

1. Unit: SPARQL - Warm Up

Exercise 1.1 (Riparian States) Which river has the most riparian states? Which river has the most riparian states in relation to its length (consider only rivers that touch at least 4 countries)?

Exercise 1.2 (Countries Without Common River & Lakes) List all pairs of countries that are neighboring but do not share a river or lake (only one direction and ordered alphabetical).

Exercise 1.3 (Cities with higher Population than their Capital) For each country give the name, the name of the capital and its population. Also, if there are any, all cities that have a higher population than the capital of this country as a result table of the following form:

Country	Capital	Capital Population	City	City Population
Germany	Berlin	3472009		
Switzerland	Bern	128848	Zürich	384786
Switzerland	Bern	128848	Genf	191557

Exercise 1.4 (Lowest of the highest Mountains) For every continent, determine the lowest mountain that is the highest mountain of that continent (excluding mountains on islands). Return the name of this mountain, the country it's located in and the continent.

Exercise 1.5 (Closest Capitals) For each continent, specify the two capitals that are closest to each other (simplification: use Pythagoras' theorem to determine the distance; justify that this does little to distort the result). The respective countries should be found at least partially on the same continent.

Exercise 1.6 (No Members in Europe) List the names of all organisations that do not have members in Europe.

Exercise 1.7 (Member on every Continent) Find all organizations which have at least one member on every continent. Do not consider the different types of memberships.

Exercise 1.8 (Sahara Population) Determine the population density of the region, which includes Algeria (DZ), Libya (LAR) and all their neighbors. Explain why you do not need a reasoner if you formulate the question skillfully and in which cases a reasoner would be necessary and why.

Exercise 1.9 (Independence of countries) Give SPARQL queries and experiment with the optional clause for the following examples:

- Select all countries with (if possible) their independence date, the country/political body it was dependent on and the name of that country/political body.
- Experiment with nested OPTIONALs and chained ones. What difference in the results do you notice? Does the order matter?
- Now also select the neighbors of the countries and try to match them with the country/political body it was dependent on. Try both to match them through the use of the same variable or a FILTER clause. Is there a difference?

Exercise 1.10 (Swiss languages)

- All country codes of countries in which a language is spoken that is also spoken in Switzerland.
- All country codes of countries in which only languages not spoken in Switzerland are spoken.
- All country codes of countries where only languages spoken in Switzerland are spoken.
- All country codes of countries in which all languages spoken in Switzerland are spoken.

Exercise 1.11 (Network Length of Rivers)

- a) Give for each river its name and total length of its river network (i.e., itself and all its direct and indirect tributaries).
- b) For rivers that are tributaries of another river, give also the name of the river where they finally flow into, which is not itself a tributary of another river.

Exercise 1.12 (Nearest Coast Cities) For every city *in Europe*, give the name, and, if it is located at a sea, the name of this sea.

If it is not located at a coast, give the name of the nearest coastal city in the same country, and the distance. If this does not exist, or if there is nearer coastal city in another country, give also the nearest such city and the distance.