More XML Schemas, XSLT, Intro to PHP

CS174

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Outline

- XML Schemas
- XSLT
- PHP

Overview of data types

- There are two categories of data types in XML Schemas:
  - simple types -- which are restricted to strings and cannot have attributes or nested elements
  - complex types -- which can have attributes and can include other data types as elements.
- There are 44 different types in XML schemas, 19 of which are primitive and the remainder are derived.
- Example primitive types include: string, Boolean, time and anyURI.
- Example predefined derived types include: byte, long, decimal, unsignedInt, positiveInteger, and NMTOKEN.
- User defined types are defined by specifying restrictions on an existing type (called a base type).
- For example, for integer there are 8 so-called "facets" on which restrictions to base types can be made: totalDigits, maxInclusive, maxExclusive minInclusive, minExclusive, pattern, enumeration, and whitespace.
- Types can be named or anonymous. Anonymous elements cannot be used outside of the element in which it was declared
- Elements in DTDs are all global. For schemas one can have local elements. These are elements which defined within the scope of some child of the schema tag. child elements themselves are global.

Simple Types

- The simplest way to define a simple a new tag would be with a command like:

  <xsd:element name="engine" type="xsd:string" />

  <!-- notice namespace applied to the word string. In general namespaces can be applied to lots of things. For example, they also can be applied to attributes. -->

- In an instance of the plane schema we could then have:

  <engine>an example of the content of an engine</engine>

- You can also give default values or force fixed values with slight variations of this declaration:

  <xsd:element name="engine" type="xsd:string" default="V-6" />

  <xsd:element name="plane" type="xsd:string" fixed="single wing" />

- A simple user-derived type can be defined using the <restriction> tag:

  <xsd:simpleType name="firstName">

     <xsd:restriction base="xsd:string">

       <xsd:maxLength value="10" />

     </xsd:restriction>

  </ xsd:simpleType>

Complex Types

- There are several kinds of complex types that can be used with XML schemas.
- We will only look at the complex types which are restricted to having subelement-only -- not both subelements and text. the complexContent tag can be used to handle other kinds of content.
- To define what subelement occur for an element we can use either sequence or all. sequence -- forces an order on the subelement, all doesn't.

```
<xsd:complexType name="car">
    <xsd:sequence>
        <xsd:element name="make"  type="xsd:string" />
        <xsd:element name="year" type="xsd:decimal" />
    </xsd:sequence><!-- you can use minOccurs, maxOccurs to specify number of occurrences ; you
        can have more than one sequence, all tag here-->
</ xsd:complexType>
```

References

- You can define element to be used as a subelement outside of another element and use a reference to refer to it:

```
<xsd:element name="year">
<xsd:simpleType >
    <xsd:restriction base="xsd:decimal">
      <xsd:minInclusive value="1900" />
      <xsd:maxInclusive value="2010" />
    </xsd:restriction>
</ xsd:simpleType>
</xsd:element>
<xsd:complexType name="car">
      <xsd:sequence>
       <xsd:element name="make"  type="xsd:string" />
        <xsd:element ref="year" />
      </xsd:sequence>
</ xsd:complexType>
<xsd:element name="sport_car" type="car">
                    <xsd:attribute name="color" type="xsd:string" />
</xsd:element>
```

XML and CSS

- Most modern browsers are completely happy to style any tag provided there is some style-sheet information given for it:

plane {display:block; border 3px;}

- To associate a stylesheet with an XML document we use the syntax:

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

XSLT

- Sometimes it is useful to transform one XML markup language into some other XML language.
- For instance, suppose you want to display a pure RSS feed nicely and you want the links to work in IE. Since IE does not support the XLink language this is hard unless you do a stylesheet tranformation.
- The basic idea of XSTL (eXtensible stylesheet transformations), is that we can associate a stylesheeet transformation with an XML document and apply this transformation using a processor (for instance, a browser), to get some other XML language.

An Example

```
<?xml version="1.0"
    encoding="utf-8" ?>
<?xml-stylesheet type="text/xslt"
    href="xslplane.xsl" ?>
<plane>
   <year>1970</year>
</plane>
```

```
<?xml version="1.0" encoding="utf-8" ?>
<xsl:stylesheet version="1.0"
   xmlns:xsl=
     "http://www.w3.org/1999/XSL/Transf
     orm"
   xmlns =
     "http://www.w3.org/1999/xhtml"
>
<xsl:template match="plane">
<html><head><title>result of
     applying a stylesheet to
     plane</title></head><body><h1>
     Plane Description</h1>
   <xsl:apply-templates />
   </body></html>
</xsl:template>
<xsl:template match="year">
   <p style="color:red">
   <xsl:value-of select=".">
   </p>
</xsl:template>
```

Introduction

- PHP was developed by Rasmus Lerdorf around 1994-1995.

- PHP originally stood for Personal Home Page, later PHP became an acronym for PHP: Hypertext Processor.

- It is one of the most common server-side programming languages.

- According to Wikipedia, over 19 million domains are hosted on servers with PHP enabled.

Overview

- The web site for PHP is http://www.php.net
- The web server determines that a page is PHP usually by looking for one of the extensions .php, .php3, .phtml
- When called from the web server on a PHP page, the PHP processor takes a PHP document and starts processing in one of two modes.
- When it sees XHTML it simply copies it to the output. (Copy mode).
- When it sees PHP code it executes the code and writes the result to the output.(Interpretive mode)
- PHP is typically interpreted but it also can be precompiled.
- The syntax of PHP is closely related to Perl and Javascript.

Configuring PHP

- PHP should be installed and running as of HW1.
- You can fine-tune how PHP runs by editing the file php.ini

- A ';' is used to indicate a comment in this file.

- The most common thing for people to change is to have a line:

  short_open_tag = On

  so that you can escape to a PHP script using <? rather than <?php

  Xampp sets things this way by default so for today we will not worry about this.

- Another common thing to change is the amount of error reporting PHP gives.

- By default, it is assumed we are in a production environment so none is given.

- For today, we want error-reporting. So find the line:

  ;error_reporting = E_ALL & ~E_NOTICE

  and uncomment it, restart Apache

General Syntax

- PHP scripts are run on the server.
- They can be run standalone, but typically, PHP code is embedded in an XHTML document.
- A section of PHP code is delimited with <?php … code here …?>
- The command include("filename.php"); can be used to include one document in another.
- All variables in PHP begin with a $ sign. Names of variables are otherwise like in Perl or other common programming languages.
- PHP can use either Perl, C++, or C comments: #, //, /* … */

Trivial PHP Program

- To test out PHP you can type the following trivial program:

```
<?php phpinfo(); ?>
```