Foundations of Semantic Web Technologies

Tutorial 1

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Exercise 1.1. Explain the following elements of the RDF and RDFS vocabulary (presuming the usual namespace definitions).

(a) `rdf:type`
(b) `rdf:about`
(c) `rdf:Property`
(d) `rdf:Seq`
(e) `rdfs:Resource`
(f) `rdf:resource`
(g) `rdf:nil`
(h) `rdfs:label`
(i) `rdfs:member`
(j) `rdf:value`

Exercise 1.2. Decide if the following propositions are true or false:

(a) Blank nodes can stand for arbitrary resources.

(b) URIs can stand for arbitrary resources.

(c) Every blank node has an ID.

(d) Two blank nodes with different IDs can stand for the same resource.

(e) Two different URIs can stand for the same resource.

(f) Blank nodes carrying the same ID that occur in several RDF documents must stand for the same resource.

(g) URIs that occur in several RDF documents must stand for the same resource.

(h) Two different Literals can never stand for the same value.

(i) Two Literals with different datatype can never stand for the same value.

(j) A URI can never stand for a datatype value.

(k) Blank nodes cannot occur in the predicate position of triples.

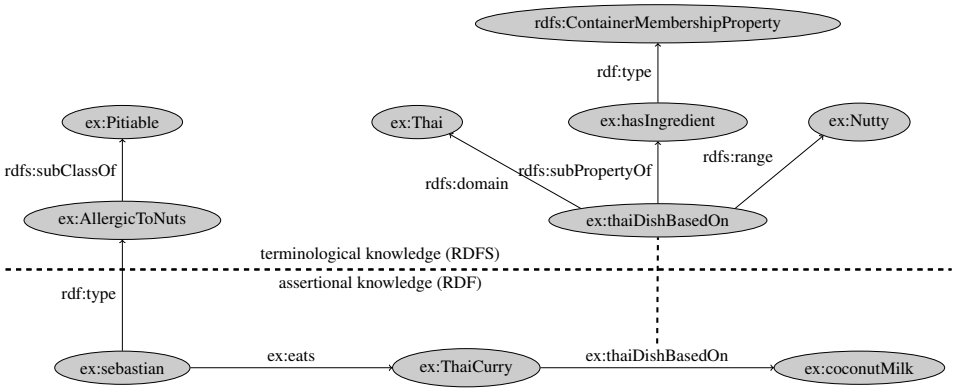
(l) Blank nodes cannot stand for properties (that is, resources that belong to the class `rdf:Property`).

Exercise 1.3. Consider the following RDF document:

```
<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:iswww="http://sw.edu/#"
>

<rdf:Description rdf:about="http://sw.edu/#germany">
  <rdf:type rdf:resource="http://sw.edu/#country" />
</rdf:Description>

<rdf:Description rdf:about="http://sw.edu/#capital_of">
  <rdf:type
   rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#Property"/
  >
  <rdfs:domain rdf:resource="http://sw.edu/#city" />
  <rdfs:range rdf:resource="http://sw.edu/#country" />
</rdf:Description>

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

<rdf:Description rdf:about="http://sw.edu/#berlin">
  <rdfs:label xml:lang="en">Berlin</rdfs:label>
  <rdf:type rdf:resource="http://sw.edu/#city" />
  <iswww:capital_of rdf:resource="http://sw.edu/#germany" />
</rdf:Description>

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

</rdf:RDF>
```

- Describe in natural language the content of this document.
- Draw the graph representation of the above document.
- Translate the document into Turtle syntax.

Exercise 1.4. Represent the following sketch of an RDF graph in RDF/XML syntax:



Exercise 1.5. Explain the difference between open and closed lists and give for each an example in Turtle syntax. What is meant by "open" and "closed"?

Exercise 1.6. Represent the following sentences graphically by means of reified triples (for space reasons, you may use usual prefixes instead of full URIs):

- Romeo thought that Juliet was dead.
- John believes that Mary wants to marry him.
- The dwarf noticed that somebody had been eating from his plate.

Exercise 1.7. Decide whether the following propositions can be satisfactorily modeled in RDFS and, if so, give the corresponding RDF(S) specification.

- Every pizza is a meal.
- Pizzas always have at least two toppings.
- Every pizza from the class `PizzaMargarita` has a `Tomato` topping.
- Everything having a topping is a pizza.
- No pizza from the class `PizzaMargarita` has a topping from the class `Meat`.
- "Having a topping" is a containedness relation.