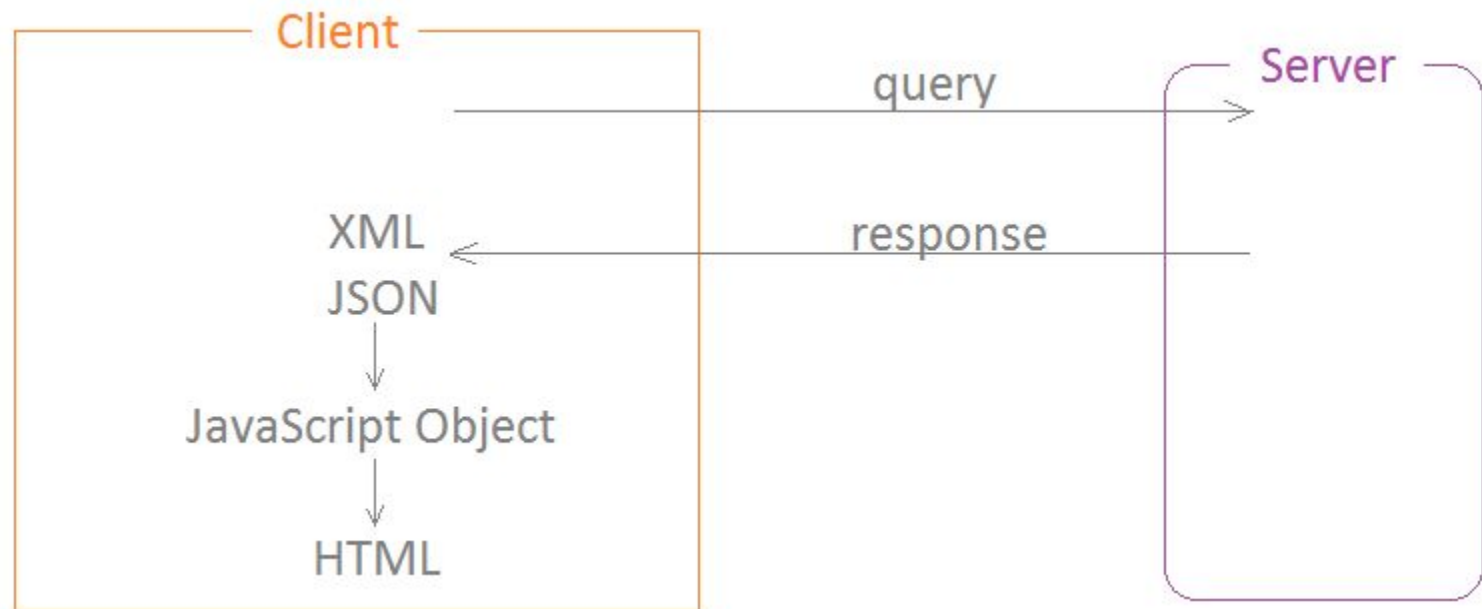
Ajax example 1: Receipt

Ajax example 1: Receipt

Click here to view receipt

Product Name	Quantity	Unit Price	Price
Automatic Card Shuffler	1	19.95	19.95
Chuggington Fish Card Game	2	5.5	11

Total Price: 30.95

Customer Reference Number: 2015ABKJ5
Payment Date: 04-12-2015

```
<button onClick="getReceiptAjax()">

  Click here to view receipt

</button>
<br /><br />


<div id="receipt">

</div>
```

Ajax example 1: Receipt

```
function getReceiptAjax(){

  var xhttp = new XMLHttpRequest();

  xhttp.onreadystatechange = function() {

    if (xhttp.readyState == 4 && xhttp.status == 200) {

      processReceipt(xhttp);

    }

  };

  xhttp.open("GET", "receipt.xml", true);

  xhttp.send();

}
```

Ajax example 1: Receipt

```
function getReceiptAjax(){
  var xhttp = new XMLHttpRequest();
  xhttp.onreadystatechange = function() {
    if (xhttp.readyState == 4 && xhttp.status == 200) {
      processReceipt(xhttp);
    }
  };
  xhttp.open("GET", "receipt.xml", true);
  xhttp.send();
}
```

XMLHttpRequest.readyState

Returns an unsigned short, the state of the request:

Value	State	Description
0	UNSENT	Client has been created. open() not called yet.
1	OPENED	open() has been called.
2	HEADERS_RECEIVED	send() has been called, and headers and status are available.
3	LOADING	Downloading; responseText holds partial data.
4	DONE	The operation is complete.

Ajax example 1: Receipt

```
function getReceiptAjax(){

  var xhttp = new XMLHttpRequest();

  xhttp.onreadystatechange = function() {

    if (xhttp.readyState == 4 && xhttp.status == 200) {

      processReceipt(xhttp);

    }

  };

  xhttp.open("GET", "receipt.xml", true);

  xhttp.send();

}
```

List of HTTP status codes

https://en.wikipedia.org/wiki/List_of_HTTP_status_codes

200 OK

Ajax example 1: Receipt

```javascript
function getReceiptAjax(){
  var xhttp = new XMLHttpRequest();
  xhttp.onreadystatechange = function() {
    if (xhttp.readyState == 4 && xhttp.status == 200) {
      processReceipt(xhttp);
    }
  };
  xhttp.open("GET", "receipt.xml", true);
  xhttp.send();
}
```

```
void open(DOMString method, DOMString url, optional boolean async,
optional DOMString? user, optional DOMString? password);
```

Ajax example 1: Receipt

```
function getReceiptAjax(){

  var xhttp = new XMLHttpRequest();

  xhttp.onreadystatechange = function() {

    if (xhttp.readyState == 4 && xhttp.status == 200) {

      processReceipt(xhttp);

    }

  };

  xhttp.open("GET", "receipt.xml", true);

  xhttp.send();

}

function processReceipt(xhttp){

  var xml = xhttp.responseXML;

  var receiptObj = parseXML(xml);

  display(receiptObj);

}
```
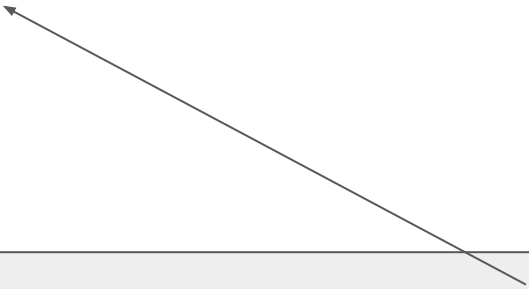
Ajax example 1: Receipt

```
function processReceipt(xhttp){

    var xml = xhttp.responseXML;

    var receiptObj = parseXML(xml);

    display(receiptObj);

}
```

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<receipt customerRef="2015ABKJ5" paymentDate="04-12-2015">
  <item>
    <productName>Automatic Card Shuffler</productName>
    <quantity>1</quantity>
    <unitPrice>19.95</unitPrice>
  </item>
  <item>
    <productName>Chuggington Fish Card Game</productName>
    <quantity>2</quantity>
    <unitPrice>5.50</unitPrice>
  </item>
</receipt>
```

1

2

3

```
▼ {customerRef: "2015ABKJ5", paymentDate: "04-12-2015", itemArray: Array(2)}
        customerRef: "2015ABKJ5"
        paymentDate: "04-12-2015"
    ▼ itemArray: Array(2)
        ▼ 0:
            productName: "Automatic Card Shuffler"
            quantity: 1
            unitPrice: 19.95
        ▼ 1:
            productName: "Chuggington Fish Card Game"
            quantity: 2
            unitPrice: 5.5
```

Click here to view receipt

Product Name	Quantity	Unit Price	Price
Automatic Card Shuffler	1	19.95	19.95
Chuggington Fish Card Game	2	5.5	11

Total Price: 30.95

Customer Reference Number: 2015ABKJ5
Payment Date: 04-12-2015

Ajax example 1: Receipt

```
function processReceipt(xhttp){

  var xml = xhttp.responseXML;

  var receiptObj = parseXML(xml);

  display(receiptObj);

}
```

1   get the response XML

2

parse the XML into a
javascript object

3

display the javascript object
in a HTML table

Ajax example 1: Receipt

```
function processReceipt(xhttp){

    var xml = xhttp.responseXML;

    var receiptObj = parseXML(xml);

    display(receiptObj);

}
```

```
function parseXML(xml){
  var receiptElement = xml.getElementsByTagName("receipt")[0];

  //create a receipt object to hold the information in the xml file
  var receiptObj = {};
  receiptObj.customerRef= receiptElement.getAttribute("customerRef");
  receiptObj.paymentDate= receiptElement.getAttribute("paymentDate");

  var itemElements = xml.getElementsByTagName("item");

  //create an array to hold the items
  receiptObj.itemArray = [];

  for(var i=0; i< itemElements.length; i++){
    var item = {};
    item.productName = itemElements[i].getElementsByTagName("productName")[0].childNodes[0].nodeValue;
    item.quantity = Number(itemElements[i].getElementsByTagName("quantity")[0].childNodes[0].nodeValue);
    item.unitPrice = Number(itemElements[i].getElementsByTagName("unitPrice")[0].childNodes[0].nodeValue);
    receiptObj.itemArray.push(item);
  }
  return receiptObj;
}
```

Ajax example 1: Receipt

```
function processReceipt(xhttp){

    var xml = xhttp.responseXML;

    var receiptObj = parseXML(xml);

    display(receiptObj);

}
```

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<receipt customerRef="2015ABKJ5" paymentDate="04-12-2015">
  <item>
    <productName>Automatic Card Shuffler</productName>
    <quantity>1</quantity>
    <unitPrice>19.95</unitPrice>
  </item>
  <item>
    <productName>Chuggington Fish Card Game</productName>
    <quantity>2</quantity>
    <unitPrice>5.50</unitPrice>
  </item>
</receipt>
```

```
function parseXML(xml){
  var receiptElement = xml.getElementsByTagName("receipt")[0];

  //create a receipt object to hold the information in the xml file
  var receiptObj = {};
  receiptObj.customerRef= receiptElement.getAttribute("customerRef");
  receiptObj.paymentDate= receiptElement.getAttribute("paymentDate");

  var itemElements = xml.getElementsByTagName("item");

  //create an array to hold the items
  receiptObj.itemArray = [];

  for(var i=0; i< itemElements.length; i++){
    var item = {};
    item.productName = itemElements[i].getElementsByTagName("productName")[0].childNodes[0].nodeValue;
    item.quantity = Number(itemElements[i].getElementsByTagName("quantity")[0].childNodes[0].nodeValue);
    item.unitPrice = Number(itemElements[i].getElementsByTagName("unitPrice")[0].childNodes[0].nodeValue);
    receiptObj.itemArray.push(item);
  }
  return receiptObj;
}
```

Ajax example 1: Receipt

```
function processReceipt(xhttp){

    var xml = xhttp.responseXML;

    var receiptObj = parseXML(xml);

    display(receiptObj);

}
```

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<receipt customerRef="2015ABKJ5" paymentDate="04-12-2015">
  <item>
    <productName>Automatic Card Shuffler</productName>
    <quantity>1</quantity>
    <unitPrice>19.95</unitPrice>
  </item>
  <item>
    <productName>Chuggington Fish Card Game</productName>
    <quantity>2</quantity>
    <unitPrice>5.50</unitPrice>
  </item>
</receipt>
```

```
function parseXML(xml){
  var receiptElement = xml.getElementsByTagName("receipt") [0];

  //create a receipt object to hold the information in the xml file
  var receiptObj = {};
  receiptObj.customerRef= receiptElement.getAttribute("customerRef");
  receiptObj.paymentDate= receiptElement.getAttribute("paymentDate");

  var itemElements = xml.getElementsByTagName("item");

  //create an array to hold the items
  receiptObj.itemArray = [];

  for(var i=0; i< itemElements.length; i++){
    var item = {};
    item.productName = itemElements[i].getElementsByTagName("productName")[0].childNodes[0].nodeValue;
    item.quantity = Number(itemElements[i].getElementsByTagName("quantity")[0].childNodes[0].nodeValue);
    item.unitPrice = Number(itemElements[i].getElementsByTagName("unitPrice")[0].childNodes[0].nodeValue);
    receiptObj.itemArray.push(item);
  }
  return receiptObj;
}
```

Ajax example 1: Receipt

```
function processReceipt(xhttp){

    var xml = xhttp.responseXML;

    var receiptObj = parseXML(xml);

    display(receiptObj);

}
```

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<receipt customerRef="2015ABKJ5" paymentDate="04-12-2015">
  <item>
    <productName>Automatic Card Shuffler</productName>
    <quantity>1</quantity>
    <unitPrice>19.95</unitPrice>
  </item>
  <item>
    <productName>Chuggington Fish Card Game</productName>
    <quantity>2</quantity>
    <unitPrice>5.50</unitPrice>
  </item>
</receipt>
```

```
function parseXML(xml){
  var receiptElement = xml.getElementsByTagName("receipt")[0];

  //create a receipt object to hold the information in the xml file
  var receiptObj = {};
  receiptObj.customerRef= receiptElement.getAttribute("customerRef");
  receiptObj.paymentDate= receiptElement.getAttribute("paymentDate");

  var itemElements = xml. getElementsByTagName("item");

  //create an array to hold the items
  receiptObj.itemArray = [];

  for(var i=0; i< itemElements.length; i++){
    var item = {};
    item.productName = itemElements[i].getElementsByTagName("productName")[0].childNodes[0].nodeValue;
    item.quantity = Number(itemElements[i].getElementsByTagName("quantity")[0].childNodes[0].nodeValue);
    item.unitPrice = Number(itemElements[i].getElementsByTagName("unitPrice")[0].childNodes[0].nodeValue);
    receiptObj.itemArray.push(item);
  }
  return receiptObj;
}
```
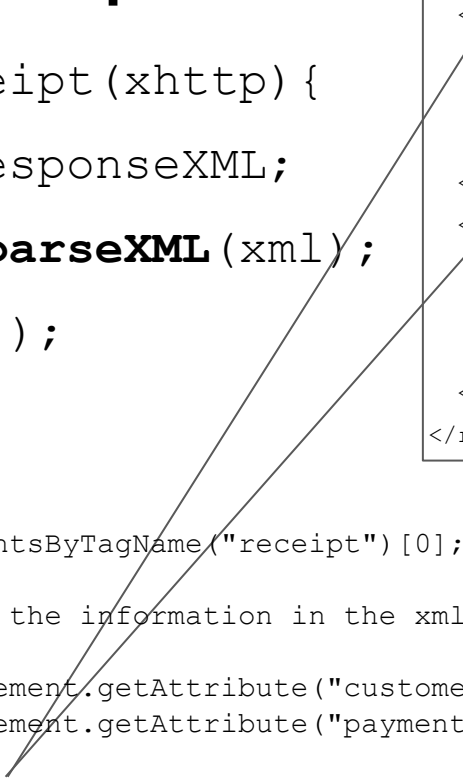
Ajax example 1: Receipt

```
function processReceipt(xhttp){

    var xml = xhttp.responseXML;

    var receiptObj = parseXML(xml);

    display(receiptObj);

}
```

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<receipt customerRef="2015ABKJ5" paymentDate="04-12-2015">
  <item>
    <productName>Automatic Card Shuffler</productName>
    <quantity>1</quantity>
    <unitPrice>19.95</unitPrice>
  </item>
  <item>
    <productName>Chuggington Fish Card Game</productName>
    <quantity>2</quantity>
    <unitPrice>5.50</unitPrice>
  </item>
</receipt>
```

```
function parseXML(xml){
  var receiptElement = xml.getElementsByTagName("receipt")[0];

  //create a receipt object to hold the information in the xml file
  var receiptObj = {};
  receiptObj.customerRef= receiptElement.getAttribute("customerRef");
  receiptObj.paymentDate= receiptElement.getAttribute("paymentDate");

  var itemElements = xml.getElementsByTagName("item");

  //create an array to hold the items
  receiptObj.itemArray = [];

  for(var i=0; i< itemElements.length; i++){
    var item = {};
    item.productName = itemElements[i].getElementsByTagName("productName")[0].childNodes[0].nodeValue;
    item.quantity = Number(itemElements[i].getElementsByTagName("quantity")[0].childNodes[0].nodeValue);
    item.unitPrice = Number(itemElements[i].getElementsByTagName("unitPrice")[0].childNodes[0].nodeValue);
    receiptObj.itemArray.push(item);
  }
  return receiptObj;
}
```
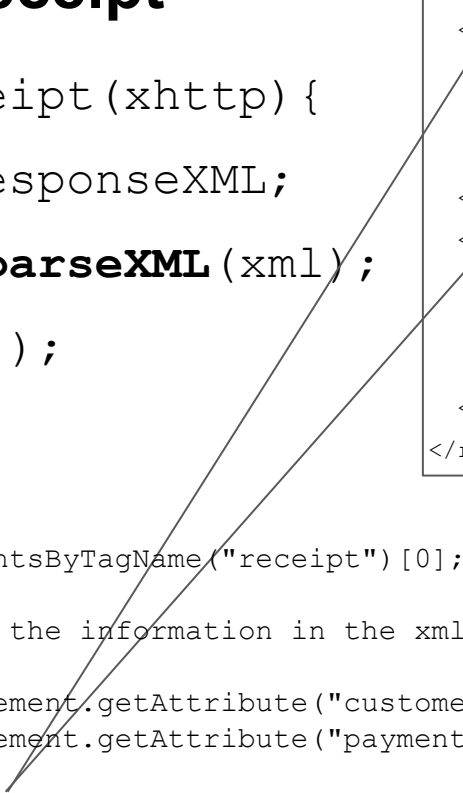
Ajax example 1: Receipt

```
function processReceipt(xhttp){

    var xml = xhttp.responseXML;

    var receiptObj = parseXML(xml);

    display(receiptObj);

}
```

1

2

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<receipt customerRef="2015ABKJ5" paymentDate="04-12-2015">
  <item>
    <productName>Automatic Card Shuffler</productName>
    <quantity>1</quantity>
    <unitPrice>19.95</unitPrice>
  </item>
  <item>
    <productName>Chuggington Fish Card Game</productName>
    <quantity>2</quantity>
    <unitPrice>5.50</unitPrice>
  </item>
</receipt>
```

```
▼ {customerRef: "2015ABKJ5", paymentDate: "04-12-2015", itemArray: Array(2)}
                    customerRef: "2015ABKJ5"
                    paymentDate: "04-12-2015"
                ▼ itemArray: Array(2)
                  ▼ 0:
                      productName: "Automatic Card Shuffler"
                      quantity: 1
                      unitPrice: 19.95
                  ▼ 1:
                      productName: "Chuggington Fish Card Game"
                      quantity: 2
                      unitPrice: 5.5
```

Ajax example 1: Receipt

```
function processReceipt(xhttp){

    var xml = xhttp.responseXML;

    var receiptObj = parseXML(xml);

    display(receiptObj);

}
```

Click here to view receipt

Product Name	Quantity	Unit Price	Price
Automatic Card Shuffler	1	19.95	19.95
Chuggington Fish Card Game	2	5.5	11

Total Price: 30.95

Customer Reference Number: 2015ABKJ5
Payment Date: 04-12-2015

```
function display(receiptObj){
  var totalPrice = 0;
  var html = "<table border='1'>";
  html += "<tr><th>Product Name</th><th>Quantity</th><th>Unit Price</th><th>Price</th></tr>";
  for(var i=0; i<receiptObj.itemArray.length; i++){
    var item = receiptObj.itemArray[i];
    var price = item.unitPrice * item.quantity;
    html += "<tr>";
    html += "<td>" + item.productName + "</td>";
    html += "<td>" + item.quantity + "</td>";
    html += "<td>" + item.unitPrice + "</td>";
    html += "<td>" + price + "</td>";
    html += "</tr>";
    totalPrice += price;
  }
  html += "</table>";
  html += "<br />";
  html += "<b>Total Price: " + totalPrice + "</b><br /><br /><br />";
  html += "<i>Customer Reference Number: " + receiptObj.customerRef + "</i> </br />";
  html += "<i>Payment Date: " + receiptObj.paymentDate + "</i>";
  var receiptDiv = document.getElementById("receipt");
  receiptDiv.innerHTML = html;
}
```

Ajax example 1: Receipt

Please see the difference between

`http://www.uow.edu.au/~dong/w3/example/AJAX/shopping/receipt.html`

and

`http://www.uow.edu.au/~dong/w3/example/AJAX/shopping/receipt2.html`

Ajax example 2: Stock market

Assume that there is an XML file, called `market.xml`. Write HTML and JavaScript codes that do the following:

There is a button "Click here to view Stock Market Activity". When the user clicks on this button, make an Ajax call to get the stock information from the xml file and display them in a table.

http://www.uow.edu.au/~dong/w3/example/AJAX/stock/market.html

Click here to view Stock Market Activity

Stock Market Activity 24/02/2015 11:30:00

Index	Value	Change	Net / %
NASDAQ	4725.64	-37.58 ▼	0.79%
NASDAQ-100 (NDX)	4312.01	-29.38 ▼	0.68%
Pre-Market (NDX)	4316.29	-25.1 ▼	0.58%
After Hours (NDX)	4320.61	8.6 ▲	0.2%
DJIA	17651.26	-99.65 ▼	0.56%
S&P 500	2051.12	-12.25 ▼	0.59%
Russell 2000	1113.13	-8.62 ▼	0.77%

Ajax example 2: Stock market

This is the content of the XML file `market.xml`

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<market queryTime="24/02/2015 11:30:00">
  <index>
    <name>NASDAQ</name>
    <value>4725.64</value>
    <change>-37.58</change>
    <netPercentage>0.79</netPercentage>
  </index>
  <index>
    <name>NASDAQ-100 (NDX)</name>
    <value>4312.01</value>
    <change>-29.38</change>
    <netPercentage>0.68</netPercentage>
  </index>
...
</market>
```

Ajax example 2: Stock market

Click here to view Stock Market Activity

Stock Market Activity 24/02/2015 11:30:00

Index	Value	Change	Net / %
NASDAQ	4725.64	-37.58 ▼	0.79%
NASDAQ-100 (NDX)	4312.01	-29.38 ▼	0.68%
Pre-Market (NDX)	4316.29	-25.1 ▼	0.58%
After Hours (NDX)	4320.61	8.6 ▲	0.2%
DJIA	17651.26	-99.65 ▼	0.56%
S&P 500	2051.12	-12.25 ▼	0.59%
Russell 2000	1113.13	-8.62 ▼	0.77%

```
<button onClick="getMarketAjax()">
  Click here to view Stock Market Activity
</button>

<div id="marketDiv">
</div>
```

Ajax example 2: Stock market

```
function getMarketAjax(){

  var xhttp = new XMLHttpRequest();

  xhttp.onreadystatechange = function() {

    if (xhttp.readyState == 4 && xhttp.status == 200) {

      processResult(xhttp);

    }

  };

  xhttp.open("GET", "market.xml", true);

  xhttp.send();

}
```

Ajax example 2: Stock market

```
function processResult(xhttp){

    var xml = xhttp.responseXML;

    var marketObj = parseXML(xml);

    display(marketObj);

}
```

1

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<market queryTime="24/02/2015 11:30:00">
  <index>
    <name>NASDAQ</name>
    <value>4725.64</value>
    <change>-37.58</change>
    <netPercentage>0.79</netPercentage>
  </index>
  <index>
    <name>NASDAQ-100 (NDX)</name>
    …
  </index>
</market>
```

2

```
▼ Object {queryTime: "24/02/2015 11:30:00", indexList: Array[7]}
    queryTime: "24/02/2015 11:30:00"
  ▼ indexList: Array[7]
    ▼ 0: Object
        change: -37.58
        name: "NASDAQ"
        netPercentage: 0.79
        value: 4725.64
    ▼ 1: Object
        change: -29.38
        name: "NASDAQ-100 (NDX)"
        netPercentage: 0.68
        value: 4312.01
    ▶ 2: Object
    ▶ 3: Object
    ▶ 4: Object
    ▶ 5: Object
    ▶ 6: Object
```

3

Stock Market Activity 24/02/2015 11:30:00

Index	Value	Change	Net / %
NASDAQ	4725.64	-37.58▼	0.79%
NASDAQ-100 (NDX)	4312.01	-29.38▼	0.68%
Pre-Market (NDX)	4316.29	-25.1▼	0.58%
After Hours (NDX)	4320.61	8.6▲	0.2%
DJIA	17651.26	-99.65▼	0.56%
S&P 500	2051.12	-12.25▼	0.59%
Russell 2000	1113.13	-8.62▼	0.77%

Ajax example 2: Stock market

```
function processResult(xhttp){

    var xml = xhttp.responseXML;

    var marketObj = parseXML(xml);

    display(marketObj);

}
```

2

```
▼ Object {queryTime: "24/02/2015 11:30:00", indexList: Array[7]}
    queryTime: "24/02/2015 11:30:00"
  ▼ indexList: Array[7]
    ▼ 0: Object
        change: -37.58
        name: "NASDAQ"
        netPercentage: 0.79
        value: 4725.64
    ▼ 1: Object
        change: -29.38
        name: "NASDAQ-100 (NDX)"
        netPercentage: 0.68
        value: 4312.01
    ▶ 2: Object
    ▶ 3: Object
    ▶ 4: Object
    ▶ 5: Object
    ▶ 6: Object
```

```
function parseXML(xml){
  var marketObj = {};  //create a market object to hold the information in the xml file

  var marketElement = xml.getElementsByTagName("market")[0];
  marketObj.queryTime = marketElement.getAttribute("queryTime");

  marketObj.indexList = [];  //create an array to hold the indices

  var indexElements = marketElement.getElementsByTagName("index");

  for(var i=0; i< indexElements.length; i++){
    var index = {};  //create an index object

    index.name = indexElements[i].getElementsByTagName("name")[0].childNodes[0].nodeValue;
    index.value = Number(indexElements[i].getElementsByTagName("value")[0].childNodes[0].nodeValue);
    index.change = Number(indexElements[i].getElementsByTagName("change")[0].childNodes[0].nodeValue);
    index.netPercentage = Number(indexElements[i].getElementsByTagName("netPercentage")[0].childNodes[0].nodeValue);

    marketObj.indexList.push(index); //put the index object into the index array
  }

  return marketObj;
}
```

Ajax example 2: Stock market

```
function processResult(xhttp){

    var xml = xhttp.responseXML;

    var marketObj = parseXML(xml);

    display(marketObj);

}
```

3

Stock Market Activity 24/02/2015 11:30:0

Index	Value	Change	Net / %
NASDAQ	4725.64	-37.58 ▼	0.79%
NASDAQ-100 (NDX)	4312.01	-29.38 ▼	0.68%
Pre-Market (NDX)	4316.29	-25.1 ▼	0.58%
After Hours (NDX)	4320.61	8.6 ▲	0.2%
DJIA	17651.26	-99.65 ▼	0.56%
S&P 500	2051.12	-12.25 ▼	0.59%
Russell 2000	1113.13	-8.62 ▼	0.77%

```
function display(marketObj){
 var totalPrice = 0;

 var html = "<h1>Stock Market Activity " + marketObj.queryTime + "</h1>";
 html += "<table border='1'>";
 html += "<tr><th>Index</th><th>Value</th><th>Change</th><th>Net / %</th></tr>";
 for(var i=0; i<marketObj.indexList.length; i++){
  html += "<tr>";
  html += "<td><b>" + marketObj.indexList[i].name + "</b></td>";
  html += "<td align='right'>" + marketObj.indexList[i].value + "</td>";

  if(marketObj.indexList[i].change < 0){
   html += "<td style='color:red' align='right'>" + marketObj.indexList[i].change + "<img src='stockDown.png' /></td>";
  }else{
   html += "<td style='color:green' align='right'>" + marketObj.indexList[i].change + "<img src='stockUp.png' /></td>";
  }

  html += "<td align='right'>" + marketObj.indexList[i].netPercentage + "%</td>";
  html += "</tr>";
 }
 html += "</table>";

 var marketDiv = document.getElementById("marketDiv");
 marketDiv.innerHTML = html;
}
```

Ajax example 2: Stock market

Please see the difference between

`http://www.uow.edu.au/~dong/w3/example/AJAX/stock/market.html`

and

`http://www.uow.edu.au/~dong/w3/example/AJAX/stock/market2.html`

References

- `http://www.w3schools.com/ajax`

- Robert W. Sebesta, *Programming the World Wide Web*, Pearson.