User Interaction: XML and JSON

Assoc. Professor Donald J. Patterson
INF 133 Fall 2014
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>Tim Berners-Lee invents the Web with HTML as its publishing language. Based on SGML, separates data from presentation, no hypertext.</td>
</tr>
<tr>
<td>1993</td>
<td>Mosaic browser is released.</td>
</tr>
<tr>
<td>1994</td>
<td>World Wide Web Consortium is formed.</td>
</tr>
<tr>
<td>1995</td>
<td>HTML 2.0 published by IETF.</td>
</tr>
<tr>
<td>1995</td>
<td>Internet Explorer is released.</td>
</tr>
<tr>
<td>1997</td>
<td>HTML 3.2 published by W3C.</td>
</tr>
<tr>
<td>1999</td>
<td>HTML 4.01 standardized and released.</td>
</tr>
<tr>
<td>2000</td>
<td>XHTML standard released.</td>
</tr>
<tr>
<td>2010</td>
<td>HTML 5 Draft Standard Released.</td>
</tr>
<tr>
<td>2014</td>
<td>HTML 5 Recommendation expected.</td>
</tr>
</tbody>
</table>
HTML and XML

HTML

XHTML

XML

HTML 5

XHTML
• Support for SVG and MathML
• New tags
  • add semantic meaning
    • section
    • article
  • add multimedia processing
    • canvas
    • video
    • audio
• Some tags deleted
  • offline storage
  • drag and drop
  • document editing
Today: HTML5.1 is in its Working Draft Form

http://www.w3.org/TR/html51/

What Is HTML5?

A nice description from a magazine I was reading yesterday that describes just what the heck HTML5 is:

"HTML5 is most often thought of broadly to include new versions of the markup language itself and its associated standard for accessing and manipulating HTML documents, the Document Object Model; Cascading Style Sheets (CSS), a language to define the presentation and appearance of an HTML document; and the JavaScript scripting language. The term is often used even more broadly to include specific application programming interfaces (APIs), such as those that enable new browser-based graphics, geolocation, local storage, and video capabilities."

I didn’t keep the reference. Comment if you know it. Maybe ACM Communications?

by admin — Tags: code, java, location — Leave a comment
HTML and XML

- HTML
- XHTML
- XML
- HTML, XML and JSON
  - Structured Data Formats that evolved with the web
  - Text with a syntax applied
  - They can represent a huge variety of information
  - They enable data transport
    - Different systems and technologies and programming languages depend on the syntax being standardized
<?xml version="1.0"?>
<note>
  <to>Tove</to>
  <from>Jani</from>
  <heading>Reminder</heading>
  <body>Don't forget me this weekend!</body>
</note>
What is XML?

- XML stands for “eXtensible Markup Language”
- XML was designed in the context of separating data from display
  - XML tags are not predefined
    - You define your own tags
- XML is designed to be self-descriptive
The Difference Between XML and HTML

XML
- designed to transport and store data
- It looks like HTML
- The focus is on what the data is

HTML
- originally focused on how data looks
- it typically is “broken-XML”
- XHTML is
  - HTML that conforms to XML standard
XML Does not DO Anything
- It is a data format
- A program must be written to manipulate the data
  - To search the data
  - To display the data
  - To change the data
- Even though the data seems to be associated with a task it is still just data.
Schema

Tags

Characters
• XML is Just Plain Text
  • There is nothing fancy about the storage
  • A program that can read and write text can read and write XML
  • an XML-aware application
    • Expects a valid tag structure
    • Interprets the tags in a particular way
• **XML declaration**
  • version
    • 1.0
      • declaration is optional, defaults assumed
    • 1.1
      • declaration is mandatory
      • some encoding ambiguities resolved between Unicode versions
  • encoding
    • how are UNICODE characters represented
  • standalone
    • can this document be DTD validated without retrieving external documents?
• With XML You Invent Your Own Tags
  • <from> and <to>
    • are not defined anywhere official
    • they are invented by the author
  • There are no predefined tags
• In contrast, HTML has predefined tags
  • <p> <href> etc.,
• In XML the author defines the tags and the structure
  • within the bounds of a “valid XML document”
• XML is Not a Replacement for HTML
  • XML complements HTML
  • XHTML is an XML syntax compliant version of HTML
    • It has tags defined by a standards body
• XML Separates Data from HTML presentation
• XML Simplifies Data Sharing
• XML Simplifies Data Transport
• XML Simplifies Platform Changes
• XML Makes Your Data More Available
XML is Used to Create New Internet Languages

- XHTML the latest version of HTML
- WSDL for describing available web services
- WAP and WML as markup languages for handheld devices
- RSS languages for news feeds
- RDF and OWL for describing resources and ontology
- SMIL for describing multimedia for the web
• XML uses a tree structure
  • with a root element
  • and child elements
• tags indicate the start and end of an element
• opening tag looks like this:
  • <tag>
• a closing tag looks like this:
  • </tag>
• A valid XML document has exactly one closing tag for every opening tag
<bookstore>
  <book>
    <title>Everyday Italian</title>
    <author>Giada De Laurentiis</author>
    <year>2005</year>
    <price>30.00</price>
  </book>
  <book>
    <title>Harry Potter</title>
    <author>J K. Rowling</author>
    <year>2005</year>
    <price>29.99</price>
  </book>
  <book>
    <title>Learning XML</title>
    <author>Erik T. Ray</author>
    <year>2003</year>
    <price>39.95</price>
  </book>
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  <book category="COOKING">
    <title lang="en">Everyday Italian</title>
    <author>Giada De Laurentiis</author>
    <year>2005</year>
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    <title lang="en">Learning XML</title>
    <author>Erik T. Ray</author>
    <year>2003</year>
    <price>39.95</price>
  </book>
</bookstore>
<!DOCTYPE bookstore [ 

<!ELEMENT bookstore (book+)>
<!ELEMENT book (title,author,year,(price)+)>
<!ELEMENT title (CDATA)>
<!ELEMENT author (CDATA)>
<!ELEMENT year (CDATA)>
<!ELEMENT price (CDATA)>

<!ATTLIST book category CDATA #REQUIRED>
<!ATTLIST title lang CDATA #IMPLIED>

]>
Details
Details

- All XML Elements Must Have a Closing Tag
- HTML
  - <p>This is a paragraph</p>
  - <p>This is another paragraph</p>
- XML
  - <p>This is a paragraph</p>
  - <p>This is another paragraph</p>
Details
- Empty XML Elements may use a short cut closing tag
  - <nothing></nothing>
  - <nothing/>
  - <img src="picture.jpg"/>
  - <img src="picture.jpg"/></img>
  - <img src="picture.jpg"/>
• Details
  • XML Tags are Case Sensitive
    • <Message>This is incorrect</message>
    • <message>This is correct</message>
    • <Message>This is correct</Message>
Details

- XML Elements Must be Properly Nested
  - HTML might have this
    - `<b><i>This text is bold and italic</b><i>`
  - Valid XML requires this:
    - `<b><i>This text is bold and italic</i></b>`
Details

- XML Documents Must Have a Root Element
  - This is the top-level tag
    - <root>
    - <child>
    - <subchild>.....</subchild>
    - </child>
    - </root>
Details

XML Nodes may have attributes
Which describe the tag
XML Attribute Values Must be Quoted

- Invalid:

  ```xml
  <note date=12/11/2007>
  <to>Tove</to>
  <from>Jani</from>
  </note>
  ```

- Valid:

  ```xml
  <note date="12/11/2007">
  <to>Tove</to>
  <from>Jani</from>
  </note>
  ```
XML

- Details
  - Special characters:
    - If you put a “<” in your data it will mess up XML parsing
      - `<message>`if salary < 1000 then`</message>`
    - 5 characters are like this
      - `& < > ” ’`
    - `<message>`if salary `&lt;` 1000 then`</message>`

http://en.wikipedia.org/wiki/Character_encodings_in_HTML
• Details
  
  • Comments in XML
    • <!-- This is a comment -->
  
  • White-space is preserved
    • <message>There is a lot of space</message>
Attributes and Elements are pretty interchangeable

```xml
<person sex="female">
   <firstname>Anna</firstname>
   <lastname>Smith</lastname>
</person>

<person>
   <sex>female</sex>
   <firstname>Anna</firstname>
   <lastname>Smith</lastname>
</person>
```
<note date="10/01/2008">
  <to>Tove</to>
  <from>Jani</from>
  <heading>Reminder</heading>
  <body>Don't forget me this weekend!</body>
</note>

<note>
  <date>10/01/2008</date>
  <to>Tove</to>
  <from>Jani</from>
  <heading>Reminder</heading>
  <body>Don't forget me this weekend!</body>
</note>

<note>
  <date>
    <day>10</day>
    <month>01</month>
    <year>2008</year>
  </date>
  <to>Tove</to>
  <from>Jani</from>
  <heading>Reminder</heading>
  <body>Don't forget me this weekend!</body>
</note>
On beyond XML
- XML validation
- Schemas like XML - DTD
- Namespaces
- XSLT
  - transforms XML to HTML for viewing
• Demo:
  • Look at Chrome debugging tools to see the “Document Object Model”
<bookstore>
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    <title lang="en">Everyday Italian</title>
    <author>Giada De Laurentiis</author>
    <year>2005</year>
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