

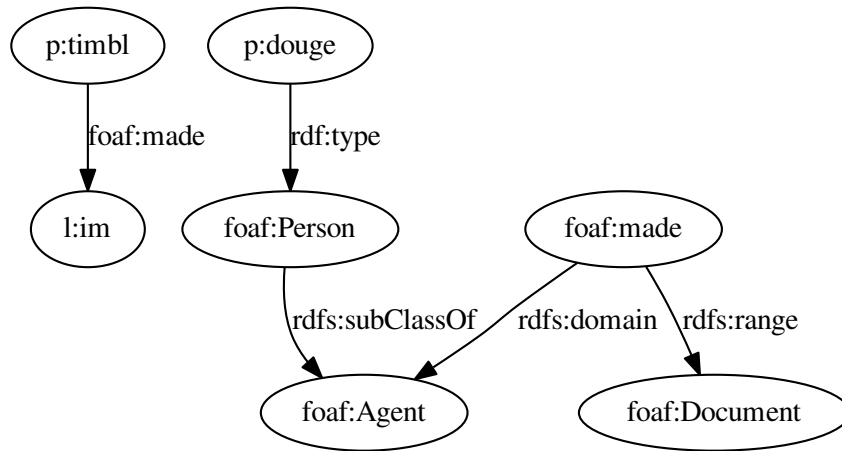
Introduction to the Semantic Web

Work sheet 4

Deadline: Tuesday, November 13, 13:00

Question 1

Consider the following RDF graph. Add all triples that can be entailed via RDFS entailment. See <https://www.w3.org/TR/rdf11-mt/> (Section 9.2.1) for the list of RDFS entailment rules. For each entailed triple, name which entailment rule was applied to derive the triple. Do not add the axiomatic triples (listed at the beginning of Section 9). (You might become bored with this task after a while because there are many triples to be added - it is not necessary that you really add everything.)



Question 2

Consider again the RDF graph from Question 1. Add the following axiomatic triples to the graph:

```
rdf:type rdfs:domain rdfs:Resource .
rdf:type rdfs:range rdfs:Class .
rdfs:domain rdfs:domain rdf:Property .
rdfs:domain rdfs:range rdfs:Class .
rdfs:range rdfs:domain rdf:Property .
rdfs:range rdfs:range rdfs:Class .
rdfs:subClassOf rdfs:domain rdfs:Class .
rdfs:subClassOf rdfs:range rdfs:Class .
```

Add all triples that can be entailed via RDFS entailment. For each entailed triple, name which entailment rule was applied to derive the triple. Ignore the other axiomatic triples. (You might become bored with this task after a while because there are many triples to be added - it is not necessary that you really add everything. However, notice that more triples can be entailed compared to Question 2.)

Question 3

Consider the following graph G :

```
ex:mescaline rdf:type ex:HallucinogenicSubstance ;
              ex:isActiveChemicalOf ex:peyoteCactus .

ex:HallucinogenicSubstance rdfs:subClassOf ex:
  PsychoactiveDrug .

ex:PsychoactiveDrug rdfs:subClassOf ex:Drug .

ex:isActiveChemicalOf rdfs:subPropertyOf ex:occursIn .

ex:occursIn rdfs:domain ex:Drug ;
            rdfs:range ex:Plant .
```

Can the following triples be inferred (via RDFS entailment) and, if so, how:

1. `ex:HalluciongenicSubstance rdfs:subClassOf ex:Drug .`
2. `ex:mescaline rdf:type ex:Drug .`
3. `ex:isActiveChemicalOf rdfs:domain ex:Drug .`
4. `ex:Plant rdfs:subClassOf rdfs:Class .`

5. `ex:PsychoactiveDrug rdfs:subClassOf ex:PsychoactiveDrug .`

Either explain how each triple can be inferred using RDFS rules, or provide a proof, that shows how the triple in question can be entailed: $G \models \{t\}$ where G is the given graph and t is a triple.