

Tutorial Exercises 1
CS 7810 - Knowledge Representation and Reasoning for the Semantic Web
Fall 2016
Due date: September 22, 2016 – before class starts

Exercise 1.1. Model the following sentences in RDF(S). Write your answer in Turtle syntax and invent your own IRIs if needed.

- (a) Leicester City won the English Premier League.
- (b) NBC broadcasts the Tonight Show hosted by Jimmy Fallon every weeknights at 11:34 PM ET.
- (c) Every university is an organization.
- (d) Any entity which has a national anthem is a country.

Exercise 1.2. Write the following part of an RDF document in Turtle syntax:

```
<rdf:RDF xmlns="http://www.example.org/"
  xmlns:base="http://www.example.org/"
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:owl="http://www.w3.org/2002/07/owl#"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#">
  <owl:Class rdf:about="Professor">
    <rdfs:subClassOf>
      <owl:Restriction>
        <owl:onProperty rdf:resource="affiliatedWith"/>
        <owl:someValuesFrom rdf:resource="University"/>
      </owl:Restriction>
    </rdfs:subClassOf>
  </owl:Class>
</rdf:RDF>
```

Exercise 1.3. Visualize the graph given in Exercise 1.2. Label the nodes and edges with their IRIs, if any, appropriately.

Exercise 1.4. Write the following RDF document in RDF/XML syntax.

```
@prefix sw: <http://sw.org/id/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
```

```
[ rdf:type owl:Class ;
  owl:UnionOf ( sw:Professor sw:Student ) ;
  rdfs:subClassOf [ rdf:type owl:Restriction ;
                   owl:onProperty sw:affiliatedWith ;
                   owl:allValuesFrom sw:University ] ] .
```

Exercise 1.5. Visualize the graph given in Exercise 1.4. Label the nodes and edges with their IRIs, if any, appropriately.

Exercise 1.6. Give an example of RDFS interpretation that is also a model of the graph given in Exercise 1.4.

Exercise 1.7. The graph in Exercise 1.4 can be rewritten as follows:

```
@prefix sw: <http://sw.org/id/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .

_:bn1 rdf:type owl:Class ;
      owl:UnionOf _:bn2;
      rdfs:subClassOf _:bn3 .
_:bn3 rdf:type owl:Restriction ;
      owl:onProperty sw:affiliatedWith ;
      owl:allValuesFrom sw:University .
_:bn2 rdf:first sw:Professor ;
      rdf:rest _:bn4 .
_:bn4 rdf:first sw:Student ;
      rdf:rest rdf:nil .
```

Using RDFS semantics, list all the IRIs and/or blank nodes that

- (a) represent some instance of `rdfs:Class`;
- (b) represent some instance of `rdf:Property`;
- (c) represent some instance of `rdf:List` .