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XML and Databases
— Exercise Sheet 3 —

You only have to submit the parts marked as "Homework Exercises", i.e. Part d) to g). But please think about the questions in Part a) and b) before the meeting! Send your homework solutions to the instructor via EMail: `brass@informatik.uni-halle.de` (with "`xml17`" in the subject line). The official deadline is November 9, 10:00 (before the lecture time).

Not all submitted homeworks will be corrected, but all homework exercises will be discussed in class. If you should have questions about your homework, please ask! A precondition for getting credit for this course is that you submit solutions to two thirds of the homework sheets. Obviously wrong or very incomplete submissions do not count.

If you should miss the tutorial session (Thursday, 12-14), it is recommended that you solve the "in-class exercises" yourself.

Repetition Questions

a) Answer the following questions about namespaces:

- What is the purpose of namespaces in XML? Give an example, where namespaces are needed.
- What is the syntax for declaring a namespace in XML? How is a default namespace declared? What is the scope of such a declaration?
- Is it important that the prefix "`xs`" is used for XML schema? How does an XML schema processor detect its tags?
- Is capitalization important when namespace URIs are compared?
- Is there a rule what must be stored in the Web for the namespace URI?
- Consider an XML processor that checks only for well-formedness and does not know about namespaces. Can it still process an XML file that uses namespaces?

b) Answer the following questions about XML schema:

- Name some restrictions of DTDs that motivated the development of XML schema.
- Which advantages and disadvantages does the XML syntax of XML schema have in comparison with the special syntax of DTDs?

- What is a complex type in XML schema? What is a simple type? What is the difference between complex and simple type? How can they be applied?
- How is an element declared in XML schema?
- What is the difference between the three schema styles "Salami Slice", "Russian Doll", "Venetian Blind"? Explain the difference between a global element declaration and a local element declaration. Also explain the difference between a named (complex or simple) type declaration and an anonymous type declaration.
- What can be done with local element declarations that is impossible in DTDs? (DTDs basically have only global element declarations.)
- In which schema styles can one enforce which element is used as the root (document element) in the documents? How is this done?

In-Class Exercises

c) Create an XML schema for the nutrition supplements database (possibly in different XML encodings and different schema styles).

Homework Exercises

d) Please download the following XML file:

[http://users.informatik.uni-halle.de/~brass/xml17/ex2_xsd.xml]

It is the homework grades database, known from the course lecture (students, exercises, and grading results, with the data in elements, not in attributes). Download also the following XML Schema definition:

[http://users.informatik.uni-halle.de/~brass/xml17/ex2.xsd]

Please check whether the XML file is correct with respect to the schema. You can use a validator like

[http://www.freeformatter.com/xml-validator-xsd.html]

You can also install the Altova XML Community Edition on a Windows computer:

[http://www.softpedia.com/get/Internet/Other-Internet-Related/AltovaXML.shtml]

If the XML file or the schema should contain errors, please correct these. Otherwise modify the XML data file such that it stays well-formed, but does not validate with respect to the schema. Please describe what you have changed and submit the name of the validator and the error message.

e) Which of the three styles is used in this schema?

f) Please change at least three element declarations in the schema such that the XML file still validates (the original version of the XML file, not the version with the error). For instance, you can change the schema to one of the other styles (for at least three elements).

g) Please have a look at the beginning of the XML Schema Primer:

[https://www.w3.org/TR/xmlschema-0/]

Find the first example schema and name one construct (XSD element) that is used in the schema and was not yet discussed in the lecture.