SQL: negation and closed (?) world:

Calculus query:

$$F(I, C) \equiv \exists Prov : geo\_island(I, C, Prov) \wedge \neg \exists Code, Name, City, Prov : airport(Code, Name, C, City, Prov, I)$$

$\pi[Island, Country]$ — $\pi[Island, Country]$

$\pi[Island, Country]$ | geo_island

$\pi[Island, Country]$ | airport

Apr 29-10:04

SQL:

```
select island,country
from geo_island
where (island,country) not in (select island,country from airport)
```

51 results

Same?

```
(select island,country
 from geo_island g)
minus
(select island,country
 from airport a )
```

132 results

distinct

```
select island,country
from geo_island g
where not exists
  (select * from airport a
   where a.island = g.island
    and a.country = g.country)
```

135 results

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Reason: NULL values

SQL: null values do not violate any {constraint / condition}

select name, country, city, island from airport where country='D'

⇒ null values for island-column
these airports might be on any island

⇒ actual answer is based on Open world
(Null values with "I don't know")

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Slide 477

relational style:

$\forall x,a: person(x) \wedge age(x,a) \wedge a \geq 18 \rightarrow adult(x)$

functional style.

$\forall x: person(x) \wedge age(x) \geq 18 \rightarrow adult(x)$

(Description logics (SemWeb)

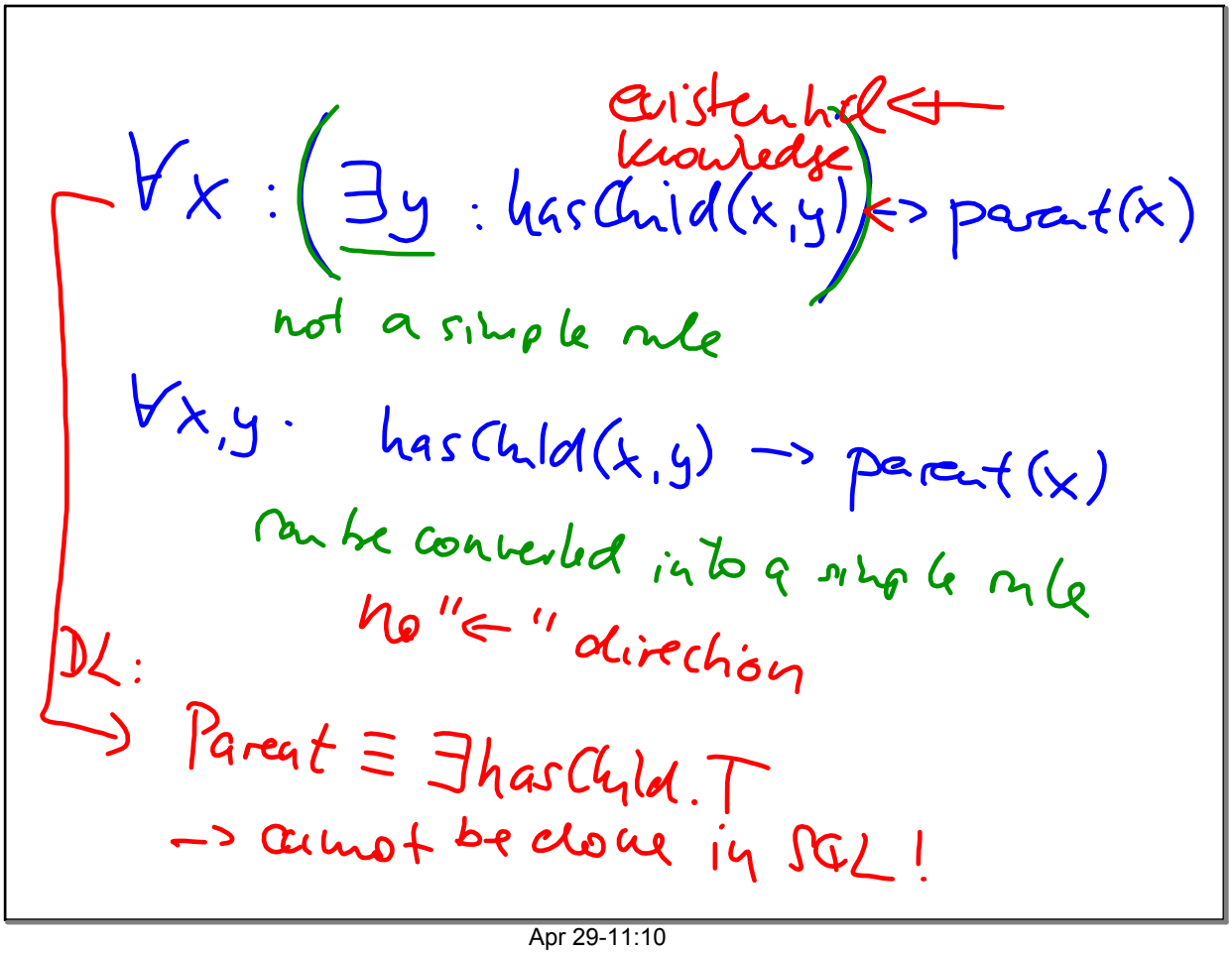
$Person \sqcap age \geq 18 \sqsubseteq Adult$)

SQL view:

```
Create View Adult as
  (Select * from Person
   where age ≥ 18 )
```

"Simple" positive RULE
→ can be expressed as SQL view

Apr 29-11:08



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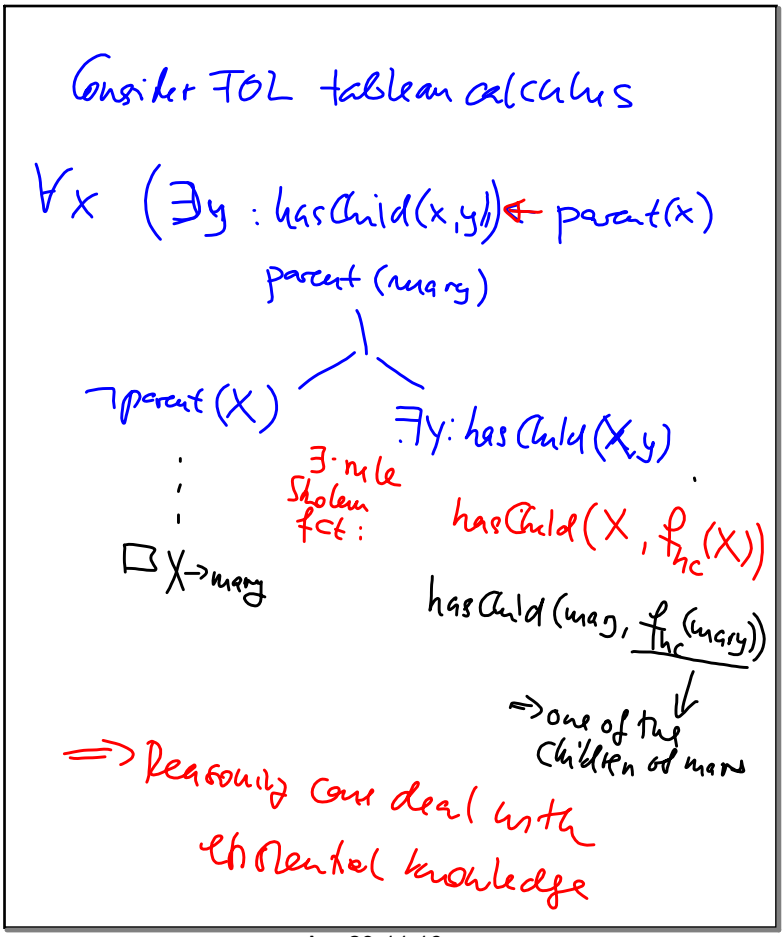

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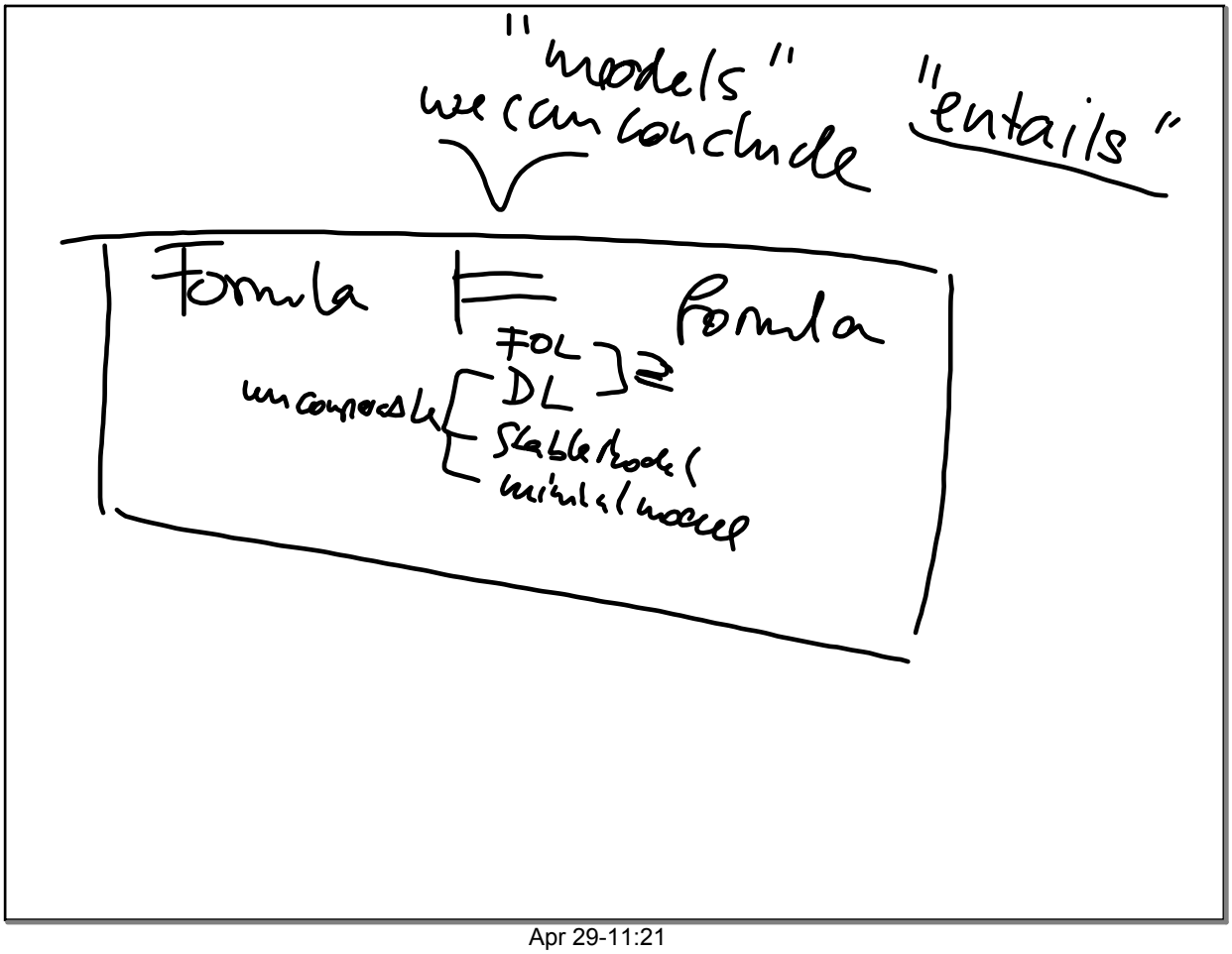
"models"
we can conclude
"entails"
Formula
Formula
FOL
DL
uncomputable
Stable model
minimal model

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