

JSON (JavaScript Object Notation)

“Code with Passion!”



Topics

- What is and Why JSON?
- JSON Object
- JavaScript Object and JSON text conversion
- JSON in Java

What is & Why JSON?

What is JSON?

- JSON is a **text format representation** of JavaScript object
 - > More precisely, it is a text format representation of a JavaScript object literal with some restrictions (see the next slide for these restrictions)
 - > Readily usable in JavaScript code - you can easily convert JSON-based text format representation to JavaScript object
- Lighter text-based data-interchange format
 - > Compared to XML
- Simple format
 - > Easy for humans to read and write
 - > Easy for machines to parse and generate

JSON Restrictions

- A key must be double quoted “” string in JSON
 - > Single quoted string is not allowed
- The values can be one of the following – it cannot be a function for example
 - > a string
 - > a number
 - > another (JSON-based) JavaScript object
 - > an array
 - > true
 - > false
 - > null

Example

- The following is a valid JavaScript object literal but it is not a valid JSON format because
 - > The keys are not in double-quoted strings
 - > The value cannot be a function

```
{  
  property1 : true,  
  showMessage : function (msg) { alert(msg) }  
}
```

Why Use JSON over XML?

- Lighter and faster than XML as on-the-wire text-based data format
- JSON data is typed while XML data is typeless
 - > JSON types: string, number, array, boolean, etc
 - > XML data are all string
- Native data form for JavaScript code
 - > JSON data is readily converted a JavaScript object in your JavaScript code vs. XML data needed to be parsed and assigned to variables through tedious DOM APIs
 - > Retrieving values is as easy as reading from an object property in your JavaScript code

Where is JSON Used?

- Data format in communication protocols
- Data format
 - > NoSQL document databases such as CouchBase, MongoDB
- Configuration information

JSON Notation

JSON Notation

- A collection of name/value pairs with some restrictions
 - > Aligned with JavaScript object format – remember JavaScript object is also a collection of name/value pairs
 - > JSON notation can be used in the JavaScript language with no extra work
- A JSON notation begins with { (left brace) and ends with } (right brace)
- Each name is followed by : (colon) and the name/value pairs are separated by , (comma)

```
{"name": "sangshin", "hobby": "golf"}
```

Example: JSON-format JavaScript Object

```
var myJSONObject = {"bindings": [  
    {"ircEvent": "PRIVMSG", "method": "newURI", "regex": "^http://.*"},  
    {"ircEvent": "PRIVMSG", "method": "deleteURI", "regex": "^delete.*"},  
    {"ircEvent": "PRIVMSG", "method": "randomURI", "regex": "^random.*"}  
    ]  
};
```

- In this example, a JSON-format JavaScript object is created containing a single member "bindings", which contains an array containing three objects, each containing "ircEvent", "method", and "regex" members
- Members can be retrieved using dot or subscript operators
`myJSONObject.bindings[0].method` // "newURI"

Lab:

Exercise 1.1: JSON
4274_javascript_json.zip



JavaScript Object to/from JSON Text Conversion

JSON Text to JavaScript Object Conversion in JavaScript code

- To convert a JSON text into an JavaScript object (some people call it JSON object), use the `eval()` function
 - > `eval('(' + <JSON-text> + ')')` invokes the JavaScript compiler
 - > Since <JSON-text> is a valid representation of JavaScript syntax, the compiler will correctly parse the text and produce a JavaScript object

```
var myJSONtext = '{"my_text": "Life is good!",  
  "my_number":35}';
```

```
var myObject = eval('(' + myJSONtext + ')');
```

Security & JSON Parser

- `eval()` can compile and execute any JavaScript program, so there can be security issues (i.e., cross-site scripting)
 - > Use of `eval()` is strongly discouraged
 - > Use `eval()` only when the source can be trusted
- When security is a concern - the source cannot be trusted -, it is better to use a JSON parser
 - > A JSON parser will only recognize JSON text and so is much safer – in other words, it will not execute malicious JavaScript code

```
var myObject = JSON.parse(myJSONtext);
```

Object to Text Conversion

```
var myJSONText = JSON.stringify(myJSONObject2);
```

- You can convert JavaScript object into JSON text

Lab:

Exercise 1.2: Conversion 4274_javascript_json.zip



JSON in Java

JSON Tools for Java Developer

- Parser
 - > Parse JSON text files and convert these to a Java model
- Renderer
 - > Render a Java representation into text
- Serializer
 - > Serialize plain POJO clusters to a JSON representation
- Validator
 - > Validate the contents of a JSON file using a JSON schema

JSON Java Packages

- Jackson
 - > <http://wiki.fasterxml.com/JacksonHome>
 - > Used internally by Jersey
- Douglas Crockford's implementation
 - > <https://github.com/douglascrockford/JSON-java>
- Json-lib
 - > <http://json-lib.sourceforge.net/>
 - > Based on Douglas Crockford's implementation
- Google GSON
 - > <http://code.google.com/p/google-gson/>

Lab:

Exercise 2: JSON Java APIs 4274_javascript_json.zip



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