2. Unit: Querying with XPath

Solve the following exercises using XPath only

Exercise 2.1 (XPath: Mondial)

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

```
//country[border/id(@country)/name='Russia' and
   population > 10000000]/name

//country[name='Russia']/border/id(@country)[population>10000000]/name
```

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

```
//organization[abbrev="NATO"]/members/id(@country)/name/text()

//country[id(@memberships)/abbrev="NATO"]/name/text()
```

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

```
//mountain[elevation>=4000]/located/id(@country)/border/id(@country)/name

//country[border/id(@country) is //mountain[elevation>=4000]/id(@country)]/name
(: 77 hits :)
```

Exercise 2.2 (XPath: Hamlet)

a) List all scenes with less than 10 persons speaking by their titles (multiple speeches by a person included).

```
//SCENE[count(.//SPEAKER)<10]/TITLE
```

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

```
(: Interessant, weil wegen Sonderzeichen :)
//ACT[SCENE[contains(TITLE, 'The Queen') and
            contains(TITLE,'closet')]]/SCENE[3]/TITLE
(: oder :)
//ACT[contains(SCENE/TITLE/text(), "The Queen's closet")]/SCENE[3]/TITLE
```

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

```
#interessanter waere nur im letzten nicht im ersten, aber not laeuft nicht)
//ACT[position()=last()]//SPEECH[SPEAKER=//ACT[1]//SPEAKER]/SPEAKER
Mit Anwendung einer Funktion:
distinct-values(//ACT[1]//SPEAKER[. = //ACT[position()=last()]//SPEAKER])
```

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

```
(: note: preceding-sibling is a backward axis! :)
//SPEECH[SPEAKER="KING CLAUDIUS" and LINE="Part them; they are incensed."]
  /preceding-sibling::STAGEDIR[1]
```

Exercise 2.3 (XPath: Mondial (2))

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

```
//country/id(@capital)[located_at/@watertype]/name
```

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

```
//country/id(@capital)[located_at/@watertype="lake"]/name
```

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

```
//lake[not (@id = //city/located_at/@lake)]/name
```

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

```
//country/id(@capital)/located_at/id(@river)/name (: 14 hits, only country capitals :)
id(//@capital)/located_at/id(@river)/name (: 33 hits, country and province capitals :)
```

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.

```
//country[name="Germany"]//*[count(./*) = 0]
//country[name="Germany"]//*[not(./*)]
```

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?

```
(: liefert nur country- und province-Elemente. :)
/mondial//*[(./city)]/name()
Oder:
 //*[./city][(name() != province) and (name() != country)]
liefert nichts.
```