

grandfather (X Z) :-

? - grandfather (Aaron, Z)

father (X ← Aaron Y ← Joseph)

father (Y ← Joseph Z ← ?)

person (Z ←)

grandfather (X Z) :- person (Z) father (Y Z) father (X Y)

? - grandfather (Aaron Z)

Given Z
do they have
any children Y?

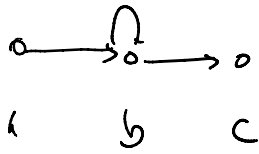
Is Y the
father of
Aaron?

Finite

Herbrand Base

All of the things we know exist.

path (x y n) = there is a path from x to y
of length n.



path (a c 2)

path (a c 3)

path (a c 4)

⋮

Negation in Datalog

- Stratify the program
- Saturate stratum 1
- fix point
- Saturate stratum 2
- Saturate stratum 3
- ⋮

Negation-as-failure.

Stratum 1

$$\begin{cases}
 P_{xy} :- E_{xy} \\
 P_{xz} :- P_{xy} E_{yz}
 \end{cases}$$

⋮

Stratum₂ [NoPath x y :- Vertex(x) Vertex(y)
(!)Path(x y).

Course Recap

Functional Programming

- Static typing
- Programming with immutable values
- Higher order functions
Functions as values
arguments
return
Call backs

Language

Implementation

- Theory + mechanics of parsing.
- Types
- Garbage collection
Runtime issues

- List processing
map fold filter
List comprehensions
-

Relational Programming

- Spreadsheets + DAGs-like computations
 - Relational algebra + SQL
 - Recursion: Graph query language, Cypher
Datalog
Prolog.
-

Why is it important

- Choosing the right abstraction

is important.

- Taste of some abstractions

- Reflective approach to programming