Tutorial Exercises 2
CS 7810 - Knowledge Representation and Reasoning for the Semantic Web
Fall 2016
Due date: October 11, 2016

Exercise 2.1. Consider the following RDF graph G:

```
@prefix exr: <http://example.org/res/> .
@prefix exo: <http://example.org/ont/> .

exo:type rdfs:subPropertyOf rdf:type .
exr:Chicago exo:type exr:City .
exr:Chicago_Bulls exo:city exr:Chicago .
```

(a) Give a triple that is simply entailed by G.
(b) Give a triple that is RDF-entailed, but not simply entailed by G.
(c) Give a non-axiomatic triple that is RDFS-entailed, but not RDF-entailed by G.

For each of the triples above, show how you derive it (using deduction rules or other means).

Exercise 2.2. This exercise asks you to play around with the DBPedia SPARQL endpoint, which can be accessed at `http://dbepdia.org/snorql`. Besides finding the information requested below, write down your queries as part of your answer for this exercise.

(a) The DBPedia SPARQL endpoint hosts more than one named graphs. Find all those named graphs.
(b) DBpedia contains RDFS triples that specify a class hierarchy (via `rdfs:subClassOf` triples and `owl:equivalentClass` triples). Find all classes whose IRI is in the `http://dbpedia.org/ontology/` namespace such that these classes are involved in any one of the `rdfs:subClassOf` triples. Furthermore, if such a class is equivalent (given via `owl:equivalentClass` triples) to another class in the `http://dbpedia.org/ontology/` namespace, also return that equivalent class.
For example, your answer should return `<http://dbpedia.org/ontology/Book>`, but not `<http://dbpedia.org/class/yago/2002Books>`
(c) Among the answer of part (b), you should be able to find `<http://dbpedia.org/ontology/Place>` as one of the classes. Find all direct and indirect subclasses of `Place` and its German label, if any. Return only those from the `http://dbpedia.org/ontology/` namespace.
Note that indirect subclasses are those obtained due to the transitivity of `rdfs:subClassOf` and `owl:equivalentClass` properties.
(d) Find all properties whose range is either `<http://dbpedia.org/ontology/City>` or `<http://dbpedia.org/ontology/Country>`.
(e) List the name of all Nobel prize winners who were born in East Asia region.
(f) List all cities in the United States named Springfield together with the state where they are located.
(g) Find all countries which has been dissolved and sort the result from the most short-lived to the most long-lived.
(h) Find the English name of all landlocked European countries whose population exceeds 5 million.
(i) List all the titles, directors, and grossing amount (if any) of movies starring five oldest actors/actresses who co-starred with Tom Cruise. Sort the results from the highest grossing amount to the lowest one.
(j) List all actors/actresses who co-starred in at least two different movies with Meryl Streep, and also list the movie titles where they co-starred with Meryl Streep where the titles are returned as one literal values (separated by ' ; ') . For example, Jack Nicholson and Meryl Streep co-starred in "Ironweed" and "Heartburn", so for Jack Nicholson the movie titles returned are "Ironweed ; Heartburn" (concatenated string from the corresponding movie titles).