RDF

Exercises

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Exercise #1

Alan Turing was born on 23 June 1912 in Maida Vale, London.

```
@prefix :  <http://example.org/> .
@prefix dbo:  <http://dbpedia.org/ontology/> .
@prefix foaf:  <http://xmlns.com/foaf/0.1/> .
@prefix rdfs:  <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .

:Alan_Turing
        foaf:name "Alan Turing" ;
        dbo:birthDate "1912-06-23"^^xsd:date ;
        dbo:birthPlace :Maida_Vale .
:Maida_Vale
        rdfs:label "Maida Vale"@en ;
        dbo:isPartOf :London .
:London
        rdfs:label "London"@en .
```

Exercise #2

Can we represent in RDF alone that «Tony Hoare was not born in Rome»? (assuming the use of *dbo:birthPlace* to represent one's birthplace)

We can't simply write the following, because RDF doesn't support negation:

NOT :Tony_Hoare dbo:birthPlace :Rome

We might be tempted to write the following triple:

:Tony_Hoare mySchema:notBornIn :Rome

However, the triple above doesn't solve our problem, because the predicate *mySchema:notBornIn* is completely unrelated to *dbo:birthPlace* (remember that the formal semantics of RDF considers IRI as opaque strings).

Exercise #2 (cont'd)

- To achieve our goal (represent the fact that a resource doesn't have a given value for a property) we have to move up one level
- Utilizing OWL 2, we can write:

```
_:x rdf:type owl:NegativePropertyAssertion .
_:x owl:sourceIndividual :Tony_Hoare .
_:x owl:assertionProperty dbo:birthPlace .
_:x owl:targetIndividual :Rome .
```

The semantics of OWL 2 allows us to understand the triples above as stating that *:Tony_Hoare* is not connected by the property *dbo:birthPlace* to *:Rome*, i.e. the fact represented by the triple *:Tony_Hoare dbo:birthPlace :Rome* doesn't hold

Exercise #3

Albert Einstein married Mileva Marić.

```
@prefix : <http://example.org/> .
@prefix dbo:  <http://dbpedia.org/ontology/> .
:Albert_Einstein
        dbo:spouse :Mileva_Marić
        .
```

Exercise #4

Albert Einstein married Mileva Marić and Elsa Löwenthal.

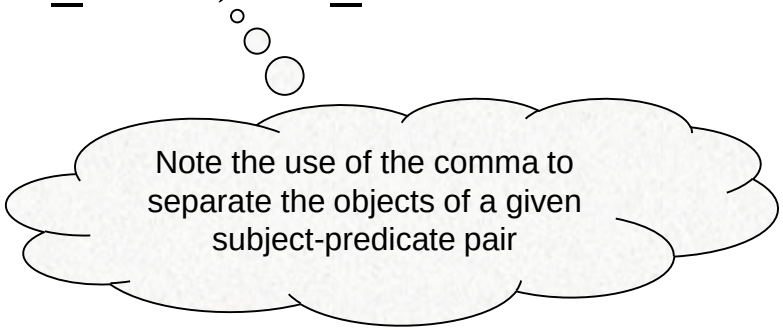
```
@prefix : <http://example.org/> .
@prefix dbo:  <http://dbpedia.org/ontology/> .

:Albert_Einstein
        dbo:spouse :Mileva_Marić ;
        dbo:spouse :Elsa_Löwenthal
        .
```

Exercise #4 (cont'd)

Albert Einstein married Mileva Marić and Elsa Löwenthal.

```
@prefix : <http://example.org/> .
@prefix dbo:  <http://dbpedia.org/ontology/> .
:Albert_Einstein
        dbo:spouse :Mileva_Marić , :Elsa_Löwenthal
        .
```



Exercise #5

Albert Einstein married Mileva Marić in 1903 and Elsa Löwenthal in 1919

```
@prefix : <http://example.org/> .
@prefix dbo:  <http://dbpedia.org/ontology/> .
@prefix mySchema:  <http://example.org/myschema> .
:Albert_Einstein
        dbo:spouse :Mileva_Marić ;
        mySchema:marriageDate "1903" ;
        dbo:spouse :Elsa_Löwenthal ;
        mySchema:marriageDate "1919"
        .
```

Exercise #5 (cont'd)

- The description in the previous slide is flawed:
  - it doesn't represent unambiguously when Albert Einstein married each woman
- Note that the following fragments serialize the same graph (because the RDF data model ignores order and multiplicity)

```
:Albert_Einstein
        dbo:spouse :Mileva_Marić ;
        mySchema:marriageDate "1903" ;
        dbo:spouse :Elsa_Löwenthal ;
        mySchema:marriageDate "1919"
        .
```

```
:Albert_Einstein
        dbo:spouse :Mileva_Marić ;
        mySchema:marriageDate "1919" ;
        dbo:spouse :Elsa_Löwenthal ;
        mySchema:marriageDate "1903"
        .
```

Exercise #6 (solution to #5)

Albert Einstein married Mileva Marić in 1903 and Elsa Löwenthal in 1919

```
@prefix : <http://example.org/> .
@prefix bio:  <http://purl.org/vocab/bio/0.1/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix dc: <http://purl.org/dc/elements/1.1/> .
:marriage1 rdf:type bio:Marriage
        bio:partner :Albert_Einstein ;
        bio:partener :Mileva_Marić ;
        dc:date «1903»  .
:marriage2 rdf:type bio:Marriage
        bio:partner :Albert_Einstein ;
        bio:partener : Elsa_Löwenthal ;
        dc:date «1919» .
```

The marriage event is modeled as a resource, the properties of which hold the partners and the date

This approach allows us to represent unambiguously when Albert Einstein married each woman