Introduction to the Semantic Web

Worksheet 2: The Resource Description Framework (RDF)

Deadline: May 15, 2023, 20:00 h

Useful Link: "RDF 1.1 Primer" (`https://www.w3.org/TR/2014/NOTE-rdf11-primer-20140624/`)

Task 1

Read the following Turtle document. Describe in natural language the content of this document.

```
@prefix dbo: <http://dbpedia.org/ontology/> .
@prefix dbp: <http://dbpedia.org/resource/> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .

dbp:Germany a dbo:Country ;
  dbo:capital dbp:Berlin .

dbp:Bielefeld a dbo:Settlement ;
  dbo:country dbp:Germany ;
  dbo:name "Bielefeld"@de ,
    "Liebefeld"@de ;
  dbo:population "327199" ;
  dbo:foundingYear "1214-01-01"^^xsd:date .
```

Task 2

Write some statements about zoos. You do not have to use URIs that resolve – feel free to invent your own URIs (you can use the prefix *ex* which we have used in our slides). Use RDF Turtle syntax.

Your statements has to model the following:

- what animals are there
- who visits zoos

- some animals live in enclosures, some live in cages
- how are cages related to enclosures
- the resources that live in enclosures are animals
- who uses a family ticket is a family

Describe where you are not satisfied with the modeling capabilities. What cannot be (easily) modeled in a machine-understandable way?

You could easily create thousands of similar statement (e.g., one for every spiecies you find in Wikipedia), but that would be boring. The exercise is about getting a feeling for how to model a domain and how to represent it in RDF. Thus, try to model a variety of aspects that you have learned in the lecture (instances, classes, properties, and how resources are related to each other).

Feel free to use a validator/converter to check that you make correct use of the RDF Turtle syntax. For example, use an online converter such as EASY RDF `http://www.easyrdf.org/converter` to validate your syntax.

Please include a plot of your RDF graph. You can use the online tool RDF Grapher (`https://www.ldf.fi/service/rdf-grapher`) to generate visualizations for RDF Turtle statements.

Task 3

Use reification to represent each of the following sentences separately in RDF. Use the Turtle serialization format.

1. Charly says that Flipper is a mammal.
2. Charly says that his father says that Flipper is a fish.

Task 4

Decide whether the following properties can be satisfactorily modeled in RDFS and, if so, give the corresponding RDFS specification (`http://www.w3.org/TR/rdf-schema/`).

1. *Every convertible is a car.*
2. *Every car has a steering wheel.*
3. *Every car has at least 1 door.*

4. *Everything having a license plate is a vehicle.*

5. *No car can run upside down.*

Task 5

Consider the following RDF graph. List all triples that can be entailed via RDFS entailment in the *N-Triples* format. Use the entailment rules explained on our slides: (types, subclasses, subproperties, domain & range). For each entailed triple, name which entailment rule was applied to derive the triple.