XML is essential for huge corporate systems .... and for us

Using the Power of XML
Personally

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Review ...

- Recall that XML is the land of tags so we can structure input separate from any processing application
- Three types of tags
  - Identity
  - Affinity
  - Collection
Our Plan For Today

- We’ll explain how you can create personal XML software for a simple task of interest to you … we’ll use a travelogue as an example
- Begin by thinking through the design
- Second Work A Simple Example
- Then Consider the Diary Problem
A Record Of Our Travels

- An example is a travel record
- Kinds of info:
  - State name
  - What we did
  - A flag adds some interest
- Also need a title

Places I've Traveled

Washington State

The State of Washington is a fun place to visit. We toured Spokane, Grand Coulee Dam, Seattle's Space Needle and Mt. Rainier, which wasn't rainy at all, but beautiful in the sun!

Oregon

South of Washington is Oregon. It is at the end of the old Oregon Trail. It is an unusual place. First, the University of Oregon's team is called the Ducks. Also, Mt. Bachelor is near the Sisters; with so many women around, why is it still a bachelor?

California

California seems to be a republic, but not a banana republic. More like an orange republic. We visited San Francisco, San Quentin, the Monterey Bay Aquarium, LA and Hollywood. We didn't see any stars, but we were not there in the dark either.
Tagging the information by what it is

```xml
<travels>
  <visit>
    <sight>Washington State</sight>
    <action flag="wash.gif">
      The State of Washington is a fun place to visit. We toured Spokane, Grand Coulee Dam, Seattle’s Space Needle and Mt. Rainier, which wasn't rainy at all, but beautiful in the sun!
    </action>
  </visit>

  <visit>
    <sight>Oregon</sight>
    <action flag="oregon.jpg">
      South of Washington is Oregon. It is at the end of the old Oregon Trail. It is an unusual place. First, the University of Oregon's team is called the Ducks. Also, Mt. Bachelor is near the Sisters; with so many women around, why is it still a bachelor?
    </action>
  </visit>

  <visit>
    <sight>California</sight>
    <action flag="california.png">
      California seems to be a republic, but not a banana republic. More like an orange republic. We visited San Francisco, San Quentin, the Monterey Bay Aquarium, LA and Hollywood. We didn't see any stars, but we were not there in the dark either.
    </action>
  </visit>
</travels>
```
The XML File Has This Content

- Tagging the information by what it is

```
<travels>
  <visit>
    <sight>Washington State</sight>
    <action flag="wash.gif">
      The State of Washington is famous to visit. We went to Seattle, Grand Coulee Dam,
      Seattle's Space Needle, and tilted a little to chase the sun!
    </action>
  </visit>
  
  <visit>
    <sight>Oregon</sight>
    <action flag="oregon.gif">
      South of Washington is Oregon. It is an unusual place.
      First, the University of Oregon's team is called the Ducks. Also, Mr. Bachelor is near the Sisters;
      with so many women around, why is it still a bachelor?
    </action>
  </visit>
  
  <visit>
    <sight>California</sight>
    <action flag="california.png">
      California seems to be a republic, but not a banana republic. More like an orange republic.
      We visited San Francisco, San Quentin, the Monterey Bay Aquarium, LA and Hollywood. We
      didn't see any stars, but we were not there in the dark either.
    </action>
  </visit>
</travels>
```

The task is to convert this XML into the Web page shown earlier.
Here are the players in this application.

**XML file**

```
<xml version="1.0" encoding="utf-8">
<xs:schema version="1.0">
<xml:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
<xml:template match="*">
<html>
<head>
<title>Travel Log</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
<style type="text/css">
body {background-color: #E6DCD6; color: #4C4A47; font-family: helvetica;}
</style>
</head>
<body>
<h2>Places I've Travelled</h2>
<xs:apply-templates/>
</body>
</html>
</xml:template>
</xs:schema>
```

**XSL file**

```
<xsl:stylesheet version="1.0">
<xsl:template match="travels">
<html>
<head>
<title>The State of Washington</title>
</head>
<body>
<h2>Places I've Travelled</h2>
<xs:apply-templates/>
</body>
</html>
</xsl:template>
</xsl:stylesheet>
```

**Firefox Browser**

**Diary Page**
Firefox Combines XML+XSL = HTML

<html>
  <head>
    <meta content="text/html; charset=UTF-8" http-equiv="Content-Type">
    <title>Travel Log</title>
    <style type="text/css">
      body {background-color: #E6DCD6; color: #4C4A47; font-family: helvetica}
    </style>
  </head>
  <body>
    <h2>Places I've Traveled</h2>
    <table width="500">
      <tbody><tr><td><h3>Washington State</h3></td></tr>
      <tr><td style="text-size:xsmall; padding-left:10px">
        <img style="float:left; padding-right:8px" alt="Flag of Location" src="TravelLog1_files/wash.gif" width="120">
        The State of Washington is a fun place to visit. We toured Spokane, Grand Coulee Dam, Seattle's Space Needle and Mt. Rainier, which wasn't rainy at all, but beautiful in the sun!</td></tr>
    </tbody></table>
  </body>
</html>
<html>
  <head>
    <meta content="text/html; charset=UTF-8" http-equiv="Content-Type">
    <visit>
      <sight>Washington State</sight>
      <action flag="wash.gif">
        The State of Washington is a fun place to visit. We toured Spokane, Grand Coulee Dam, Seattle's Space Needle and Mt. Rainier, which wasn't rainy at all, but beautiful in the sun!
      </action>
    </visit>
  </head>
  <table width="500">
    <tbody>
      <tr><td><h3>Washington State</h3></td></tr>
      <tr style="text-size:xsmall; padding-left:10px">
        <img style="float:left; padding-right:8px alt=Flag of Location" src="TravelLog1_files/wash.gif" width="120">
        The State of Washington is a fun place to visit. We toured Spokane, Grand Coulee Dam, Seattle's Space Needle and Mt. Rainier, which wasn't rainy at all, but beautiful in the sun!
      </tr>
      </tbody>
    </table>
  </table>
</html>
Firefox Combines XML + XSL = HTML

```html
<html>
<head>
<meta content="text/html; charset=UTF-8" http-equiv="Content-Type">
<title>Travel Log</title>
<style type="text/css">
body {background-color : #E6DCD6; color : #4C4A47; font-family : helvetica}
</style>
</head>
<body>
<h2>Places I've Traveled</h2>
</body>
</html>
```

**Final HTML**

**XSL Input**
For this application, “processing” the files means creating HTML from XML guided by XSL

Here’s how ---

- For each tag, we say what HTML we want, using “XSL”
- Put those definitions into a file (they’re called templates)
- Put directions at the top of the XML definition telling it where to find the definitions file
- “Run” the XML in Firefox (you use Firefox, right?) ... it does all the rest!
XSL: Extensible StyleSheet Language

- XSL is a markup language for XML ... and (of course) it's written in XML
- Let’s take a look

```xml
<?xml version="1.0" encoding="utf-8" ?>
<xsl:stylesheet version="1.0"
  xmlns:xsl="http://www.w3.org/1999/XSL/Transform">

<xsl:template match="travels">
  <html >
    <head> <title>Travel Log</title> 
      <meta http-equiv="Content-Type"
        content="text/html; charset=utf-8" />
      <style type="text/css"> 
        body {background-color : #E6E6DD; color : #4C4A47;
          font-family : helvetica}
      </style>
    </head>
    <body>
      <h2>Places I've Traveled</h2>
    </xsl:apply-templates/>
    </body>
  </html>
</xsl:template>
```
This is the remainder of the Travel Log XSL

```xml
<xsl:template match="visit">
  <table width="500">
    <xsl:apply-templates/>
  </table>
</xsl:template>

<xsl:template match="sight">
  <tr><td><h3>
    <xsl:apply-templates/></h3>
  </td></tr>
</xsl:template>

<xsl:template match="action">
  <tr><td style="text-size:xsmall; padding-left:10px">
    <img src="@flag" alt="Flag of Location" width="120"
      style="float:left; padding-right:8px"/>
  </td></tr>
</xsl:template>
</xsl:stylesheet>
```

XSL is all tags because it has its own tags like `<xsl:template ... >` plus all of the HTML tags it will output, like `<h3>`. But if it’s an XSL tag, it says so.
Look closely at the XSL mixing its own tags with HTML tags

```
<?xml version="1.0" encoding="utf-8"?>
<xsl:stylesheet version="1.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform">

<xsl:template match="travels">
  <html>
    <head>
      <title>Travel Log</title>
      <meta http-equiv="Content-Type"
        content="text/html; charset=utf-8"/>
      <style type="text/css">
        body {background-color : #E6DCD6; color : #4C4A47;
          font-family : helvetica}
      </style>
    </head>
    <body>
      <h2>Places I've Traveled</h2>
      <xsl:apply-templates/>
    </body>
  </html>
</xsl:template>
```

Standard header text ... must be first in XSL file

Here's how to say what XML tag this definition is for

HTML in here

Important tag, to be explained next
So, we build the skeleton of the XSL with our text editor.

```
<?xml version="1.0" encoding="utf-8" ?>
<xsl:stylesheet version="1.0"
  xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
  <xsl:template match="travels">
    <xsl:apply-templates/>
  </xsl:template>

  <xsl:template match="visit">
    <xsl:apply-templates/>
  </xsl:template>

  <xsl:template match="sight">
    <xsl:apply-templates/>
  </xsl:template>

  <xsl:template match="action">
    <xsl:apply-templates/>
  </xsl:template>

</xsl:stylesheet>
```

“apply-templates” tag says “style inner stuff”

Say how to style each XML tag

All that’s left is HTML
Top-level Tag: `<travels>`

- The “root tag” needs to style the main page

```
<xsl:template match="travels">
  <xsl:apply-templates/>
</xsl:template>

<html>
  <head>
    <title>Travel Log</title>
    <meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
    <style type="text/css">
      body {background-color: #E6DCD6; color: #4C4A47; font-family: helvetica}
    </style>
  </head>
  <body>
    <h2>Places I've Traveled</h2>
    <xsl:apply-templates/>
  </body>
</html>
```

“style inner stuff”
Continue For Other Tags

```xml
<xsl:template match="visit">
  <xsl:apply-templates/>
</xsl:template>

<xsl:template match="visit">
  <table width="500">
    <xsl:apply-templates/>
  </table>
</xsl:template>

<xsl:template match="sight">
  <xsl:apply-templates/>
</xsl:template>

<xsl:template match="sight">
  <tr>
    <td>
      <h3>
        <xsl:apply-templates/>
      </h3>
    </td>
  </tr>
</xsl:template>
```
When we have an attribute like
<action flag="wash.gif">
we grab the value using a very odd syntax
<img src="{@flag}" ...
To make this all happen, we go to the XML and link it to the XSL file:

- Add two “boiler plate” encoding lines (just copy)
- Make href point to the XSL file

```xml
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="travelLogSS.xsl"?>

<travels>
  <visit>
    <sight>Washington State</sight>
    <action flag="wash.gif">
      The State of Washington is a fun place to visit. We toured Spokane, Grand Coulee Dam, Seattle’s Space Needle and Mt. Rainier, which wasn't rainy at all, but beautiful in the sun!
    </action>
  </visit>
  <visit>
    <sight>Oregon</sight>
  </visit>
</travels>
```
We have an app! … open XML file with Firefox
Now, Add to Data As Needed

- The Travel Log app is done; we don’t expect to write more XSL, except to restyle something
- Just add to XML file

```xml
<visit>
  <sight>Alaska</sight>
  <action flag="ak.png">
  Alaska is kind of hard to describe -- it is enormous. We visited Anchorage, of course, but we also saw Denali (Mt. McKinley), where we saw grizzly bears. In Fairbanks on the summer solstice, we saw the Midnight Sun Baseball game -- no lights, just sunshine!
  </action>
</visit>
```
What about the pictures???
Add an XML picture tag ... like HTML, it will be self-terminating; needs styling XSL, too

- `<pic name="im/mtrainier.jpg" />` goes in XML
- `<xsl:template match="pic">` goes in XSL
  `<img src="{@name}" alt="Travel pic" width="500"/>
</xsl:template>

Place `<pic>` tags inside of `<action>` tags
Adding More XML

- Suppose our travels take us to Chicago ... we have two options:
  - Treat Chicago like any state sight – it has a flag, for example
  - Add a new kind of visit, maybe a <tour> that is similar to <action> but is used for cities; it can have different attributes, like sports_team="Cubs"
- Additional XML means more XSL is needed at the start
The video "What most schools don't teach" came out yesterday. will.i.am claims that programmers are rock stars. This is amazing, because writing programs isn't that hard. Of course, playing in a band isn't either, so maybe the comparison is good.

Tuesday, February 26, 2013