Example for Slide DB 4.1.4

$F = \exists x,y : P(x) \wedge q(x,y)$ is satisfiable

$\mathcal{I} = (I, \mathcal{D})$: $\mathcal{D} = \{a, b\}$

$I(P) = \{(a)\}$

$I(q) = \{(a,b)\}$

Mai 8-10:04

Slide 44, Query Axiomatization

$F(N)$ ← Query $\equiv$

$\exists d,p : Dept(d) \wedge name(d, 'Sales')$

$\wedge Emp(p) \wedge worksfor(d,p)$

$\wedge name(p,N)$

$\mathcal{I} \models_\beta F$

which β?

... answer: $\beta_1 : \{N \to 'Alice'\}$

$\beta_2 : \{N \to 'Bob', \ldots\}$

Mai 8-10:48

unsatisfiable formulas, example:

$\mathcal{F}$: axiomation, ... with some problem,
ie. an inconsistent class spec
↳ Ch

$\mathcal{F} \wedge \exists x : C(x)$

is unsatisfiable!

Mai 8-10:53

Slide 45

given: $\mathcal{F}$ "specification" "axiomatization"

G = child("John", "Bob")

$\mathcal{F} \models G$

Consider $\mathcal{I} = (I, \mathcal{D})$ s.t. $\mathcal{I} \not\models \mathcal{F}$:

$\mathcal{D} = \{$"John", "Jack", "Alice", "Bob", "Carol"$\} \cup \mathbb{N}$

I(person) = {("John", 35), ...}

I(child) = {("John", "Alice"), ...}

I(sibling) = {("Alice", "Bob"), ("Bob", "Alice")}

$\mathcal{F} \not\models$ child("John", "Bob"),
since $\mathcal{I} \not\models \mathcal{F}$, $\mathcal{I} \not\models$ child("John", "Bob")

Consider $\mathcal{I}'$, which is similar to $\mathcal{I}$, namely $\mathcal{I}' = (I', \mathcal{D})$

$I' \supseteq I$, and otherwise I'(child) = I(child) $\cup$ {("Jack", "John")}

$\mathcal{I}' \not\models \mathcal{F}$

Consider $\mathcal{I}''$ .... similar to before, with $I'' = I \cup$ {("John", "Jack")}

then also $\mathcal{I}'' \not\models \mathcal{F}$

Consider $\mathcal{I}'''$ is the same way as with I'''(child) = I(child) $\cup$ {("John", "Carol")}

$\mathcal{I}''' \not\models \mathcal{F}$

$\mathcal{I} \not\models$ sibling("Alice", "Carol")

$\mathcal{I}''' \models$ sibling("Alice", "Carol")

Mai 8-10:59

$G \equiv \forall P, A: person(P, A) \rightarrow A < 100$

$\equiv \neg \exists P: \exists A: (person(P, A) \wedge A > 100)$

Does $\mathcal{F} \models G$? no!

φ''''' , sonst φ !

$\mathcal{I}'''''(person) = \mathcal{I} \cup \{(\text{"Tom"}, 174)\}$

$\varphi''''' \not\models \mathcal{F}$

Mai 8-11:27