COS 425:
Database and Information
Management Systems

XML and information exchange continued

Last time:
- XML document structure
- XML querying with XQuery

Today:
- XML name spaces
- XML Schema definition
- Conclusion

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Namespaces

- Exchanging XML documents with unrelated sites, unrelated applications requires unambiguous identifiers across sources of documents
- XML allows each source to specify a globally unique name: universal resource identifiers (URIs)
  - URLs
- Names within one source expect source to keep unambiguous

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Namespace specification

- Prepend URI to each tag or attribute name
  http://www.princeton.edu:student
- Verbose – have abbreviation mechanism
  Attribute within *root* tag: xmlns:*abbrev*="*URI*"

```
<students xmlns:PUstu="http://www.princeton.edu">
    <PUstu:student>
    <PUstu:year>2005</PUstu:year>
    …
```

Becomes part of tag name

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Multiple namespaces

- One document can have several namespaces defined and used
  - Different sources
  - Sources need not be sites
- Namespace can denote specific XML standard
  - Extend types
  - Extend functions

xmlns:xs="http://www.w3.org/2001/XMLSchema"
Get types "xs:string", "xs:decimal"

Leads us to …

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Language *XML Schema*

Standard for specifying schema of a document:

- Specify tag names, attribute names
- Declare leaf types (contents)
  - Built-in types
  - User-defined types
- Declare tag structure
  - tree model
- Specify constraints:
  - key
  - foreign key

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XML Schema specification

The schema for a document is
an XML document

Says using specific w3c standard from namespace

<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">

… *specification of document*

</xs:schema>

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Board

Outline of XScheme **Basics**

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Putting example all together *(Note NOT same R&G* BOOKLIST *example)*

```
< xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
    <xs:element name="books" type="ListBooksType"/>
    <xs:element name="book" type="BookType"/>
    <xs:complexType  name="BookType">
        <xs:attribute name="in_print"/>
        <xs:sequence>
            <xs:element name="title" type="xs:string"/>
            <xs:element name="isbn" type="xs:string"/>
            <xs:element name="edition" type="xs:string"/>
            <xs:element name="date" type="xs:string"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType  name="ListBooksType">
        <xs:sequence>
            <xs:element ref="book" minOccurs="1" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
</xs:schema>
```

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XML uses for information exchange

- Many and wide range of applications use XML to exchange information (data)
- Some examples:
  - PADS tool here (Prof. Walker) converts "ad hoc" (nonstandard) data file into an XML file
    - XML one of choices
  - XML standards for specifying 3D models
    - Acrobat (U3D)
    - Google (Collada)
  - describe security vulnerabilities
  - W3C specify XML standards

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SUMMARY

- XML is language for representing information (data) in semi-structured way
  - Self documenting by tag names
  - Flexible formatting
  - Began as language for generalizing specification of document display
- Generality allows XML to be important information exchange format for internet
- ***XML Schema*** provides formal specification of document schema
- XQuery provides SQL-like query language for extracting information from an XML document

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