

3. Unit: OWL

Exercise 3.1 (Win-Move Game: Draw Nodes) Consider again the Win-Move-Game. There, WinNodes and LoseNodes have been axiomatized.

a) Is it possible to characterize DrawNodes in OWL?

Consider two alternative variants:

a) use the game axioms/rules to axiomatize DrawNodes explicitly.

b) consider the possible values: win/lost/drawn.

Test both with *typical* minimal examples and explain the results.

Comparison with the DBT/Deductive Databases lecture: Interpret the results and compare them with the semantics of the well-founded model and of stable models.

b) Is it possible to obtain the drawn nodes by using SPARQL?

If yes, give a query that does this.

Exercise 3.2 (Gods I) Give an OWL 1.0 specification of the following situation:

The Jewish belief is a monotheistic belief – the only god is Jehova. The old northern European belief was polytheistic, the set of gods consists of Odin, Thor, and Freya. Moshe is a Jew, Haegar is a northern European.

State a SPARQL query that tells you who believes in whom.

Exercise 3.3 (Gods II) Solve Exercise 3.2 using OWL2 features.

Exercise 3.4 (Male and Female Names)

Consider again the *Male and Female Names* Example from the lecture:

The name commonly female name “Maria” is (mainly by catholics) also used as an additional first name for males, e.g. Rainer Maria Rilke (German poet, 1875-1926), José Maria Aznar (*1956, Spanish Prime Minister 1996-2004), cf. also Jean-Marie Le Pen (*1928, French Politician).

Discuss the consequences on the ontology.

Exercise 3.5 Consider again the “Escher Stairs” example from the lecture:

- what happens when the above program is extended to four corners (:a :b :c :d)?
 - What is the result of the SPARQL query?
 - What are the possible models? – Analyze the result also from the logical point of view.
- Characterize the models when the program is extended to five and six nodes.

Exercise 3.6 (Role Chains: Uncles)

Characterize the uncle relationship as a role chain:

- x 's uncles are the brothers of x 's parents, and
- x 's uncles are husbands of the sisters of x 's parents.

Diese Aufgabe ist noch nicht fertig (erzeugt einen Fehler)

Exercise 3.7 Consider again the “Parricide” example from the Semantic Web lecture and the answer (from pellet) to `parricide2.sparql` in an *absolutely strict* way.

- What has actually been proven by the answer?
- What *additional* human reasoning took place in the lecture when *interpreting* the answer to `parricide2.sparql` as “it can be either Iokaste or Oedipus (depending on whether Perineikes is a parricide, which nobody knows)”.
- complete the ontology and the SPARQL query in a way that the human reasoning conclusions are mirrored in the setting.
- is it possible to include *all* human reasoning conclusions in the setting?

Still, Zeus is a `:KnowsO_PoPGonP`, so there must be a `PoPGonP` amongst the persons from the Oedipus tale. Perineikes can be excluded.

- Not really. One might close the scenario by asserting that Thesandros has no children. Only then, he would also end up in `:Comp_PoPGonP`. Otherwise this last conclusion is just external human reasoning on a higher level when reasoning about the reasoner’s behavior.