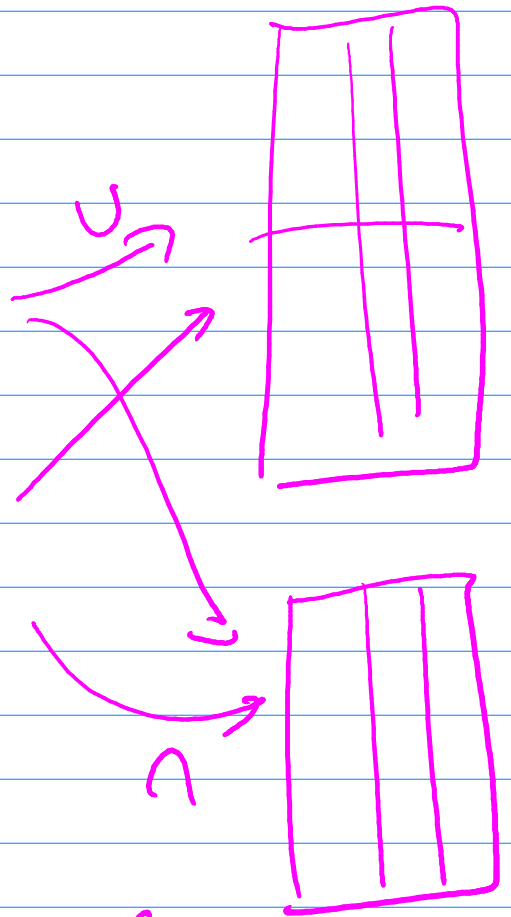


AlbumID ArtistID Date

AlbumID	ArtistID	Date
XXXXXXXXXX		

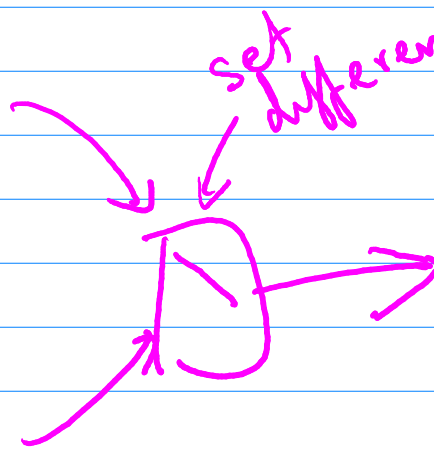
AlbumID	ArtistID	Date
XXXXXXXXXX		



3 → 4
 $T_1 \setminus T_2$

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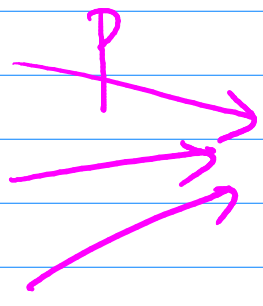
project
select
TT

Album id	Artist id	Date

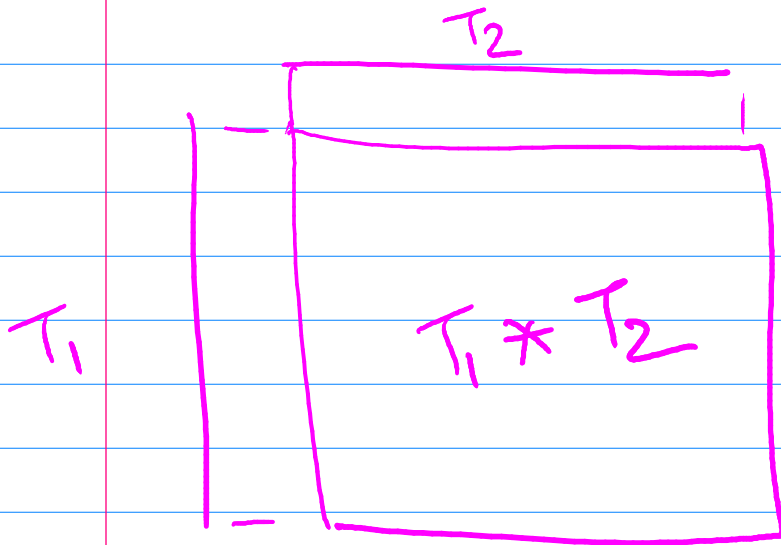


Artist id	Date
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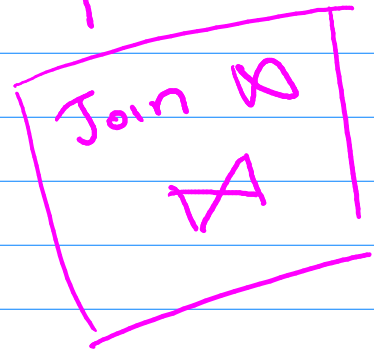
select
o



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Cartesian product *



$$T_1 \bowtie T_2 = \sigma_p (T_1 * T_2)$$

Recursive Query Languages

Example (Cousins)

Two people with the same grandparent

<u>Parent</u>		<u>Cousin</u>
John	Mary	Susan Mike
Mary	Mike	Mike Susan
John	Nate	Mike Mike
Nate	Susan	Susan Susan

Computing Cousins with RA/SOL

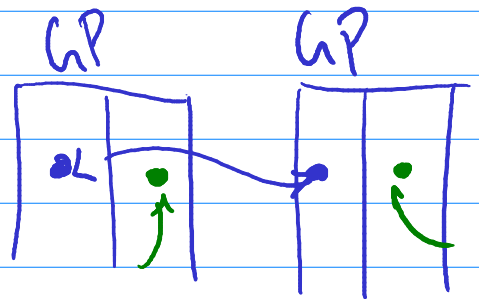
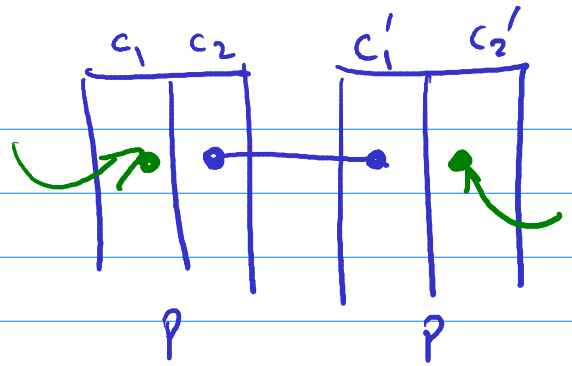
GP = select P₁.parent, P₂.child
from Parent as P₁, Parent as P₂
where P₁.child = P₂.parent

<u>GP</u>	
John	Mike
John	Susan

$$GP = \pi_{c_1, c_4} \left(P \bowtie_{c_2=c'_1} P \right)$$

views

$$C = \pi_{c_2, c_4} \left(GP \bowtie_{c_1=c'_1} GP \right)$$



a, b, c, d, e
Find me 5 people in the world (I don't care how)

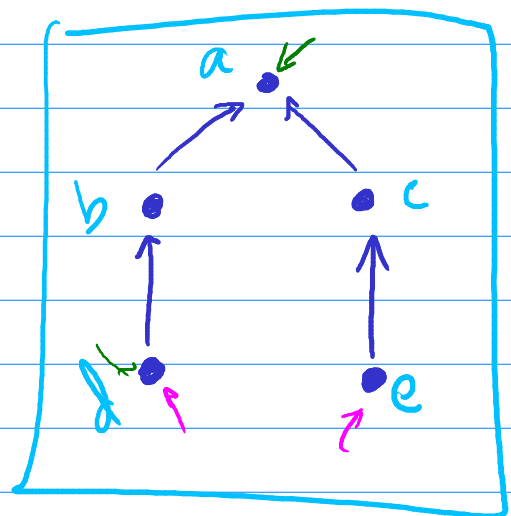
s.t.

a is b's parent

a is c's parent

b is d's parent

c is e's parent.



If you can, then d & e are cousins.

If we have $P(a,b)$ and $P(a,c)$ and
 $P(b,d)$ and $P(c,e)$,
then $C(d,e)$.

$C(d,e) :- P(a,b), P(a,c),$
 $P(b,d), P(c,e)$

Our first Datalog
query.

$$GP = \pi_{c_1, c_2} (P \bowtie P)$$

views

$$C = \pi_{c_2, c_4} (GP \bowtie GP)$$

Variables

$C(d, e) :- P(a, b), P(a, c),$
 $P(b, d), P(c, e)$

head

body

Relations

$\forall d, e$ if

$\exists a, b, c, d, e$