

1. Unit: Warm-up Exercises

*Information about the XML practical training (XML-Praktikum) can be found at <http://www.dbis.informatik.uni-goettingen.de/Teaching/XML-P-SS05/>
Solve the following exercises using XPath only, unless noted otherwise.*

Exercise 1.1 (XPath: Mondial)

- Find out which countries are neighbors of Russia and have more than 10 million inhabitants.
- Which countries are members of the NATO? Return the countries' names.
- Give the names of countries with a neighbor country with a mountain of 4000 m and higher.

Exercise 1.2 (XPath: Hamlet)

- List all scenes with less than 10 persons speaking by their titles (duplicates allowed).
- What is the title of the third scene of the act with a scene called "The Queen's closet"?
- Who are the persons speaking in both the first and the last act?
- What happens (stage directive) directly before King Claudius says: "Part them; they are incensed."?

Exercise 1.3 (XPath: Mondial (2))

- Which (country) capitals are located at a river, sea or lake? Give their names.
- What are the names of those cities located next to a lake?
- What are the names of all lakes with no city located next to it?
- What are the names of all rivers flowing through (at least) one capital?
- Find all "german leaf-nodes", which means all element nodes that are sub-nodes of the country-element of Germany and have no children.
- 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?

From hereon, you may use XPath and XQuery.

Exercise 1.4 (XPath / XQuery: Borders in Mondial)

- XPath:** Return the names of all countries bordering Germany.
- XPath:** Return the names of all countries which are bordering countries bordering Germany.
- XQuery:** Are there pairs of countries exist with borders of inconsistent length? Will say, where the border length of country A to country B is unequal to the border length of country B to country A ?

Exercise 1.5 (Mondial - max pop country)

Give name and population of the country with the highest population.

Exercise 1.6 (Mondial - sum pop order)

For each organization, return its name and the sum of the population of its members (in descending order, ignore different member types).

¹You may ignore duplicates

Exercise 1.7 (Mondial - Sunrise in Dakar)

Imagine the moment of sunrise in Dakar on 21th of September. Which is the city where the sun rises next?

Exercise 1.8 (Mondial - Russia Water Neighbor)

Which lakes, seas and rivers does Russia share with *exactly one* other country?

Exercise 1.9 (Mondial - redundancy)

TODO: Welcher Absolutwert ist als Basis zu nehmen? The database contains redundant information about the population of countries (in country and in province). Compute all inconsistent countries, i.e., those whose population differs more than 10% from the sum of the population of their provinces.

Exercise 1.10 (Mondial - Seas and Countries)

Compute all pairs of european countries that are adjacent to the same set of seas.

Exercise 1.11 (Mondial - Caribbean Sea)

How many countries and how much area are encompassed by the islands in the Caribbean Sea?

Exercise 1.12 (Mondial - sum pop neighbors)

For all countries, give the sum of the population of all its neighbors.

Exercise 1.13 (Mondial - 6 max pop countries)

List the names of the 6 most populated countries.

Exercise 1.14 (Mondial - Biggest Cities) For each country with at least 3 cities, compute the sum of the inhabitants of the three biggest cities.

Exercise 1.15 (Mondial - Cities pop above average)

Compute all cities that have more inhabitants that the average of all cities in that country.

Exercise 1.16 (Mondial - Urbanization)

A country is called *strongly urbanized* if more than 10% of its population live in cities with more than 500000 inhabitants. Which countries belonging to the EU are strongly urbanized?

Exercise 1.17 (Mondial - min max mountain)

Compute the lowest mountain which is the highest one on its continent.

Exercise 1.18 (Hamlet - speech max lines)

Who has the longest speech (the most consecutive lines) in Hamlet?

Exercise 1.19 (Mondial - Country, Neighbor, Organization)

- Compute all pairs (country, organization) s.t. the country belongs to the organization, but all its neighbors do not belong to the organization.

- Compute all pairs (country, organization) s.t. the country does not belong to the organization, but all its neighbors belong to the organization.

Exercise 1.20 (Mondial - Organizations and Continents)

Compute all organizations with at least one member country on each continent.

Exercise 1.21 (Mondial - Bundesland-Partner)

For each "Bundesland" of the Federal Republic of Germany, compute those states that have about the same population ($\pm 10\%$) as the Bundesland.

Exercise 1.22 (Mondial - no european member orgs)

Compute the set of all organizations with no european member countries.

Exercise 1.23 (Mondial - european member orgs)

Compute the number of european members in each organization.

Exercise 1.24 (Mondial - Gross Domestic Product)

Rank the different forms of government according to the average gross national product (gdp.total) per person.

Exercise 1.25 (Mondial - Globally Urbanized)

Compute the ratio of the world's population living in mondial-stored cities.

Exercise 1.26 (User-defined function)

Write a recursive function that computes the length of a river system.