2. Unit: Querying with XPath

Information about the XML course is found under
`http://www.stud.informatik.uni-goettingen.de/xml-lecture`.
These exercises are supposed to be solved using XPath, not with XQuery

Exercise 2.1 (XPath: Mondial)

a) Find out which countries are neighbors of Russia and have more than 10 million inhabitants.

b) Which countries are members of the NATO? Return the countries' names.

c) Give the names of countries with a neighbor country with a mountain of 4000 m and higher.

Exercise 2.2 (XPath: Hamlet)

a) List all attributes from hamlet.xml.

b) List all scenes with less than 10 persons speaking by their titles (duplicates allowed).

c) What is the title of the third scene of the act with a scene called 'The Queen's closet'?

d) Who are the persons speaking in both the first and the last act?

e) What happens (stage directive) directly before King Claudius says: "Part them; they are incensed."?

Exercise 2.3 (XPath: Mondial (2))

a) Which (country) capitals are located at a river, sea or lake? Give their names.

b) What are the names of those cities located next to a lake?

c) What are the names of all lakes with no city located next to it?

d) What are the names of all rivers flowing through (at least) one capital?

e) Find all "german leaf-nodes", which means all element nodes that are sub-nodes of the country-element of Germany and have no children.

f) In Mondial, there exist city elements as sub-elements of province elements, and city elements as sub-elements of country elements. Are there any other city elements?

Exercise 2.4 (XML —>RDB) A possible model for storing (or indexing) XML data is based on relational tables (we ignore namespaces here).

(1) a table for storing element and text nodes:
- first column: node identifier in Dewey Notation (e.g., 1.2.6.3 for the third child of the sixth child of the second child of the root node),
- second column: number of the node when enumerated in *preorder*,
- third column: number of the node when enumerated in *postorder*,
- forth column: element type (or "text"),
- fifth column: text content (or NULL).

(2) a table for storing attribute nodes:
- first column: dewey identifier of the node where the attribute belongs to,
- second column: attribute name,
- third column: value.

a) Discuss whether the above information is sufficient for storing an XML document. Give the tables for a small example document.

b) Discuss what must be done when an update (modification, insertion, deletion) is executed.

c) Given a "current" element somewhere in the tree, characterize the following sets of nodes (i.e., the nodes that result from navigating along the different axes) by their dewey notation and, if possible, by their preorder / postorder information:

- the parent
- all children
- all successors
- all ancestors
- all siblings
- all predecessors according to document order
- all successors according to document order
- all attributes