8. RDFS Reasoning in Jena

The purpose of this lab is to let you learn how to perform RDFS reasoning in Jena.

RDFS Reasoner in Jena

In Jena, the interface `Model` is used to represent a graph (a set of triples). Jena provides the interface `InfModel`, an extension to `Model` that supports access to any underlying inference capability, which includes generating additional entailments from a graph.

Given an RDFS ontology `schema` and some RDF data `data`, via the class `ModelFactory`, which provides methods for creating kinds of `Model`, you can use the method

```
createRDFSModel(Model schema, Model data)
```

to return an `InfModel` through which all the RDFS entailments derivable from the given `schema` and `data` models are accessible.[1]

Task 1 You are asked to develop an RDFS ontology about family relationships with 5 axioms (e.g., about subclasses, subproperties, domains, ranges) and 3 facts that use the axioms. Using Jena, load the ontology and the facts. Then, print out all new inferred facts that are not RDFS axiomatic triples.

Hint: You can compute the difference between the inferred model and the original model to find out the new inferred facts. The class `Model` provides the method `difference` to perform such an operation.[2]

Schema.org Ontology

Schema.org provides a collection of shared vocabularies webmasters can use to mark up their pages in ways that can be understood by the major search engines: Google, Microsoft, Yandex and Yahoo!.[3]

[1] See also its Javadoc specification: `http://bit.ly/16nKx4i`
[2] See also its Javadoc specification: `http://bit.ly/1BHGf1N`
[3] `http://schema.org/docs/gs.html`

Task 2 Represent in RDF Turtle the following facts using the Schema.org ontology:

- Toyota Corolla is a product.
- The aggregate rating of Toyota Corolla has the rating count of 20, the best rating score of 100 and the average rating score of 90.
- An image of the product is provided at `http://bit.ly/1vNHib3`.
- There are two offers of the product.
  - The company Auto2020 offers the product for $10000.
  - The company OneAuto offers the product for $9999.

Next, download the Schema.org ontology at `http://schema.rdfs.org/all.ttl`.

Task 3 Using Jena, load the ontology and product data, and then print out all new inferred facts that are not RDFS axiomatic triples.