

Ontologies (2)

Exercise 1

- Download the reasoner **Pellet** and associated editor **SWOOP** from <http://pellet.owldl.com/>.
- Use SWOOP to create the ontology of Exercise 3 of the previous assignment. Note: in SWOOP check “Show Inherited”, and “Editable” in the horizontal bar. Choose “Pellet” instead of “No Reasoner”.
- Check the extension of classes and properties of Exercise 3.

Exercise 2

Write down one or more DL axioms that express the same constraints expressed in each of the following OWL axioms:

a)

```
<owl:Class rdf:ID="Elephant">
  <rdfs:subClassOf rdf:resource="#Animal" />
  <rdfs:subClassOf>
    <owl:Restriction>
      <owl:onProperty rdf:resource="#eats" />
      <owl:allValuesFrom rdf:resource="#Plant" />
    </owl:Restriction>
  </rdfs:subClassOf>
</owl:Class>
```

b)

```
<owl:ObjectProperty rdf:ID="fatherOf">
  <rdf:type rdf:resource="#owl:FunctionalProperty" />
  <rdfs:domain rdf:resource="#Man" />
  <rdfs:range rdf:resource="#Person" />
  <rdfs:subPropertyOf rdf:resource="#parentOf" />
</owl:ObjectProperty>
```

Exercise 3

Use the tableau method to prove the satisfiability or unsatisfiability of the following DL concept:

$$(\exists R. (\forall S.M)) \cap (\forall R. (\exists S. \neg M))$$

Exercise 4

A and B are concepts and R is a role. The extension of a concept or a role is given by the function ext.

$$\text{ext}(\text{Top}) = \{v, w, x, y, z\}$$

$$\text{ext}(A) = \{v, w, x, z\}$$

$$\text{ext}(B) = \{x, y\}$$

$$\text{ext}(R) = \{(v, w), (v, x), (y, x), (x, z)\}$$

Give the extension of the following DL concept expressions :

- a) $\exists R.A$
- b) $\forall R.A$
- c) $\leq 1 R$
- d) $\geq 2 R$
- e) $\neg B$
- f) $\exists R.(\exists R.A)$
- g) How would you close R for v?

Check your answers in SWOOP.