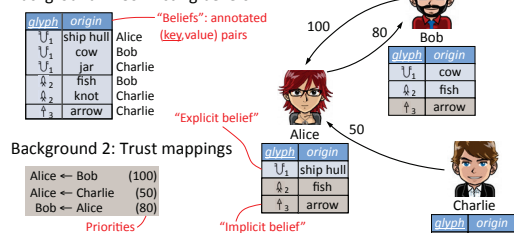




## 1. Conflicts & Trust mappings in Community DBs

### Background 1: Conflicting beliefs\*



### Background 2: Trust mappings



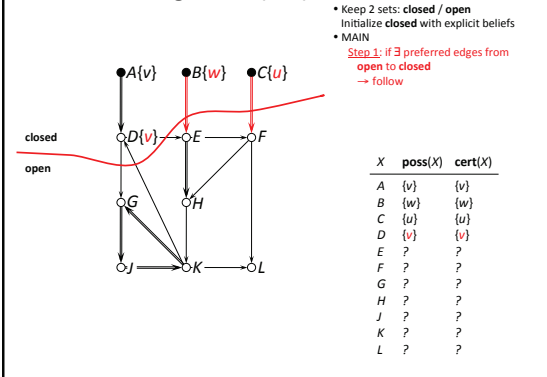
Recent work on community databases:

- Orchestra [SIGMOD'06, VLDB'07]
- Youtopia [VLDB'09], BeliefDB [VLDB'09]

How to unambiguously assign beliefs to all users?

\* Current state of knowledge on the Indus Script: Rao et al., Science 324(5931):1165, May 2009

## 4. Resolution Algorithm (1/2)



## 2. Stable solutions

### Priority trust network (TN)

- assume a fixed key
- users (nodes): A, B, C
- values (beliefs): v, w, u
- trust mappings (arcs) from "parents"

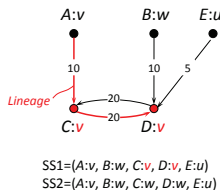
### Stable solution

- assignment of values to each node\*, s.t. each belief has a "non-dominated lineage" to an explicit belief

### Possible / Certain semantics

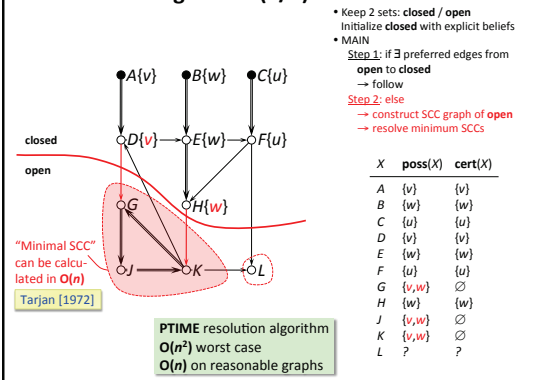
- a stable solution determines, for each node, a possible value ("poss")
- certain value ("cert") = intersection of all stable solutions, per user

\* each node with at least one ancestor with explicit belief



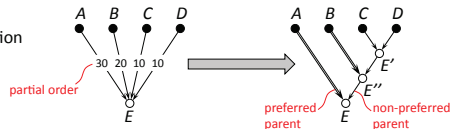
X	poss(X)	cert(X)
A	{v}	{v}
B	{w}	{w}
C	{v,w}	$\emptyset$
D	{v,w}	$\emptyset$
E	{u}	{u}

## 5. Resolution Algorithm (2/2)

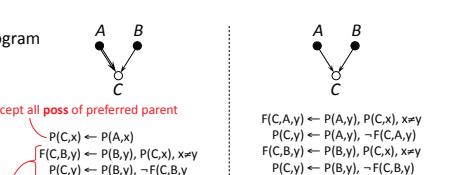


## 3. Logic programs with stable model semantics

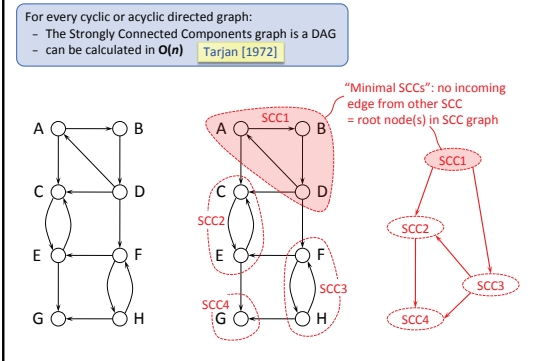
### Step 1: Binarization



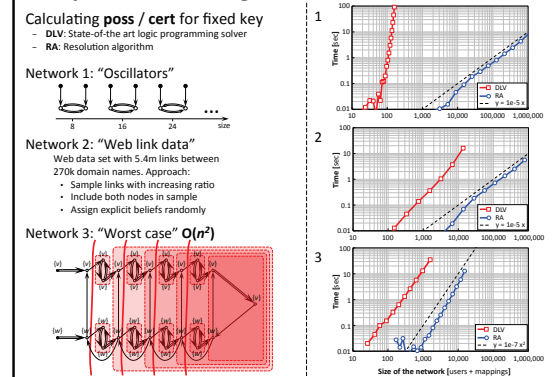
### Step 2: Logic program



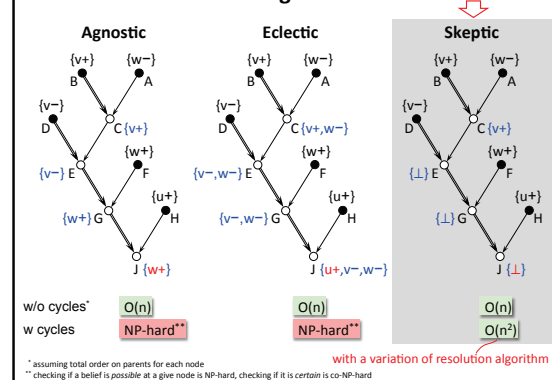
## 6. Detail: Strongly Connected Components (SCCs)



## 7. Experiments on large network data



## 8. Three semantics for negative beliefs



## 9. Take-aways automatic conflict resolution

Problem

- Given explicit beliefs & trust mappings, how to assign consistent value assignment to users?

Our solution

- Stable solutions with possible/certain value semantics
- PTIME algorithm [ $O(n^2)$  worst case,  $O(n)$  experiments]
- Several extensions
  - negative beliefs: 3 semantics, two hard, one  $O(n^2)$
  - bulk inserts
  - agreement checking
  - consensus value
  - lineage computation

Slides soon available on our project page:  
<http://db.cs.washington.edu/beliefDB>