

Advanced Data Modeling

Summer Semester 2008

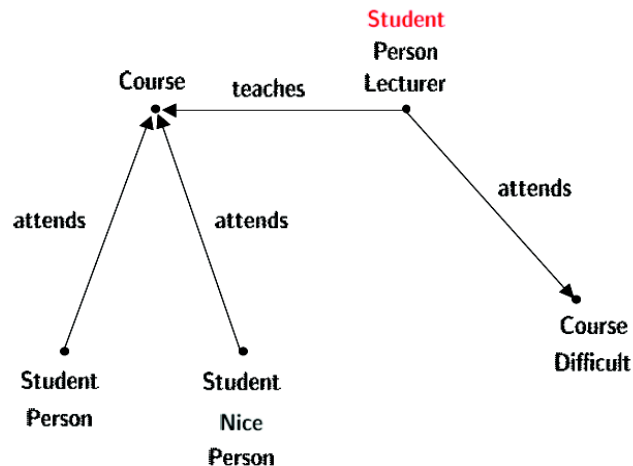
- Exercises VI -

To be handed in before **2008-06-08, 23:59** via e-mail to sschenk@uni-koblenz.de, subject line: [ADM] ...

- 1) Given the following ALC interpretation from the slides:

Add two more persons and two more courses, such that the result is still a model of the TBox from slide 12.

Various solutions are possible.



- 2) Add an ABox with 4 Individuals to the TBox on slide 12 and extend the model accordingly.

Various solutions are possible.

- 3) Design an ALC Tbox, that restricts the domain of the role „employs“ to „Company“ and the range to „Employee“. Define a „BigCompany“ as a Company, which employs at least 10 people. Try to define a small company as one, which employs at most 5 people. Is this possible in ALC?

$\forall \text{ employs}^{-}.(\neg \text{Company}) \sqsubseteq \perp$

$\forall \text{ employs}^{-}.(\neg \text{Employee}) \sqsubseteq \perp$

$\text{BigCompany} \sqsubseteq \text{Company} \sqcap \geq 10 \text{ employs}^{-} \top$

$\text{SmallCompany} \sqsubseteq \text{Company} \sqcap \leq 5 \text{ employs}^{-} \top$

comment: due to the open world assumption, if we want to infer some company really is a SmallCompany, we also need limitations in the ABox, e.g.:

$\forall \text{ mySmallCompany} \text{ employs}^{-} \{a, b, c, d, e\}$

- 4) Explain „Open World Assumption“ in the context of DLs.

Knowledge is always assumed to be incomplete. ABoxes and Tboxes only restrict the set of admissible models. Further, there is no unique name assumption. Hence, there are always multiple models of a DL knowledge base. Entailment is defined as entailment of ALL models.

- 5) Is the TBox on slide 12 definitorial? If yes, add axioms, such that it is no longer definitorial, otherwise remove axioms, such that it becomes definitorial.

No. We need to remove two axioms.