

se 437

$$\mathcal{D} = \{ \dots \}$$

DB:

R
1

logical, $I(R) = \{ (-1) \}$

$$\mathcal{I}_1 = (I, \mathcal{D}_1)$$

$$\mathcal{D}_1 = \{ 1, 2, 3, \text{john}, \text{Berlin} \}$$

$$\mathcal{Q}_1(F(X)) = \mathcal{Q}_1(\neg R(X)) = \{ \{X/2\}, \{X/3\}, \{X/\text{john}\}, \{X/\text{Berlin}\} \}$$

"answer bindings"

$$\mathcal{I}_2 = (I, N)$$

$$\mathcal{Q}_2(F(X)) = \{ \{X/n \mid n \in N, n > 0\} \}$$

\Rightarrow Query is not domain-independent

\Rightarrow does not only depend on the database, but also on an "external" "implicit" domain

\Rightarrow not applicable to the database world

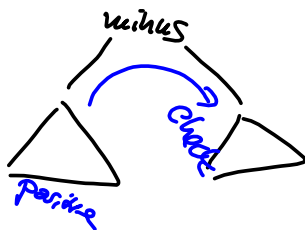
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~ make formula $F(X)$ safe
↳ by a "possible" occurrence of X ,

$$F(X) = \text{person}(X) \wedge \neg \text{named}(\text{john}, X) \wedge \neg (X = \text{john})$$

→ SQL
select name
from person x
where name \neq 'john'
and not ('john', x)
in (select *
from named)

Algebra



both Algebra and SQL are inherently safe :)

SE 442 examples.....

$$F(x, y) = r(\text{"John"}, \underset{\vee}{x}, 3, \underset{\vee}{y})$$

$$r(F) = \{x, y\}$$

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$$F(x,y,z) = p(x,y) \wedge (q(y) \vee r(z))$$

π :
 $\underbrace{\{x,y\} \quad \underbrace{\{y\} \quad \{z\}}_{\emptyset}}_{\emptyset}$

$$F(x,y) = p(x,y) \wedge (q(y) \vee r(x))$$

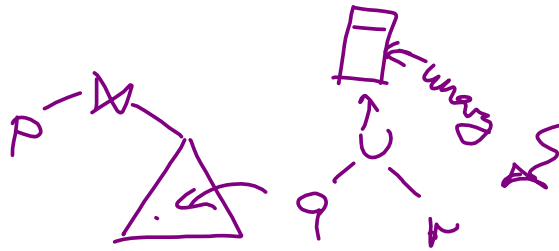
$\sqrt{\text{safe}}$
 $\underbrace{\{x,y\} \quad \underbrace{\{y\} \quad \{x\}}_{\emptyset}}_{\emptyset}$

$\Rightarrow \text{SQL}$

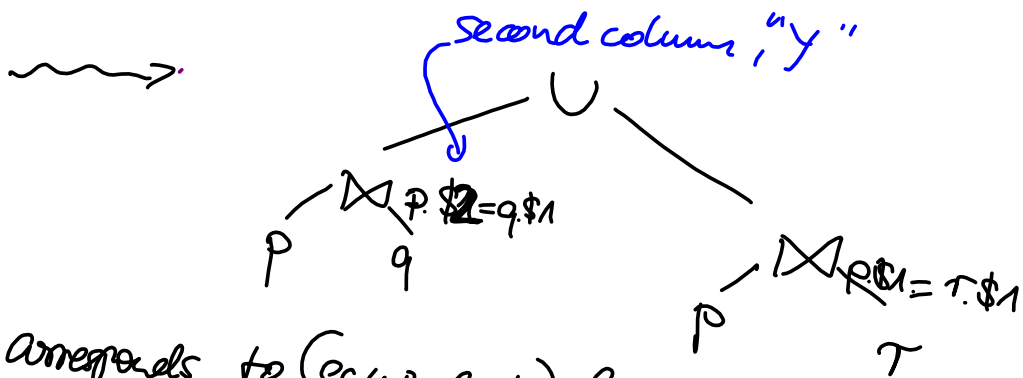
select x,y
 from p

where p.y in (select * from q)
 or p.x in (select * from r)

algebra



... not like this ... SRNF not directly
 convertible to Algebra
 \rightarrow a step missing
 using SRNF \rightarrow RANF Algebra
 \hookrightarrow maybe with next slides



corresponds to (equivalent) formula

$$F(x,y) = (P(x,y) \wedge Q(y)) \vee (P(x,y) \wedge T(x)) \text{ in PAUF}$$