

Exercises for the book

Semantic Web Databases

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Chapter 9 – Inference

1. Apply the rules of [Gutierrez, Hurtado and Mendelzon, 2004] to the following RDF data and determine all inferable facts.

@**prefix** ub: <http://www.luposdate.org/university/> .
@**prefix** rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@**prefix** rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@**prefix** instance: <http://www.Department0.University0.edu/> .

ub:UniversityMember rdfs:subClassOf ub:Person .
ub:Student rdfs:subClassOf ub:UniversityMember .
ub:UndergraduateStudent rdfs:subClassOf ub:Student .
ub:GraduateStudent rdfs:subClassOf ub:Student .

ub:Peter rdf:type ub:UndergraduateStudent .
ub:Peter ub:name "Peter" .

ub:Harald rdf:type ub:GraduateStudent .
ub:Harald ub:name "Harald" .

ub:Egon rdf:type ub:UniversityMember .
ub:Egon ub:name "Egon" .

2. In this exercise, we want to only apply the rudimentary RDF Schema inference rules (I), (II), (VII) and (VIII) of [Gutierrez, Hurtado and Mendelzon, 2004]. How do the unoptimized and the optimized operatorgraphs of the following SPARQL query and the RDF Schema ontology of Exercise 1 look like for (a) materializing all inferences, (b) materializing only inferences in the ontology layer, and (c) materializing no inferences?

PREFIX ub: <http://www.luposdate.org/university/>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

SELECT ?X
WHERE { ?X rdf:type ub:UniversityMember .
 ?X ub:takesCourse ub:Course1 . }