

XQuery exercises

A. Restaurants

Given the following DTD:

```
<!ELEMENT restaurants (restaurant+)>  
<!ELEMENT restaurant (name, dish+)>  
<!ELEMENT dish (name, ingredient+, price)>  
<!ELEMENT ingredient (name, weight)>  
<!ELEMENT name (#PCDATA)>  
<!ELEMENT weight (#PCDATA)>  
<!ELEMENT price (#PCDATA)>
```

A. Restaurants

1. List all dishes served by restaurant “UnibgFood”?
2. For each restaurant, return the number of available dishes
3. How many restaurants serve dishes with mushrooms?
4. For each restaurant identify the most expensive dish(es)
5. For each restaurant identify the dishes that cost at least 90% of the price of the most expensive dish (in desc. price order)
6. Which is the restaurant with the maximum number of dishes?
7. For each ingredient return the list of restaurants that use it
8. For each restaurant list the names of its dishes, sorting them by number of contained ingredients

B. Santa Claus goes geek

The website of Good Old Santa allows children to submit letters with their wishlist for Christmas via Web Service invocations, whose WSDL exposes an interface with the following format for data encoding:

```
<!ELEMENT Letters (Letter*)>
<!ELEMENT Letter ( ChildName, Address, Country, Toy+ )>
<!ELEMENT NameChild (#PCDATA)>
<!ELEMENT Address (#PCDATA)>
<!ELEMENT Country (#PCDATA)>
<!ATTLIST Country TimeZone CDATA #Implied>
<!ELEMENT Toy (#PCDATA)>
<!ATTLIST Toy weight CDATA #Required>
```

B. Santa Claus goes geek

1. Find the names of all children who did not ask for a mobile phone
2. Find the name of the Italian child whose letter has the heaviest toy list
3. For each country extract the average number of toys asked by children

C. I have a drink

```
<!ELEMENT Cocktails ( Cocktail+, Ingredient+ )>  
<!ELEMENT Cocktail ( Name, Component+, GlassType,  
Garnish, Procedure )>  
<!ELEMENT Component ( IngredientName, Quantity )>  
<!ELEMENT Ingredient ( Name, CaloriesPerGram )>
```

This DTD describes a portion of the content of a Web-accessible barman course. Unspecified elements only contain PCDATA. Quantity is expressed in milliliters or grams (respectively for liquids and solids) and refers to the amount required for a cocktail for one person. The ingredient name identifies the ingredient.

C. I have a drink

1. For each ingredient, the list of the names of cocktails containing it
2. Build in XQuery a “summary” document that, for each cocktail, presents:
 - the total amount of calories in the cocktail (considering ALL the ingredients);
 - the list of the 4 ingredients used in the largest quantity (consider milliliters and grams as equivalent); in the case of a tie, always choose 4 ingredients based on the alphabetical order.

D. Olympic games

1. Find countries that never won a team medal (a team medal is a medal won by more than one athlete)
2. Find the name of the athlete who won the highest number of medals, considering all possible disciplines and all kinds of medal.

E. Hierarchy of Components

A shop sells electronic components, described in document catalog.xml. For each component the cost is represented and, for complex components, the internal structure:

```
<!ELEMENT Catalog (Component+)>  
<!ELEMENT Component (Description, Component*)>  
<!ATTLIST Component    Code ID #REQUIRED,  
                        Cost CDATA #REQUIRED>
```

Where Description only contains PCDATA.

E. Hierarchy of Components

1. Extract the component that has the greatest number of sub-components (direct and indirect)
2. Build in XQuery an XML document that shows, for each leaf component *c*, the list of the codes of the components that contain *c*, ordered from the “lower” one to the “higher” one in the containment hierarchy

F. Sports Club

Consider the following DTD about the organization of a sports club. Elements not further specified contain only PCDATA. The team names and social security numbers (SSN) are unique.

```
<!ELEMENT Club ( Coach+, Team+ )>
```

```
<!ELEMENT Coach ( SSN, Name, Lastname )>
```

```
<!ELEMENT Team ( Name, CoachSSN, Player+ )>
```

```
<!ELEMENT Player ( SSN, Name, Lastname, Role )>
```

F. Sports Club

1. Write in XQuery the query that extracts the names of the coaches who train three or more teams and who also appear as player in some other team (i.e. not in a team coached by them)
2. Write in XQuery the query that for each coach retrieves the coach's data and the complete list in alphabetical order of all the players he coached (considering all the teams he trains)