Foundations of Semantic Web Technologies

Solutions for Tutorial 1: RDF and RDF Schema
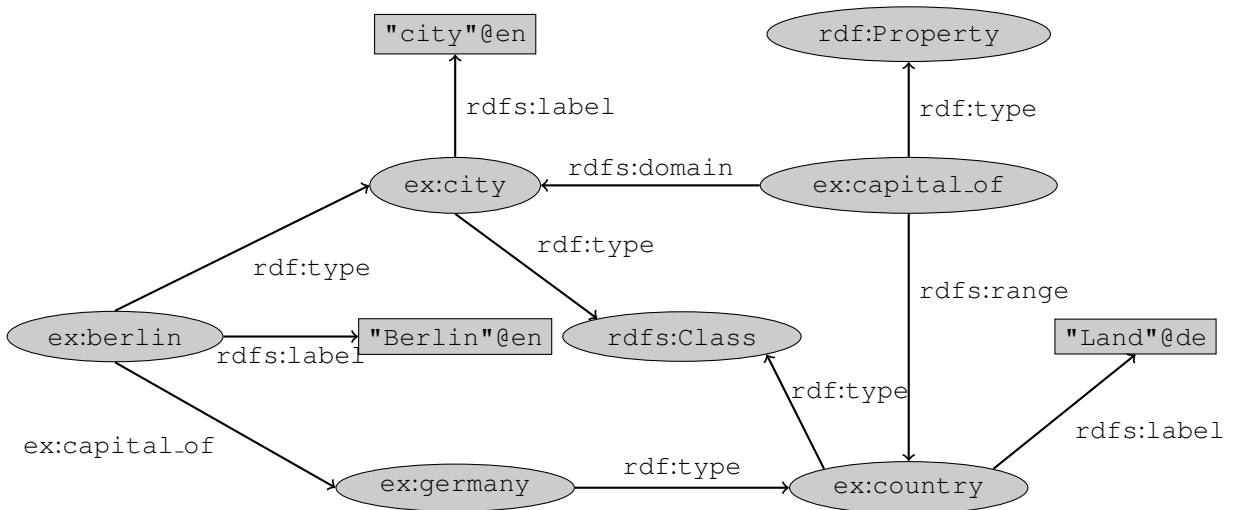
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Solution of Exercise 1.2

(a) Blank nodes can stand for arbitrary resources.
⚡wrong: not for predicates – they always have to be defined by an URI.

(b) URIs can stand for arbitrary resources.
✓correct

(c) Every blank node has an ID.
⚡wrong: e.g. the value of the resource of the attribute `rdf:parseType` automatically generates a blank node without ID.

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

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

(f) Blank nodes carrying the same ID that occur in several RDF documents must stand for the same resource.
⚡wrong: An ID of a blank node is local.

(g) URIs that occur in several RDF documents must stand for the same resource.
✓correct: URI stands for "Unique Resource Identifier".

(h) Two different Literals can never stand for the same value
⚡wrong: 2.0 and 2.00 stand for the same value in `xsd:decimal`.

(i) Two Literals with different datatypes can never stand for the same value.
⚡wrong: 2 (`xsd:integer`) and 2.0 (`xsd:decimal`) stand for the same value, i.e. 2.

(j) A URI can never stand for a datatype value.
⚡wrong: stands for the value of datatype `xsd:anyURI`.

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

(l) Blank nodes cannot stand for properties (that is, resources that belong to the class rdfProperty).
↯wrong

Solution for Exercise 1.3 (b)

Solution of Exercise 1.3 (c)

```
@prefix rdf: <http://www.w3.org/1990/02/22-rdf-syntax-ns#>.
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>.
@prefix ex: <http://example.org/>

ex:germany      rdf:type            ex:country .

ex:capital_of   rdf:type            rdf:Property ;
                rdfs:domain         ex:city ;
                rdfs:range          ex:country .

ex:country          rdf:type            rdfs:Class ;
                 rdfs:label          "Land"@de .

ex:berlin           rdf:type            ex:city ;
                 rdfs:label          "Berlin"@en ;
                 ex:capital_of       ex:germany .

ex:city         rdf:type            rdfs:Class ;
                 rdfs:label          "Stadt"@de .
```

Solution of Exercise 1.4

```
<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/ThaiCurry">
  <ex:thaiDishBasedOn
rdf:resource="http://example.org/CoconutMilk"/>
</rdf:Description>

<rdf:Description rdf:about="http://example.org/Sebastian">
  <rdf:type rdf:resource="http://example.org/AllergicToNuts"/>
  <ex:isst rdf:resource="http://example.org/ThaiCurry"/>
</rdf:Description>

<rdf:Description rdf:about="http://example.org/AllergicToNuts">
  <rdfs:subClassOf rdf:resource="http://example.org/Pitiable"/>
</rdf:Description>

<rdf:Description
rdf:about="http://example.org/thaiDishBasedOn">
  <rdfs:subPropertyOf rdf:resource="http://example.org/hasIngredient"/>
  <rdfs:domain rdf:resource="http://example.org/Thai"/>
  <rdfs:range rdf:resource="http://example.org/Nutty"/>
</rdf:Description>

<rdf:Description rdf:about="http://example.org/hasIngredient">
  <rdf:type rdf:resource=
    "http://www.w3.org/2000/01/rdf-schema#ContainerMembershipProperty"/>
</rdf:Description>

</rdf:RDF>
```
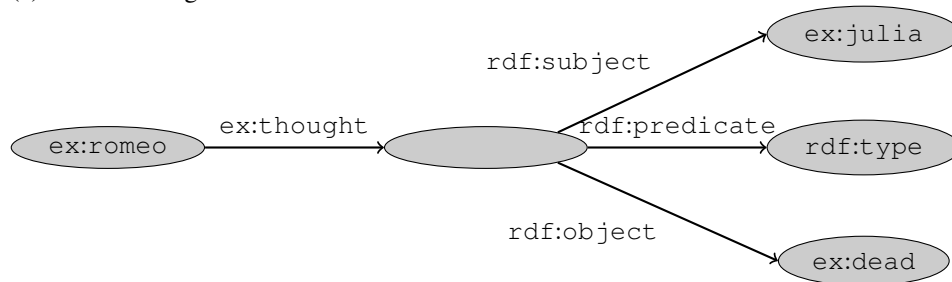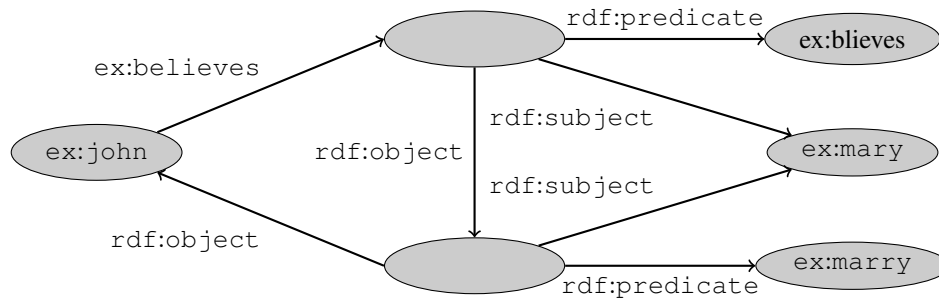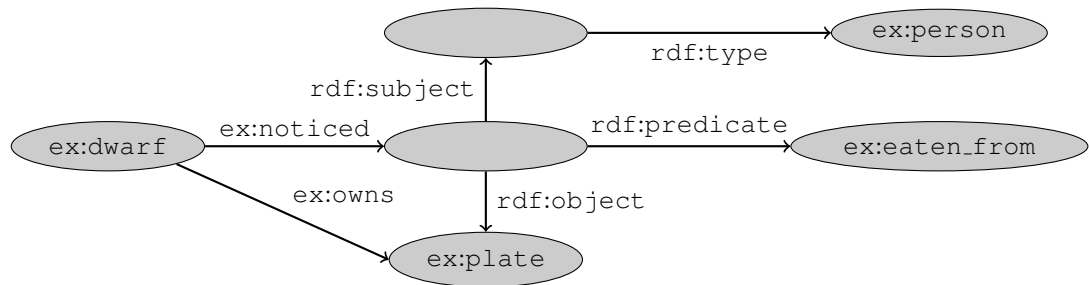
Solution for Exercise 1.6

(a): Romeo thought that Julia was dead.

(b): John believes that Mary wants to marry hime.

(c): The dwarf noticed that somebody had been eating from his plate.

Solution for Exercise 1.7   (b), (c), and (e): cannot be modeled in RDF(S).

```
@prefix rdf: <http://www.w3.org/1990/02/22-rdf-syntax-ns#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix ex: <http://example.org/> .
```

- Every pizza is a meal.
  ```
  ex:Pizza rdfs:subClassOf ex:Meal.
  ```

- Everything having a topping is a pizza.
  `ex:hasTopping rdfs:Domain ex:Pizza.`

- "Having a Topping" is a containedness relation.
  `ex:hasTopping rdf:type rdfs:ContainerMembershipProperty.`