Semi-structured Data

3 - Namespaces
Outline

• The Need for Namespaces

• Namespace Syntax

• Default Namespace

• Multiple Namespaces
A Common Problem

- Merging of XML documents often leads to conflicts

<!-- Students’ Evaluation -->
<course>
  <title>SSD</title>
  <assessment>Fair</assessment>
</course>

<!-- University’s Evaluation -->
<course>
  <title>SSD</title>
  <assessment>Elective</assessment>
</course>

- The two assessment elements are semantically different

- How we distinguish these two elements?
Solution 1 - Renaming

• Simply *rename* the assessment elements

  \[
  \text{<studassessment> Fair </studassessment>}
  \]

  \[
  \text{<univassessment> Elective </univassessment>}
  \]

• … but there are some weaknesses:
  
  o The new element names are *not transparent*

  o *We may get new conflicts* in the future
Solution 2 - Refined Renaming

- Rename the elements, but use a separator

  `<stud:assessment> Fair </stud:assessment>`
  `<univ:assessment> Elective </univ:assessment>`

- ... but still:
  - Although the new element names are transparent
  - We may get new conflicts in the future
Solution 3 - Unique Names

- We can exploit URIs (Uniform Resource Identifier)
  - http://www.oeh.ac.at - Austrian Students’ Union
  - http://www.tuwien.ac.at - TU Wien


- Transparent and unique element names

- But, the new document is not well-formed - not valid XML names
Final Solution - Namespaces

- Combination of solutions 2 and 3 - Namespaces
- Mechanism to associate the prefixes stud and univ with the URIs

```xml
<course
    xmlns:stud="http://www.oeh.ac.at"
    xmlns:univ="http://www.tuwien.ac.at">
    <title>SSD</title>
    <stud:assessment>Fair</stud:assessment>
    <univ:assessment>Elective</univ:assessment>
</course>
```

**ATTENTION:** Namespace URIs are simply identifiers, they are not followed as links
The Need for Namespaces

Namespaces have two purposes in XML:

• Disambiguating elements and attributes
  Distinguish between elements and attributes from different vocabularies that share the same name but are semantically different

• Grouping elements
  Group related elements and attributes together so that programs can easily recognize them
Namespace Syntax

• A namespace declaration is of the form:

\[
\text{xmlns:prefix=“name”}
\]

where prefix is an XML name, and name is a URI

• It appears as an attribute in an element

\[
\text{<course xmlns:stud=“http://www.oeh.ac.at” xmlns:univ= “http://www.tuwien.ac.at”>}
\]
Namespace Syntax

• For elements and attributes **qualified names** are used of the form
  \[\text{prefix:local-name}\]

  where both prefix and local-name are XML names

  \[<\text{stud:assessment}>\text{Fair}\</\text{stud:assessment}>\]

  \[<\text{univ:assessment}>\text{Elective}\</\text{univ:assessment}>\]
Default Namespace

- We can have a **default namespace** declared as `xmlns="name"`
- We simply remove the prefix

```xml
<!-- Students’ and University’s Evaluation -->
<course
    xmlns="http://www.oeh.ac.at"
    xmlns:univ="http://www.tuwien.ac.at">
    <title>SSD</title>
    <assessment>Fair</assessment>
    <univ:assessment>Elective</univ:assessment>
</course>
```

**ATTENTION:** Default namespace applies only to unprefixed elements, not attributes
Multiple Namespaces

- We can redefine a prefix or the default namespace

```xml
<!-- Students’ and University’s Evaluation -->
<course xmlns="http://www.tuwien.ac.at">
  <title>SSD</title>
  <assessment xmlns="http://www.oeh.ac.at">
    Fair
  </assessment>
  <assessment>Elective</assessment>
</course>
```

multiple definitions of the default namespace
Multiple Namespaces

• The closest ancestor with a namespace declaration takes precedence

• If there is no declaration among the ancestors:
  o For the default namespace the empty namespace is used
  o For a prefix we get an error (when the prefix us used)

<!-- Students’ and University’s Evaluation -->
<course xmlns= "http://www.tuwien.ac.at">
  <title> SSD </title>
  <assessment xmlns="http://www.oeh.ac.at" >
    Fair
  </assessment>
  <assessment> Elective </assessment>
</course>

Expanded Names