

Dependency graph

EDB relations: a/2, b/3, c/2, d/4

DB predicates/relations/views

$p(A,B,C) :- a(A,B), b(B,D), c(C).$

$q(B,X) :- p(A,B,C), c(A,X).$

$r(X) :- q(B,X).$

p/3, q/2, r/1

Dependency graph:



relate:
 $r(X) = \exists b. \exists a. p(a,b,c) \wedge c(a,X)$
 $= \exists a. a: a(b,b) \wedge b(b,d,c) \wedge c(a,X)$
 non-recursive program

T_p query evaluation

$T_p^1(\emptyset) = \dots$ all facts \rightarrow a, b, c, d filled

$T_p^2(\emptyset) =$ facts + p complete

$T_p^3(\emptyset) =$ facts + p + q complete

$T_p^4(\emptyset) =$ facts + p + q + r complete

$T_p^5(\emptyset) = T_p^4(\emptyset) = T_p^\omega(\emptyset)$

$\hat{=}$ evaluation of the algebra expression(s)

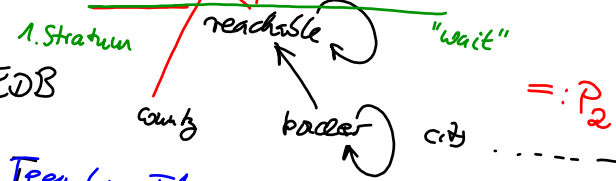
every term label corresponds to one T_p round
 $\hat{=}$ maximal path in the DepGraph

Jun 1-14:10

Consider program P "border/reachable" (Slide 559)

2. Stratum ~~not_reachable~~ + not_reachable(X,Y) :- county(X), county(Y), \neg reachable(X,Y).
 $=: P_2$

EDB



$T_{p eval}$:

$T_p^1 =$ facts

$T_p^2 =$ facts + border symm. + reachable^{1/2}

$T_p^3 =$ " " " " + reachable^{1/2} + reachable^{2/2}

$T_p^{i+2} =$ reachable-in-n steps^{1/2} + reachable^{1/2} + reachable^{2/2} + ...

T_p^ω

wait...until T_p^ω complete

\rightarrow then evaluate not_reachable

$\hat{=} T_{P_2}^\omega(T_p^\omega(\emptyset))$

Jun 1-14:33

Q. 559

cont₃ → x

res(O) = ∃ n, hpc, hpcr, hpp, e : org(O, n, hpc, hpcr, hpp, e)

∧ ∀ cn : (∃ ca : cont(cn, ca))

∃ cn

→ ∃ x_n, x_{code}, x_{cp}, x_{cpp}, x_a, x_{pp}, p_{cc}, t :

cont₃(x_n, x_{code}, x_{cp}, x_{cpp}, x_a, x_{pp})

∧ enc(x_{code}, cn, p_{cc})

∧ isMember(x_{code}, O, t)

org cont

Jun 1-15:22

3rd rule

select name
from organization
where not exists

(select *

from certfilet

where not exists

(select *

from enc, isMember

where enc.cont₃ = isM.cont₃)

2nd rule
"notResult(x)"

1st rule
"org cont₃"

Jun 1-15:32

Aggregation

- cf. algebra: $\pi[\dots](r)$
 $\sigma[\dots](r)$

aggregation "max"
 $\gamma[\max \leftarrow \max(\$1)](\pi[\text{pop}](\text{city}))$

grp by:
 for each county

max
23000000

$\gamma[\text{county}, \{\max \leftarrow \max(\$1)\}](\pi[\text{county}, \text{pop}](\text{city}))$

grp by what?

county	max
D	35000000

Relalg: $\text{res}(C, V) :- \text{county}(N, C, \dots),$
 $V := \max(P, [C], \text{city}(C, P, \dots))$

\uparrow Value \uparrow grp by

Jun 1-15:39