

7. XPath

Hint: You can run XPath queries in Eclipse in the XML perspective, using the XPath view. To open that view, go to

Window --> Show View --> XPath

If you do not see XPath as one of the options under Show View, go to Other . . . and open the XML folder, where you find an XPath Symbol to choose.

1. Countries

Open the `countries.xml` file in Eclipse.¹ Write XPath expressions that return answers to queries below² To formulate some of queries, you may need to consult the slides of the XPath lecture for built-in functions.

1. Return the area of Mongolia.
2. Return the names of all countries with population greater than 100 million.
3. Return the names of all countries where over 50% of the population speaks German.
(Hint: Depending on your solution, you may want to use `self::*`, which refers to the "current element" within an XPath expression.)
4. Return the names of all countries where a city in that country contains more than one-third of the country's population.
5. Return the population density of Qatar. Note: Since the quotes/ operator has its own meaning in XPath, the division operator is infix `div`. So to compute population density use `"(@population div @area)"`.

¹These data have a long history in XML teaching. They originate from the Mondial database, assembled by Wolfgang Mey at the University of Göttingen. The current, simplified version has been created at the Stanford InfoLab, building upon a version created at the University of Washington, Seattle.

²The queries and the exercises are taken from classes at Stanford.

6. Return the names of all countries whose population is less than one thousandth that of some city (in any country).
7. Return the names of all cities that have the same name as the country in which they are located.
8. Return all city names that appear more than once, i.e., there is more than one city with that name. You may return a city name multiple times if it simplifies your query.
(Hint: You might want to use the “preceding” and/or “following” navigation axes for this query.)
9. Return the names of all countries which have a city such that some other country has a city of the same name.

The next four queries are four different variations on the same theme. Consider the built-in function `contains`.

10. Return the names of all countries whose name textually contains a language spoken in that country. For instance, Uzbek is spoken in Uzbekistan, so return Uzbekistan.
(Hint: As in question 3, you may want to use “.”, which refers to the “current element” within an XPath expression.)
11. Return the names of all countries in which people speak a language whose name textually contains the name of the country. For instance, Japanese is spoken in Japan, so return Japan.
12. Return all languages spoken in a country whose name textually contains the language name. For instance, German is spoken in Germany, so return German.
(Hint: Depending on your solution, may want to use “`data(.)`”, which returns the text value of the “current element” within an XPath expression.)
13. Return all languages whose name textually contains the name of a country in which the language is spoken. For instance, Icelandic is spoken in Iceland, so return Icelandic.
14. Return the number of countries where Russian is spoken.
15. Return the names of all countries that have at least three cities with population greater than 3 million.
16. Return the names of all countries for which the data does not include any languages or cities, but the country has more than 10 million people.