XML

XRay XML Editor

- Available from
  - http://www.architag.com
  - Download for free

XML ADVANTAGES

- Extensible
  - Add your own tags

```
<color>
   <red></red>
   <green></green>
   <blue></blue>
</color>
```

XML ADVANTAGES

- Interoperable
  - XML has no dependencies on
    - Operating System
    - Language
    - Data source

XML ADVANTAGES

- Self Describing
  - Data describes itself
  - Structure is easily identified

```
<employee>
   <name>Jake</name>
   <salary>25000</salary>
   <region>Ohio</region>
</employee>
```

XML DISADVANTAGES

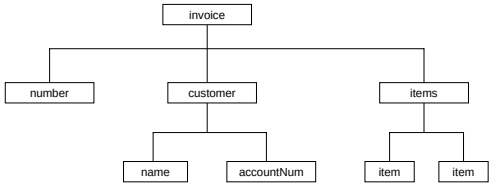
- Main Disadvantage
  - Well structured, but no 'markup' or manipulation
    - This is where XSL comes in

XML

- Each box in the flow chart is a container
  - Containers are also known as ELEMENTS
    - What tags you are wrapping text in
    - What your data talks about

```
<name>Jake</name>
```

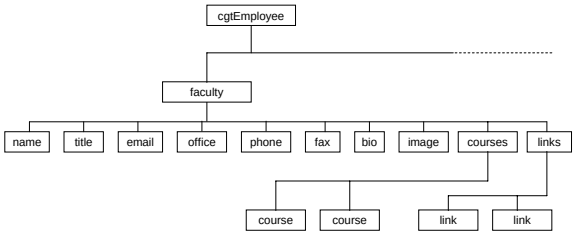
XML STRUCTURE



XML STRUCTURE

```
<invoice>
   <number>xxx</number>
   <customer>
        <name>yyy</name>
        <accountNum>ZZZ</accountNum>
   </customer>
   <items>
        <item>aaa</item>
        <item>bbb</item>
   </items>
</invoice>
```

CGT FACULTY DATA TREE



CGT FACULTY XML TREE

```
<cgtEmployee>
   <faculty>
        <name></name>
        <title></title>
        <email></email>
        <office></office>
        <phone></phone>
        <fax></fax>
        <bio></bio>
        <image></image>
        <courses>
              <course number="101" href="class.htm" />
              <course number="102" href="class2.asp" />
        </courses>
        <links>
              <link name="link1" href="link1.htm" />
              <link name="link2" href="link2.asp" />
        </links>
   </faculty>
</cgtEmployee>
```

- For the CGT Dept., the XML structure between the faculty tags would repeat ~20 times.
- Why?
  - There are ~20 faculty members in CGT

Abridged Version

```
<cgtEmployee>
   <faculty>
        ...
   </faculty>
   <faculty>
        ...
   </faculty>
   <faculty>
        ...
   </faculty>
   <staff>
        ...
   </staff>
</cgtEmployee>
```

Or maybe something like this →

```
<cgtEmployee>
   <employee type="faculty">
        ...
   </employee>
   <employee type="faculty">
        ...
   </employee>
   <employee type="staff">
        ...
   </employee>
   <employee type="staff">
        ...
   </employee>
</cgtEmployee>
```

Faculty vs Staff

- Staff
  - May not have as many elements as faculty
    - courses
    - links
    - May or may not have a bio
    - publications

Big Picture

- Perhaps your root is technology:

```
<technology>
      <bcmEmployee>
            ...
      </bcmEmployee>
      <cgtEmployee>
            ...
      </cgtEmployee>
      <cptEmployee>
            ...
      </cptEmployee>
      ...
</technology>
```

HTML, CSS, XML, XSL

- HTML
  - Formatting without structure
- CSS
  - Added formatting without structure
- XML
  - Structure without formatting
- XSL
  - Add formatting to XML

FORMATTING XML WITH CSS

- XML can be formatted with
  - HTML
  - CSS
  - XSL (Extensible Sylesheet Language)
    - XSL is to XML what CSS is to HTML
      - Kind of…
  - CSS can be applied to an XML document

```
<?xml-stylesheet type="text/css" href="mystyles.css"?>
```

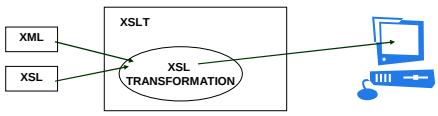
XML AND XSLT

- XML – Extensible Markup Language
- XSLT – Extensible Style Language Transformations

- Well-formed
  - Adheres to rules we described earlier
  - Same rules we have followed all semester

- Valid
  - Is well-formed, but adheres to something called a schema

XSL Transformation



XML and XSL

- XML CSS Example
- XSL Example 1
- XSL Example 2
- orgChart example

XSLT

- XSLT document has series of Templates
- Each template references a source document Element
  - (match)

```
<xsl:template match="/">

<xsl:template match="courses">
```

XSL

- Extensible Stylesheet Language
  - XML based language
  - Used for manipulating XML data
  - Takes care of the Presentation Layer

XSL continued

- With this separation of Data & Presentation
  - Can have one set of Data
  - Can create many stylesheets for data
  - Can manipulate data differently each time
  - KEY
    - Without touching the data

DB vs. XML


```
<Employee>
   <EmployeeID></EmployeeID>
   <LastName></LastName>
   <FirstName></FirstName>
   <Title></Title>
   <TitleOfCourtesy></TitleOfCourtesy>
   <BirthDate></BirthDate>
   <HireDate></HireDate>
   <Address></Address>
   <City></City>
   <Region></Region>
   <PostalCode></PostalCode>
   <Country></Country>
   <HomePhone></HomePhone>
   <Extension></Extension>
   <Photo></Photo>
   <Notes></Notes>
   <ReportsTo></ReportsTo>
</Employee>
```

If Statement

```
------------
VBScript
------------

If 7 <> 14 Then
   Response.Write("True")
End If

-----------
  XSL
-----------

<xsl:if test="7 != 14">
   True
</xsl:if>
```

Choose

```
------------
VBScript
------------

If 7 <> 14 Then
    Response.Write("True")
ElseIf 7 = 14 Then
    Response.Write("False")
Else
    Response.Write("This will never happen.")
End If
```

Choose (cont.)

```
----------
 XSL
----------

<xsl:choose>
    <xsl:when test="7 != 14">    <!-- Same as If above ------>
       True
    </xsl:when>
    <xsl:when test="7 = 14">     <!-- Same as ElseIf above -->
       False
    </xsl:when>
    <xsl:otherwise>              <!-- Same as Else above ---->
       This will never happen.
    </xsl:otherwise>
</xsl:choose>
```

For

Using this XML:

```
<CATALOG>
    <PLANT>
        <COMMON>Marigold</COMMON>
    </PLANT>
</CATALOG>
```

For (cont.)

```
-------------
VBScript
-------------

For Each child In oRootElement.childNodes
    Response.Write(child.childNodes(0).text)
Next
```

For (cont.)

```
----------
 XSL
----------

<xsl:for-each select="PLANT">
    <xsl:value-of select="COMMON">
</xsl:for-each>
```

img tag Example

Using this XML

```
<manager>
    <employee>
        <alias>cabartlett</alias>
    </employee>
    <staff>
        <alias>jmfallen</alias>
    </staff>
    <booboobear>
        <alias>booboo</alias>
    </booboobear>
</manager>
```

img tag Example (cont.)

XSL

```
<!-- Starting from already inside manager ------------>
<!-- The asterick is a wildcard ---------------------->
<!-- Doesn't matter that one element is employee & --->
<!-- the next is staff & the next is booboobear ------>

<xsl:for-each select="*/alias">
    <!-- Create big image -->
    <img width="144" height="144" style="display:none">
        <!-- The following line should be all on one line, but it wraps here: -->
        <xsl:attribute name="src">images/bigTestPics/<xsl:value-of select="."
          />.jpg</xsl:attribute>

        <xsl:attribute name="id"><xsl:value-of select="." />bigPic</xsl:attribute>

        <xsl:attribute name="name"><xsl:value-of select="." />bigPic</xsl:attribute>
    </img>
</xsl:for-each>
```

img tag Example (cont.)

Output

```
<img src="images/bigTestPics/cabartlett.jpg" id="cabartlettbigPic"
    name="cabartlettbigPic" width="144" height="144" style="display:none">

<img src="images/bigTestPics/jmfallen.jpg" id="jmfallenbigPic" name="jmfallenbigPic"
    width="144" height="144" style="display:none">

<img src="images/bigTestPics/booboo.jpg" id="booboobigPic" name="booboobigPic"
    width="144" height="144" style="display:none">
```

XSL

- XSL Parameters

```
<xsl:param>
<xsl:param name="phone">555-1234</xsl:param>
```

Looks the same as a variable

Variable vs. Param

- Variables
  - Constants (values cannot be changed)
  - Only way they can be changed is by declaring it inside of a for-each loop, in which case its value is updated for each iteration.

Variable Example

```
<xsl:variable name="mailLink">
  <a href=mailto:{$email}>
      <xsl:value-of select="$email" />
  </a>
</xsl:variable>
```

Notice the use of { and }

- Used because XML will not allow you to nest angle brackets <>
- If you tried to use value-of instead of { } then you would get an error

Continued

Finally, notice that the above variable has tags in it. It has the anchor tag <a>

To copy this variable value, it would look like this

```
<p>Please contact us at
  <xsl:copy-of select="$mailLink" />
</p>
```

Notice the use of copy-of

Use copy-of when there are elements (tags) as part of the value of a variable.

XSL Attributes

```
<book id="1234567">
  <author></author>
</book>
<book id="7654321">
  <author></author>
</book>
```

Select the ID of each book

```
<xsl:for-each select="book">
  <b><xsl:value-of select="@id" /></b>
</xsl:for-each>
```

Use the @ symbol to access attribute values

Create a Variable

- Variable Creation

```
<xsl:variable name="email">rjglotzbach@tech</xsl:variable>

<xsl:variable name="subject">Wrox Press</xsl:variable>

<xsl:variable name="address">123 N. South St. </xsl:variable>
```

To get the value of the variable

```
<xsl:value-of select="$email" />
```

Precede the variable name with $

Parameters

- Assigned a value from <xsl:with-param>
- Can be assigned just like a variable (as in the preceding example), in which case, it behaves just like a variable.