XML AND JSON

Software Engineering
CS 130

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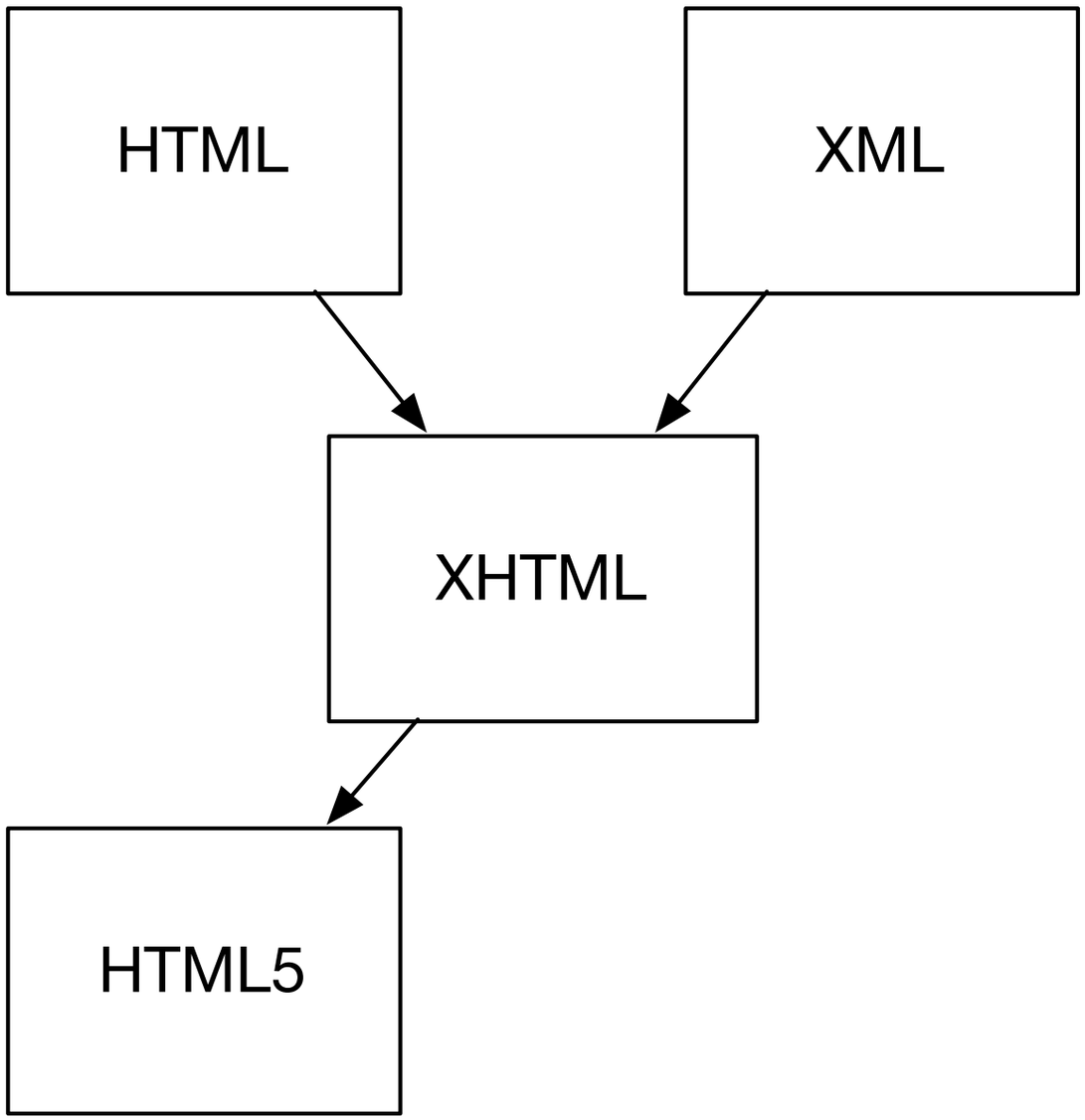
Content adapted from Essentials of Software Engineering 3rd edition by Tsui, Karam, Bernal Jones and Bartlett Learning

HTML and XML

- 1989: Tim Berners-Lee invents the Web with HTML as its publishing language
- Based on SGML
  - Separates data from presentation
  - No hypertext
- 1993: Mosaic browser is released
- 1994: World Wide Web Consortium is formed
- 1995: HTML 2.0 published IETF
- 1995: Internet Explorer is released
- 1997: HTML 3.2 published by W3C
- 1999: HTML 4.01 standardized and released
- 2000: XHTML standard released
- 2010: HMTL 5 Draft Standard Released
- 2014: HTML 5 finalized on 10/28/14

HTML AND XML



HTML5

- 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

HTML and XML

- Today: HTML5.1 is in its Working Draft Form
  - http://www.w3.org/TR/html51/

July 26, 2012

What Is HTML5?

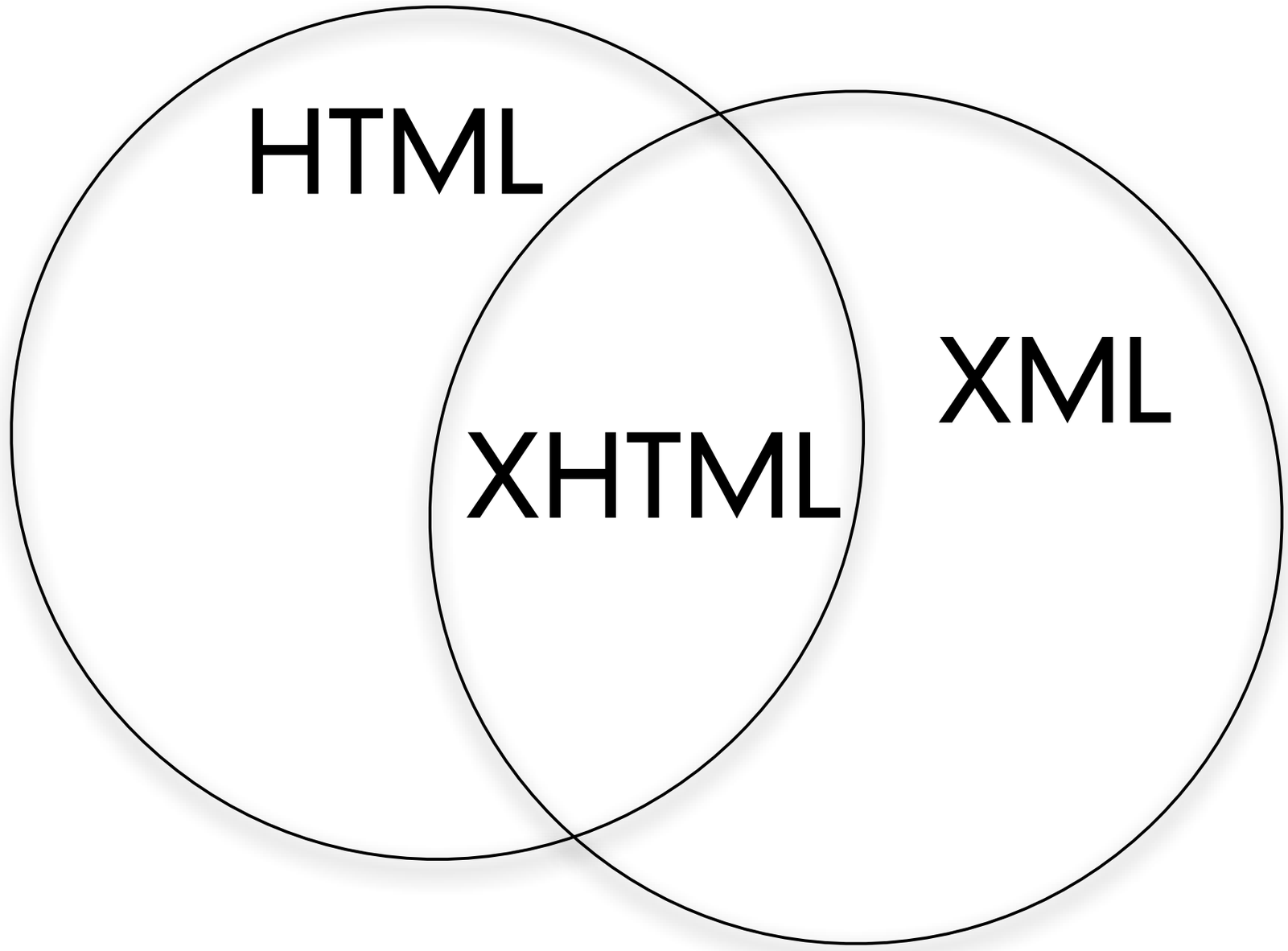
A nice description from a magazine I was reading yesterday that describes just what the heck HTML5 is. :

> *"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, 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>
```

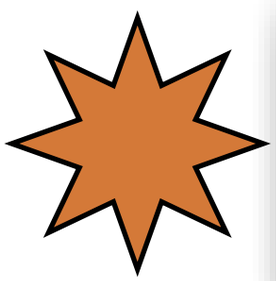
- What is XML?
  - XML stands for “eXtensible Markup Language”
  - XML was designed in the context of separating
    - data from display
  - XML tags are not predefined
    - You define your own tags
  - XML is designed to be self-descriptive

- 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 focussed 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 version="1.1" encoding="utf-8" standalone="yes"?>
```

- 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?

Schema

Tags

Characters

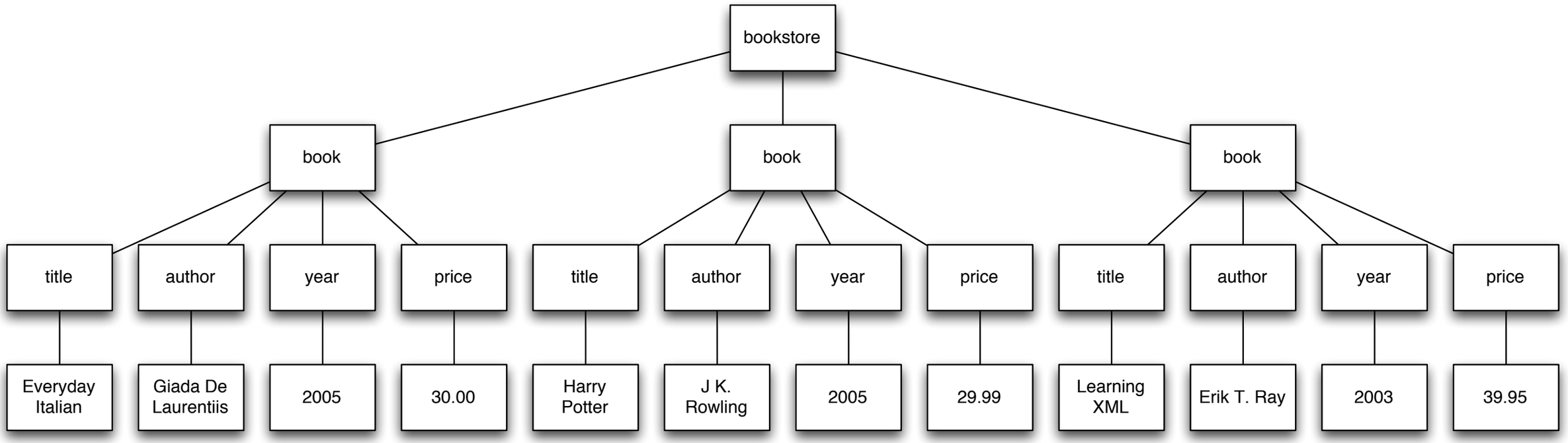
- With XML You Invent Your Own Tags
  - <from> and <to>
    - are not defined anywhere official
    - they are invented by the author
  - There are no predefined tags
- In contrast, HTML has predefined tags
  - <p> <href> etc.,
- In XML the author defines the tags and the structure
  - within the bounds of a “valid XML document”

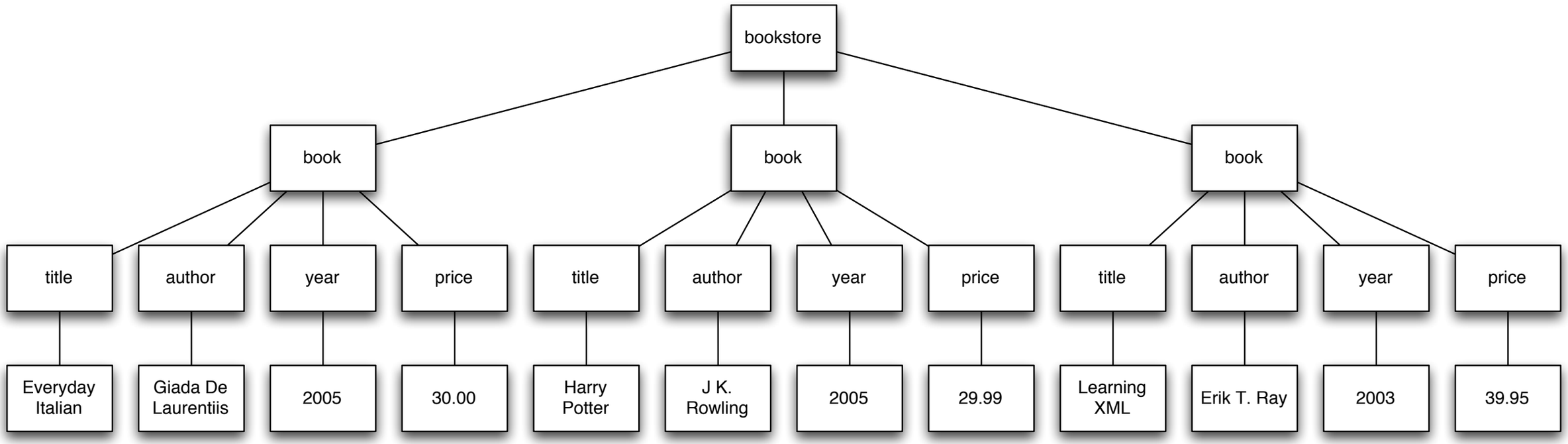
- XML is Not a Replacement for HTML
  - XML complements HTML
    - XHTML is an XML syntax compliant version of HTML
      - It has tags defined by a standards body

- XML Separates Data from HTML presentation
- XML Simplifies Data Sharing
- XML Simplifies Data Transport
- XML Simplifies Platform Changes
- XML Makes Your Data More Available

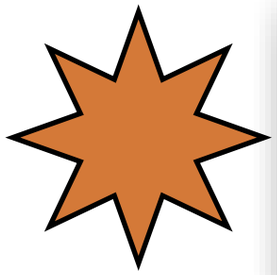
- XML is Used to Create New Internet Languages
  - XHTML the latest version of HTML
  - WSDL for describing available web services
  - WAP and WML as markup languages for handheld devices
  - RSS languages for news feeds
  - RDF and OWL for describing resources and ontology
  - SMIL for describing multimedia 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
book
book
title
author
year
price
title
author
year
price
title
author
year
price
Everyday Italian
Giada De Laurentiis
2005
30.00
Harry Potter
J K. Rowling
2005
29.99
Learning XML
Erik T. Ray
2003
39.95




```xml
<bookstore>
    <book category="COOKING">
        <title lang="en">Everyday Italian</title>
        <author>Giada De Laurentiis</author>
        <year>2005</year>
        <price>30.00</price>
    </book>
    <book category="CHILDREN">
        <title lang="en">Harry Potter</title>
        <author>J K. Rowling</author>
        <year>2005</year>
        <price>29.99</price>
    </book>
    <book category="WEB">
        <title lang="en">Learning XML</title>
        <author>Erik T. Ray</author>
        <year>2003</year>
        <price>39.95</price>
    </book>
</bookstore>
```



Schema

Tags

Characters

```
<!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
    - This is a paragraph
    - This is another paragraph
- XML
  - This is a paragraph
  - This is another paragraph

- Details
  - Empty XML Elements may use a short cut closing tag
  - ✓ <nothing></nothing>
  - ✓ <nothing/>

  - ✗ <img src="picture.jpg">
  - ✓ <img src="picture.jpg"></img>
  - ✓

- 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
      - This text is bold and italic
  - Valid XML requires this:
    - This text is bold and italic

- 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:

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

- Valid:

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

- 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
      - & < > “ ‘
      - & → & (ampersand, U+0026)
      - < → < (less-than sign, U+003C)
      - > → > (greater-than sign, U+003E)
      - " → " (quotation mark, U+0022)
      - ' → ' (apostrophe, U+0027)
    - <message>if salary < 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

```
<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"

Poll

```
<bookstore>
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        <year>2005</year>
        <price>30.00</price>
    </book>
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        <title lang="en">Harry Potter</title>
        <author>J K. Rowling</author>
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        <author>Erik T. Ray</author>
        <year>2003</year>
        <price>39.95</price>
    </book>
</bookstore>
```

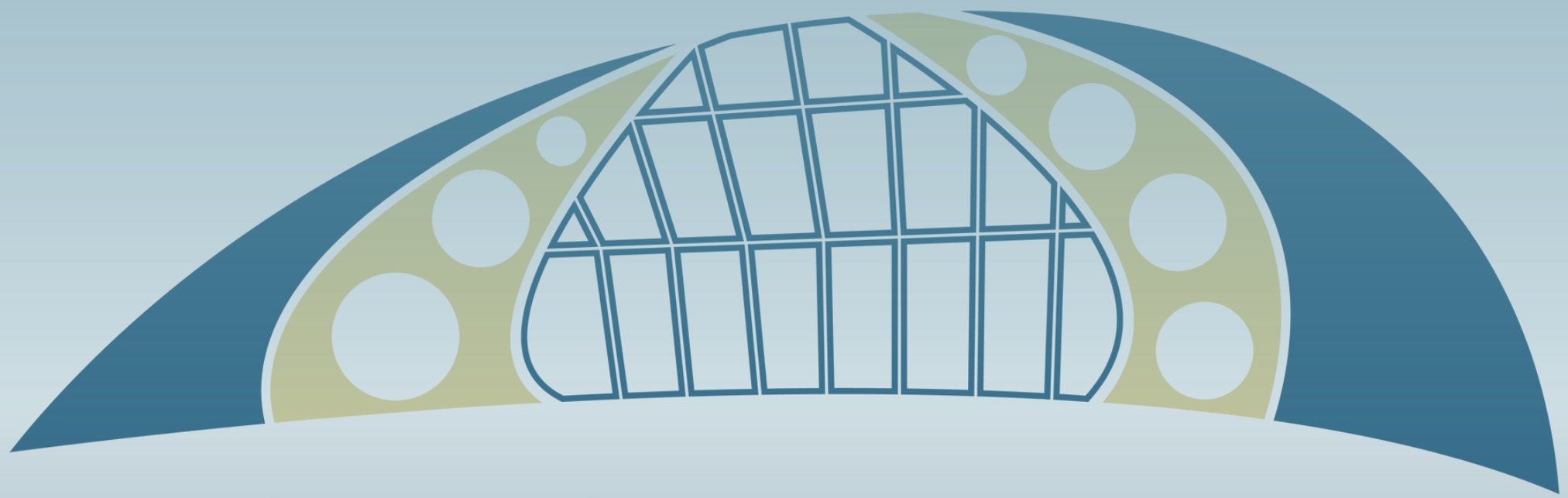

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