CSIT128 / CSIT828

JSON

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JavaScript Object Notation (JSON)

- In most web applications, XML and JSON are used to store or transport data
- JSON is "self-describing" and easy to understand

This is an example of a JSON describing a student object:

```
{
  "firstName":"John",
  "lastName":"Smith",
  "domestic":true,
  "fee":100.5
}
```

JSON

- Data is in name/value pairs
- Data is separated by commas
- Curly braces hold objects

```
{
  "firstName":"John",
  "lastName":"Smith",
  "domestic":true,
  "fee":100.5
}
```

JSON

Translate from Javascript object to JSON string

```
objJSON = JSON.stringify(obj);
```

Translate from JSON string to javascript object

```
obj = JSON.parse(objJSON);
```

JSON

Example 1: http://www.uow.edu.au/~dong/w3/example/json/example1.html

```
function showJSON(){
  //create a student object
  var john = {};
  john.firstName = "John";
  john.lastName = "Smith";
  john.domestic = true;
  john.fee = 100.50;

  //get JSON string from the javascript object
  var johnJSON = JSON.stringify(john);

  //print the JSON string to the console
  console.log(johnJSON);
}

<button onClick="showJSON()">
Click here to see JSON string
</button>
```

JSON

Example 2: http://www.uow.edu.au/~dong/w3/example/json/example2.html

```
function showObject(){
 //JSON string
 var johnJSON = '{"firstName":"John","lastName":"Smith",
                          "domestic":true,"fee":100.5}';

 //get javascript object from JSON string
 var john = JSON.parse(johnJSON);

 //print the object to the console
 console.log(john);
 console.log("Full name is "+john.firstName+ " " + john.lastName);
}


<button onClick="showObject()">
Click here to see object from JSON
</button>
```

JSON

Square brackets hold arrays

```
[
  {
    "firstName":"John",
    "lastName":"Smith"
  },
  {
    "firstName":"Kate",
    "lastName":"Williams"
  }
]
```

JSON

Example 3: http://www.uow.edu.au/~dong/w3/example/json/example3.html

```
function showJSON(){
  var john = {};
  john.firstName = "John";
  john.lastName = "Smith";

  var kate = {};
  kate.firstName = "Kate";
  kate.lastName = "Williams";

  //create an array of student objects
  var studentList = [john, kate];

  //get JSON string from the javascript array
  var studentListJSON = JSON.stringify(studentList);

  //print the JSON string to the console
  console.log(studentListJSON);
}
```

```
<button onClick="showJSON()">
Click here to see JSON string
</button>
```

JSON

Example 4: http://www.uow.edu.au/~dong/w3/example/json/example4.html

```
function showArray(){
 //JSON string
 var studentListJSON = '[{"firstName":"John","lastName":"Smith"},
                 {"firstName":"Kate","lastName":"Williams"}]';

 //get javascript array from JSON string
 var studentList = JSON.parse(studentListJSON);

 //print the object to the console
 console.log(studentList);
 console.log("There are " + studentList.length + " students");
}
```

```
<button onClick="showArray()">
Click here to see array from JSON
</button>
```

JSON

Example 5: http://www.uow.edu.au/~dong/w3/example/json/example5.html

```
function showJSON(){
  var john = {}; //create a student object
  john.firstName = "John";
  john.lastName = "Smith";
  john.enrolledSubjects = [];
//empty array to hold subjects

  var math101 = {};
  math101.code = "MATH101";
  math101.title = "Algebra";
  john.enrolledSubjects.push(math101); //put subject into array

  var csit122 = {};
  csit122.code = "CSIT122";
  csit122.title = "C programming";
  john.enrolledSubjects.push(csit122); //put subject into array

  var johnJSON = JSON.stringify(john); //get JSON string from obj
  console.log(johnJSON); //print JSON string to the console
}
```

```
{
  "firstName":"John",
  "lastName":"Smith",
  "enrolledSubjects":[
    {
      "code":"MATH101",
      "title":"Algebra"
    },
    {
      "code":"CSIT122",
      "title":"C programming"
    }
  ]
}
```

JSON

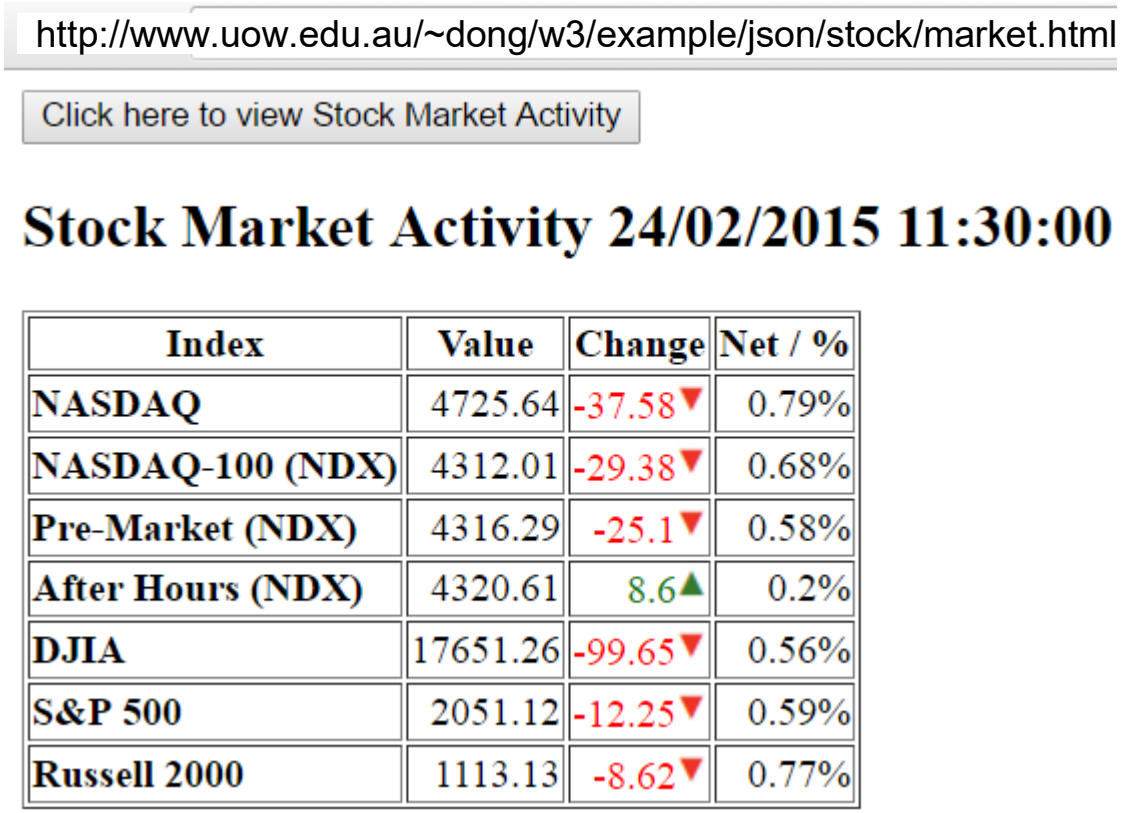
Example 5: http://www.uow.edu.au/~dong/w3/example/json/example5.html

```
{
  "firstName":"John",
  "lastName":"Smith",
  "enrolledSubjects":[
    {
      "code":"MATH101",
      "title":"Algebra"
    },
    {
      "code":"CSIT122",
      "title":"C programming"
    }
  ]
}
```

Ajax-JSON example: Stock market

Assume that there is a JSON file, called `market.json`. 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 JSON file and display them in a table.

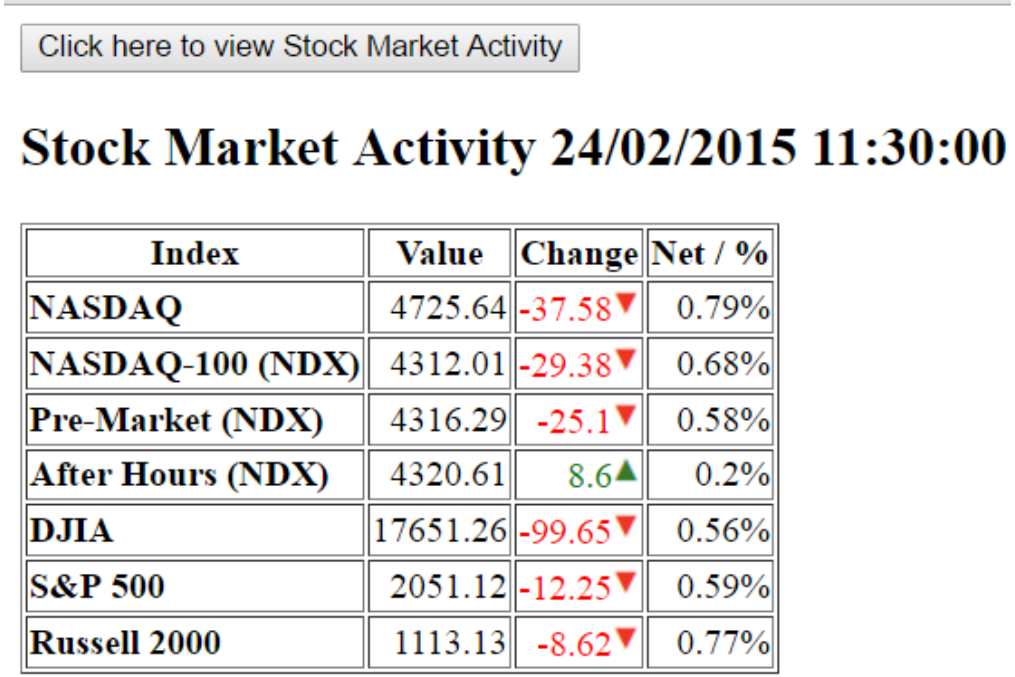


Ajax-JSON example: Stock market

This is the content of the JSON file `market.json`

```
{
  "queryTime":"24/02/2015 11:30:00",
  "indexList":[
    {
      "name":"NASDAQ",
      "value":4725.64,
      "change":-37.58,
      "netPercentage":0.79
    },
    {
      "name":"NASDAQ-100 (NDX)",
      "value":4312.01,
      "change":-29.38,
      "netPercentage":0.68
    },...
  ]
}
```

Ajax-JSON example: Stock market




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

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

Ajax-JSON example: Stock market

```
function getMarketAjax(){
  var xhttp = new XMLHttpRequest();
  xhttp.onreadystatechange = function() {
    if (xhttp.readyState == 4 && xhttp.status == 200) {
      processResult(xhttp);
    }
  };
  xhttp.open("GET", "market.json", true);
  xhttp.send();
}
```

Ajax-JSON example: Stock market

```
function processResult(xhttp){
 var jsonText = xhttp.responseText;
 var marketObj = JSON.parse(jsonText);
 display(marketObj);
}
```

1


```
{
  "queryTime":"24/02/2015 11:30:00",
  "indexList":[
    {
      "name":"NASDAQ",
      "value":4725.64,
      "change":-37.58,
      "netPercentage":0.79
    },...
  ]
}
```


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-JSON example: Stock market

```
function processResult(xhttp){
 var jsonText = xhttp.responseText;
 var marketObj = JSON.parse(jsonText);
 display(marketObj);
}
```

1

```
{
  "queryTime":"24/02/2015 11:30:00",
  "indexList":[
    {
      "name":"NASDAQ",
      "value":4725.64,
      "change":-37.58,
      "netPercentage":0.79
    },...
  ]
}
```

What is the difference between this Ajax-JSON example with our previous Ajax-XML example?

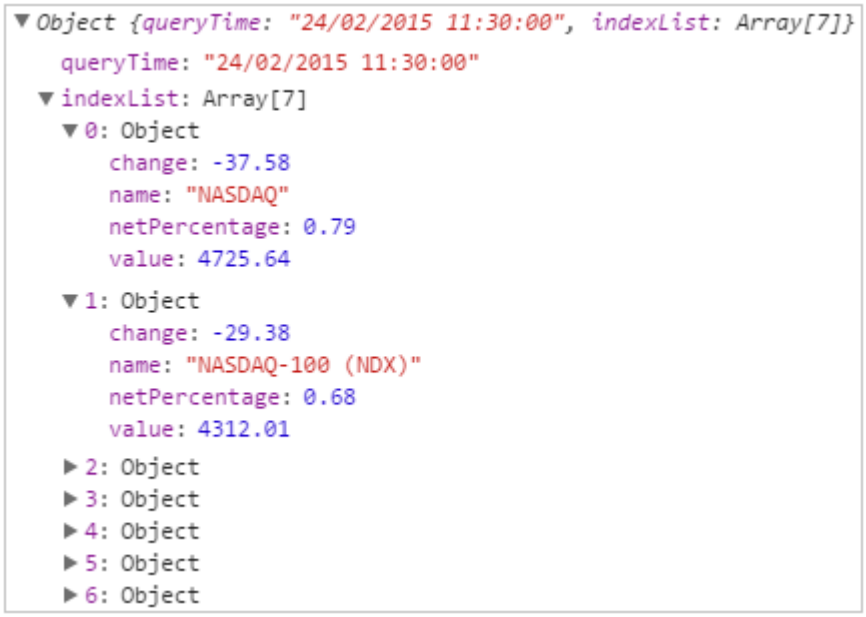
Ajax-JSON example: Stock market

```
function processResult(xhttp){
 var jsonText = xhttp.responseText;
 var marketObj = JSON.parse(jsonText);
 display(marketObj);
}
```

1

```
{
  "queryTime":"24/02/2015 11:30:00",
  "indexList":[
    {
      "name":"NASDAQ",
      "value":4725.64,
      "change":-37.58,
      "netPercentage":0.79
    },...
  ]
}
```

2



JSON.parse(JSON-string) will turn a JSON string into a Javascript object

What is the difference between this Ajax-JSON example with our previous Ajax-XML example?

Ajax-JSON example: Stock market

```
function processResult(xhttp){
 var jsonText = xhttp.responseText;
 var marketObj = JSON.parse(jsonText);
 display(marketObj);
}
```

3

Stock Market Activity 24/02/2015 1

Index	Value	Change	Net / %
NASDAQ	4725.64	-37.58▼	0.79%
NASDAQ-100 (NDX)	4312.01	-29.38▼	0.68%
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```
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;
}
```

This is exactly the same as our previous Ajax-XML example

Ajax-JSON example: Stock market

Please see the difference between

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

and

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

References

`http://www.w3schools.com/json`

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