**《语义网与知识图谱》实验手册**

**实验四 描述逻辑及语义**

目的：

1. 熟悉描述逻辑的基本语法，并掌握利用描述逻辑进行知识表示的方法。
2. 了解描述逻辑的简单推理。

内容：

**【习题1】** Translate the ontology which you created as a solution for Exercise 【2】 in Experiment 3 into DL syntax.

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| - Vegetable ⊑PizzaTopping  - PizzaTopping ∏ Pizza ⊑ ┴  - Vegetable(aubergine)  - ⊤ ⊑ ∀hasTopping.PizzaTopping  ∃hasTopping.⊤ ⊑ Pizza  - VegPizza ≡ NoMeatPizza ∏ NoFishPizza  - hasTopping ⊑ hasIngredient |

【习题2】 Translate the ontology which you created as a solution for Exercise 【2】 in Experiment 3 into predicate logic syntax.

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| ∀x(Vegetable(x) → PizzaTopping(x))  ┐(∃x (PizzaTopping(x) ∧ Pizza(x)))  Vegetable(aubergine)  ∀x∀y(hasTopping(x, y) → PizzaToping(y))  ∀x(((∃y)hasTopping(x, y)) → Pizza(x))  ∀x(VegPizza(x) ↔ NoMeatPizza(x) ∧ NoFishPizza)  -∀x∀y(hasTopping(x, y) → hasIngredient(x, y)) |

【习题3】Express the following sentences in SROIQ，using the individual names **bonnie** and **cylde,** theclass names **Honest** and **Crime**, and the role names **reports**, **commits**, **suspects**, and **knows**.

1. Everybody who is honest and commits a crime reports himself.
2. Bonnie does not report Clyde.
3. Clyde has committed at least 10 crimes.
4. Bonnie and Clyde have committed at least one crime together.
5. Everybody who knows a suspect is also a suspect.

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| Honest ∏ ∃commits.Crime ⊑ ∃reports.self  ┐reports(Bonnie, Clyde)  ≥10 commits.Crime(Clyde)  (∃commits.(Crime ∏ ∃commit**-**.{Clyde}))(Bonnie)  knows**-** ⚪suspects ⊑ suspects |

【习题4】Translate the knowledge base

Human⊑∃hasMother.Human

∃hasMother.(∃hasMother.Human) ⊑Grandchild

Human(anupriyaAnkolekar)

into RDFS syntax.

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| <owl:Class rdf:about=”Human”>  <rdfs:subClassOf>  <owl:Restriction>  <owl:onProperty rdf:resource=”hasMother”>  <owl:someValuesFrom rdf:resource=”Human”>  </owl:Restriction>  </rdf:subClassOf>  </owl:Class>  <owl:ObjectProperty rdf:about=”hasMother”>  <owl:someValuesFrom>  <owl:Restriction>  <owl:onProperty rdf:resource=”hasMother”>  <owl:someValuesFrom rdf:resource=”Human”>  </owl:Restriction>  </owl:someValuesFrom>  <rdfs:subClassOf>  <owl:Class rdf:resource=”Grandchild”>  </rdfs:subClassOf>  </owl:ObjectProperty>  <Human rdf:about=”anupriyaAnkolekar”> |

【习题5】Consider the two RDFS triples

**r rdfs:domain B. and A rdfs:subClassOf B .**

Understood as part of an OWL knowledge base, they can be expressed as B⊑∀r.⊤ and A⊑B.

Give a triple which is RDF-entailed by the two given triples, but which cannot be derived from the OWL DL semantics.

Furthermore, give an OWL DL statement which is a logical consequence of the two OWL statements but cannot be derived using the RDFS semantics.

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| -- rdf:type rdfs:range rdfs:Class  -- R rdfs:domain A |