

Exercises sheet OWL/DL – Reasoning

1. Translate the following axioms in to RDF Turtle

Human $\sqsubseteq \neg$ *Alien*

FatherWithDaughters \sqsubseteq *Man* $\sqcap \forall$ *hasChild*.*Woman*

Sibling $\sqsubseteq \exists$ *parent*. \exists *hasChild*. \neg *Self*

2. Decide whether the following translations are correct or not. Explain your answer

- a) Each Student had not wrote a habilitation

Student $\sqsubseteq \neg(\exists$ *wrote*.*Habilitation*)

- b) A conference chair organizes at least one event that is both research and public

Chair $\sqsubseteq \forall$ *organizes*.(*Research* \sqcap *Public*)

- c) Each assistant is a university staff cannot teach in a privatissimum (exclusive tutorial)

Assistant \sqsubseteq *Staff* $\sqcap \forall$ *teaches*.(\neg *Privatissimum*)

3. Decide if the user understood the ontological definitions correctly. Explain your answer.

- a) *Customer* \sqsubseteq *PublicOrganization* *Customer* \sqsubseteq *Municipality*

A customer is both a public organization and municipality

- b) *GuestProfessor* $\sqsubseteq \neg \forall$ *holds*.(*Lecture* \sqcup *Seminar*)

If someone holds a Lecture or a seminar then he/she is a guest professor.

- c) *Secretary* \sqsubseteq *UniEmployee* *UniEmployee* $\sqsubseteq \neg$ *Secretary*

All secretaries are university employee, but not every employee is a secretary

4. Use the ALC rules presented on the slides to check if the following ontology is consistent. Draw the derivation tree and explain how the rules are applied.

Pizza \sqsubseteq *Bred* $\sqcap \exists$ *topping*.*Cheese*

Pizza(*Margherita*)

topping(*Margherita*, *Mozzarella*)

5. Use the ALC rules presented on the slides to check if the ontology entails *Prof*(*Peter*). Draw the derivation tree and explain how the rules are applied. Note that $A \equiv B$ (equivalence) is a shortcut for the two axioms $A \sqsubseteq B$ and $B \sqsubseteq A$

Student $\sqsubseteq \forall$ *visits*.*Lecture*

Prof $\equiv \exists$ *teaches*.(*Seminar* \sqcup *Lecture*)

teaches(*Peter*, *AlgoDat*)

Student(*John*)

visits(*John*, *AlgoDat*)