

# Foundations of Semantic Web Technologies

## Tutorial 1

Sebastian Rudolph

SS 2014

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

- |                                |                               |
|--------------------------------|-------------------------------|
| (a) <code>rdf:type</code>      | (f) <code>rdf:resource</code> |
| (b) <code>rdf:about</code>     | (g) <code>rdf:nil</code>      |
| (c) <code>rdf:Property</code>  | (h) <code>rdfs:label</code>   |
| (d) <code>rdf:Seq</code>       | (i) <code>rdfs:member</code>  |
| (e) <code>rdfs:Resource</code> | (j) <code>rdf:value</code>    |

**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>

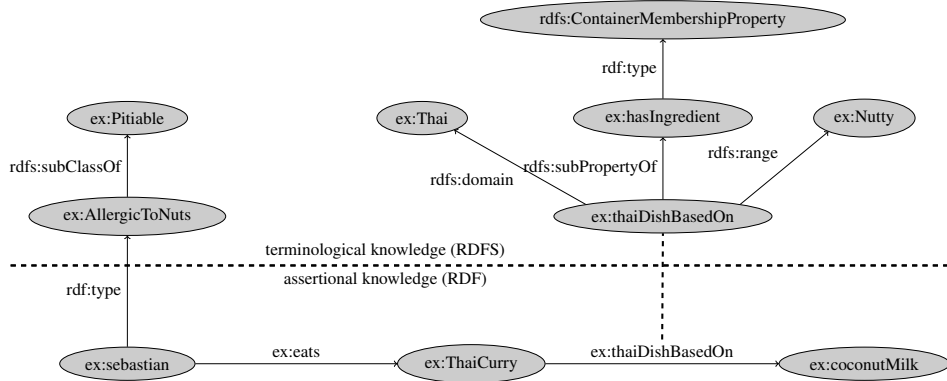
<rdf:Description rdf:about="http://sw.edu/#berlin">
  <rdfs:label xml:lang="en">Berlin</rdfs:label>
  <rdf:type rdf:resource="http://sw.edu/#city" />
  <iswww:capital_of rdf:resource="http://sw.edu/#germany" />
</rdf:Description>

<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.