

10.05.2012

Exercise Sheet 2  
Data Representation and Modeling (2)

**Exercise 1 (RDF/RDFS Syntax + Semantics)**

**20 points**

Consider the following RDF representation:

```
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:ex="http://example.org/">

  <rdf:Description rdf:about="http://example.org/deutschland">
    <rdf:type rdf:resource="http://example.org/Land"/>
  </rdf:Description>

  <rdf:Description rdf:about="http://example.org/hauptstadt_von">
    <rdf:type rdf:resource=
      "http://www.w3.org/1999/02/22-rdf-syntax-ns#Property"/>
    <rdfs:domain rdf:resource="http://example.org/Stadt"/>
    <rdfs:range rdf:resource="http://example.org/Land"/>
  </rdf:Description>

  <rdf:Description rdf:about="http://example.org/Land">
    <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
    <rdfs:label xml:lang="en">country</rdfs:label>
  </rdf:Description>

  <rdf:Description rdf:about="http://example.org/berlin">
    <rdfs:label xml:lang="en">Berlin</rdfs:label>
    <rdf:type rdf:resource="http://example.org/Stadt"/>
    <ex:hauptstadt_von rdf:resource="http://example.org/deutschland"/>
  </rdf:Description>

  <rdf:Description rdf:about="http://example.org/Stadt">
    <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
    <rdfs:label xml:lang="en">city</rdfs:label>
  </rdf:Description>

</rdf:RDF>
```

- a) What information is encoded in this RDF/RDFS graph? Describe in your own words.
- b) Represent the RDF/RDFS graph graphically.
- c) Translate the given RDF/XML document into Turtle syntax.

## Exercise 2 (Modeling in RDF)

20 points

Decide whether the following statements can be modelled with the help of RDF(S). If yes, give a graphical representation of the respective statement.

- a) Every pizza is a dish.
- b) Every pizza has at least two toppings.
- c) Every pizza in the class `PizzaMargarita` has tomatoes as a topping.
- d) Everything that has a topping is a pizza.
- e) No pizza in the class `PizzaMargarita` has a topping from the class `Meat`.

## Exercise 3 (RDFS Annotations)

20 points

Remember the modeling description from last week, which you should express (among others) as RDF:

"The elementary school of Freiburg has three employees: the two teachers Mr. Maier and Mrs. Schmidt, and the schoolmaster Mrs. Koster. In addition to their administrative duties, Mrs. Koster also does some teaching. In particular, Mr. Maier is assigned to the First-graders, while Mrs. Schmidt and Mrs. Koster together teach the second-, third-, and fourth-graders. Mr. Maier has specialized in sports and therefore is assigned to physical education for all four grades of school. Each grade has a class representative and at least one pupil. Actually, Marie is a fourth-grader. Her favourite subjects in school are physical education, painting, and mathematics."

Now extend your modeling with RDFS, in particular `rdfs:subClassOf`, `rdfs:subPropertyOf`, `rdfs:domain`, and `rdfs:range`. Finally list the facts that can be derived from your graph according to the RDFS semantics.