Datalog

More recursive →

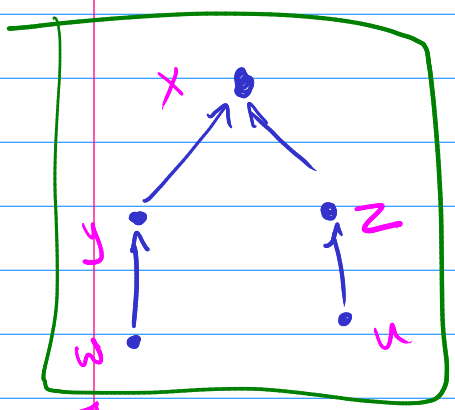
Spreadsheets	SQL RA	Graph databases	Datalog

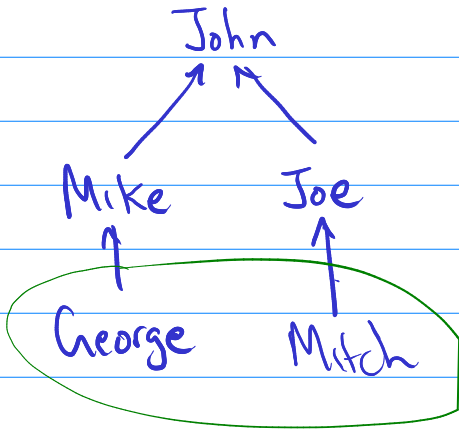
Ex : Given : Family tree parent (x y)

To find : All pairs of cousins

↑

people sharing the same grandparent.





Idea #1 : Instead of explicitly writing down SPJ queries write down rules.

Whenever I can find five people x y z w u with relationships as in the fig, w & u are cousins.

$\forall x\ y\ z\ w\ u,$

$(cousins(w\ u) \Leftarrow parent(x\ y) \wedge parent(x\ z) \wedge parent(y\ w) \wedge parent(z\ u).)$

Input : edge(x y) Output : path(x y)

EDB IDB

R1 path(x y) :- edge(x y)

R2 path(x z) :- edge(x y) path(y z).

need if

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1 → 2 → 3 → 4

Iteration 0	Iteration 1	Iteration 2	Iteration 3	Iteration 4
E12	E12	E12	E12	=
E23	E23	E23	E23	
E34	E34	E34	E34	
	P12	P12	P12	
	P23	P23	P23	
	P34	P34	P34	
		P13	P13	
		P24	P24	
			P14	

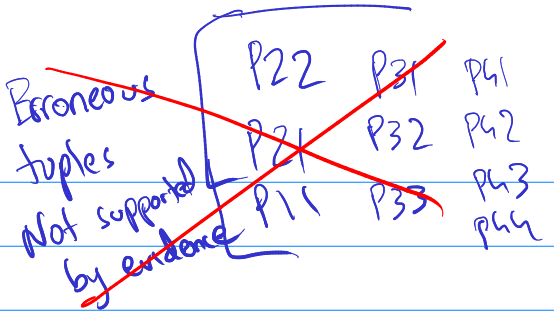
What we will know tomorrow

What we know today

$X = f(X)$

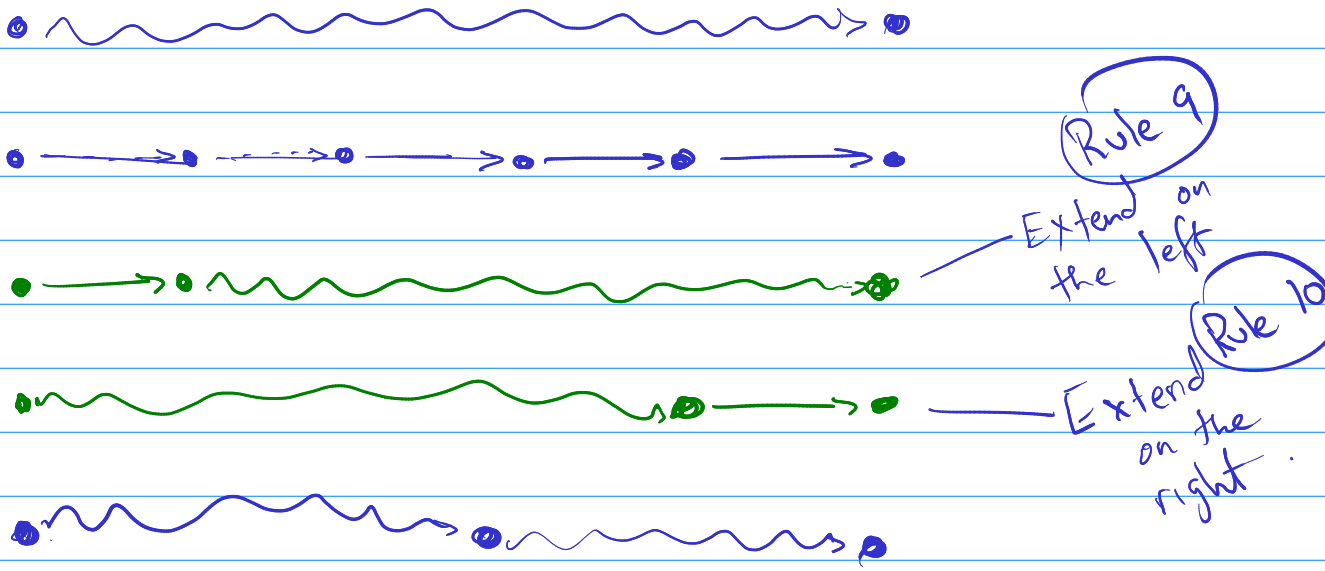
DB grows with time →

Least → Fixpoint

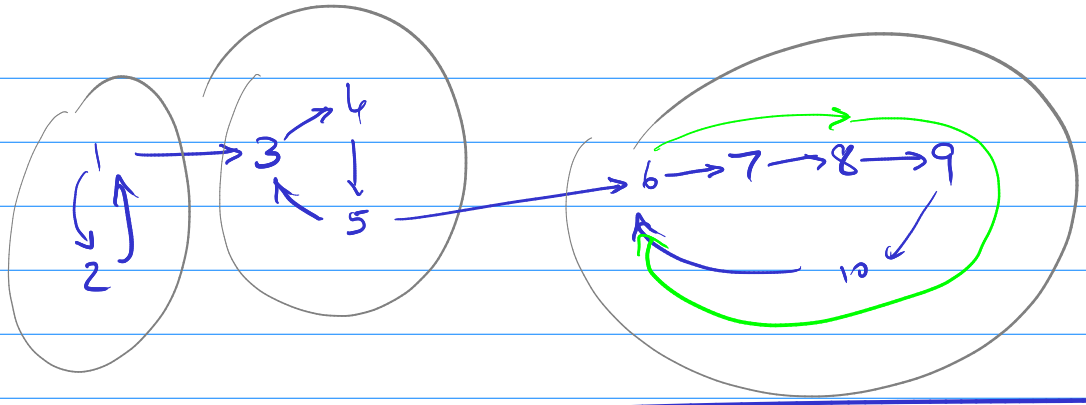


Forest 1 : 1 tiger, 100 deer ⟿ 10 tiger, 50 deer

Forest 2 : 10 tiger, 10000 deer ⟿ 150 tiger, 6000 deer

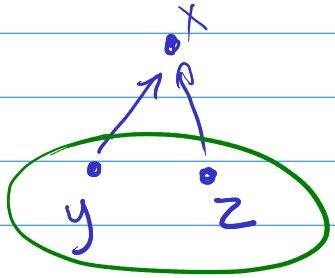


Ex:

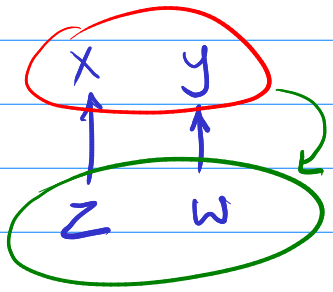


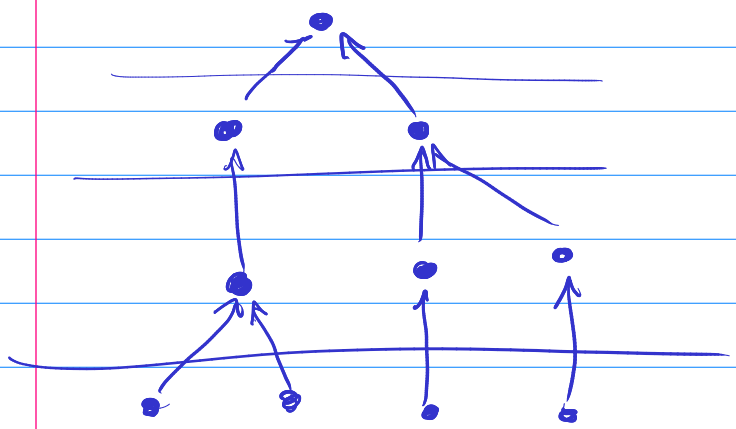
Ex: Same gen When are two people in the same generation?

Fact #1: Siblings are always in the same gen.

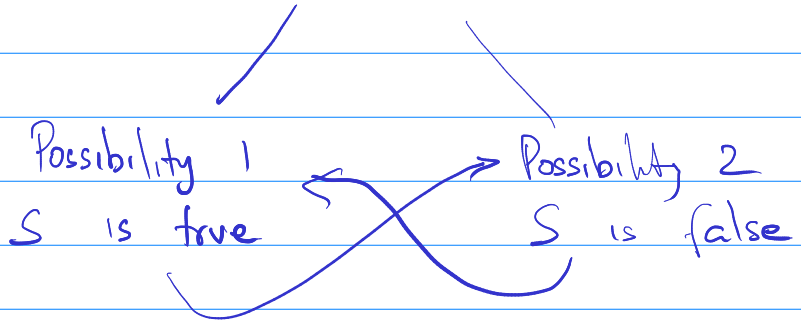


Fact #2 Transitive case





S: This sentence is a lie.



The Problem of Negation