ECMAScript and E4X

Seminar OHJ-1860:

Web-Oriented Software Development

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ECMAScript

- ECMA (The European Computer Manufacturers Association) has developed standards for information and communication systems since 1961

- Standardized version of JavaScript is called ECMAScript (ECMA-262, ISO-16262) 1999

- Invented and first used by Netscape

- Several versions of JavaScript (JScript used in Internet Explorer)

- ECMAScript for XML (E4X) adds native XML support in JavaScript

- ECMA-357 (E4X) was standardized in June 2004

JavaScript

- JavaScript is a lightweight, object-oriented, scripting language
- A scripting language:
  - runs within a host environment
  - used for manipulating existing functionality
- A host supporting the specification makes JavaScript executable
- Web browser provides a host for client-side application
- Enables manipulating browser objects (windows, pop-ups, events..)
- A server can provide host for server-side computation

JavaScript

Language

- Object-based: objects have properties (object, value, method)
- A dynamically typed language (data types are converted automatically during script execution)
- No proper classes like, e.g., in C++ and Java
- Constructors are used for creating and initializing objects
- Prototype-based inheritance (a constructor has a prototype property, an object has a reference to its prototype)
- The specification doesn't describe the DOM

JavaScript

A JavaScript can be used to?

- Develop client-side programs
- Gives a programming tool to HTML developers
- To give feedback to the users (e.g., allerts, dialogs)
- Dynamic HTML pages (e.g., animated graphics, dynamic menus)
- React on events (mouse, window, key, and form events)
- Processing HTML (e.g., adding and deleting nodes)
- Data processing and validaling (passwords, email addresses, forms)
- Detect visitor information (e.g., browser version)
- Create cookies

JavaScript

A JavaScript can't be used to?

- Read or write the client-side file system. A good thing.
- Read or write the server-side file system. One should use, e.g., CGI scripts (Perl, Python, PHP) (e.g. writing log files, storing visitor information).
- Access windows and Web pages, which are opened by someone else

XML for ECMAScript (E4X)

Motivation

- Increasing use of XML (XML data, XHTML, SOAP, WSDL, deployment descriptors, XSLT, Schema....)

- Current XML processing techniques
  - The document Object Model (DOM)
  - The Extensible Stylesheet Language (XSLT)
  - Object Mapping in JavaScript (XML object ◄► JavaScript object)

E4X

Design Principles

- **Simple**: to simplify common programming tasks
- **Consistent**: internal consistent
- **Framiliar**: use of common JavaScript operators for handling XML
- **Minimal**: the set of new operators should be kept to a minimum
- **Loose Coupling**: minimal dependencies to external data formats
- **Complementary**: integrating well with other XML manipulating techniques (such as xPath and XSLT)

E4X

- Easy way to define XML documents as JavaScript objects

```
var library = <library>
<items>
<item id="312A-1">
        <name>I like XML</name>
        <isbn>0-445-333</isbn>
        </item>
</items></library>
```

- Easy to load and store XML documents

```
var xmlDoc = new XML()
xmlDoc.load("addressBook.xml")
document.write(xmlDoc)
```

- Indexing of elements

```
item0=doc.item[0]
```

- Adding and deleting nodes

```
delete.doc@c; doc.insertChildAfter(doc.b[1], newNode);
```

- XPath like queries (e.g. based on element name, attribute value)

```
myNode = doc.item.(@id=="123");   allName = doc..@name;
```

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E4X

E4X support

- A beta version of the **Mozilla 1.8** has limited support for E4X
- **Mozilla Rhino**, an open-souce implementation of JavaScript
- Later versions of IE expected to support E4X (an estimate IE7)
- The first browser to support E4X was expected to be Firefox 1.1. But it wasn't..?
- Example is tested and works with **Firefox 1.5**

- Not so many good sources of examples availabe
- Use of XML header *<?xml version="1.0" encoding="UTF-8"?>* ?

Resources

- Negrino, Tom and Smith, Dori: *JavaScript for the World Wide Web Visual Quickstart Quide. Fift Edition.* Peachpit Press, 2004. See the examples at URL http://www.javascriptworld.com/index.html.

- *ECMAScript Language Scecification (ECMA-262)*, December 1999. 3nd Edition. At URL http://www.ecma-international.org/.

- *ECMAScript for XML (E4X) Scecification (ECMA-357)*, December 2005. 2nd Edition. At URL http://www.ecma-international.org/. At URL http://www.ecma-international.org/.

- http://xml.coverpages.org/ECMAScript-XML.html

- http://www.w3schools.com/

Thank you

Examples..