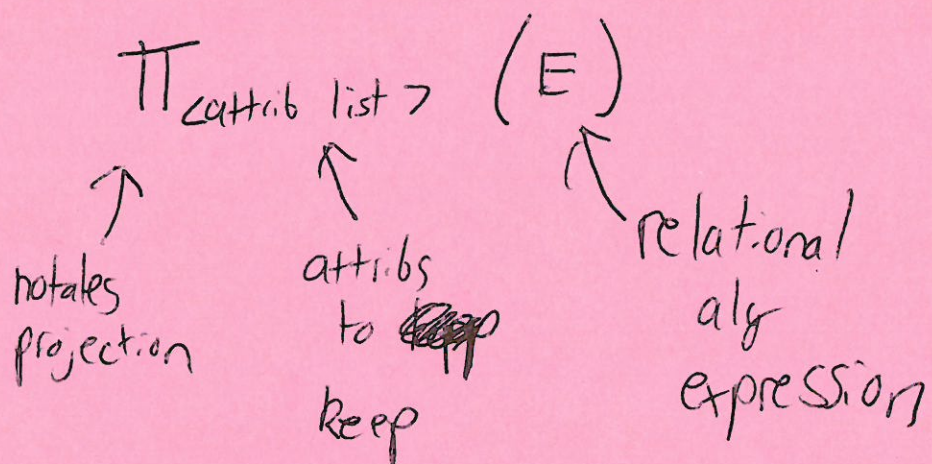


SELECT props:

$$\sigma_{\langle c_1 \rangle} (\sigma_{\langle c_2 \rangle} (E)) = \sigma_{\langle c_2 \rangle} (\sigma_{\langle c_1 \rangle} (E))$$

PROJECT:

Chooses subset of cols from a relation



$\Pi_{\text{Fname, Minit}} (\text{EMPLOYEE})$

Fname	Minit
Franklin	T
Jennifer	S
Ramesh	K

Possible Problem:

duplicate ~~data~~  
creation

Soln:

duplicate elimination

Alt:

mult. sets (bags)

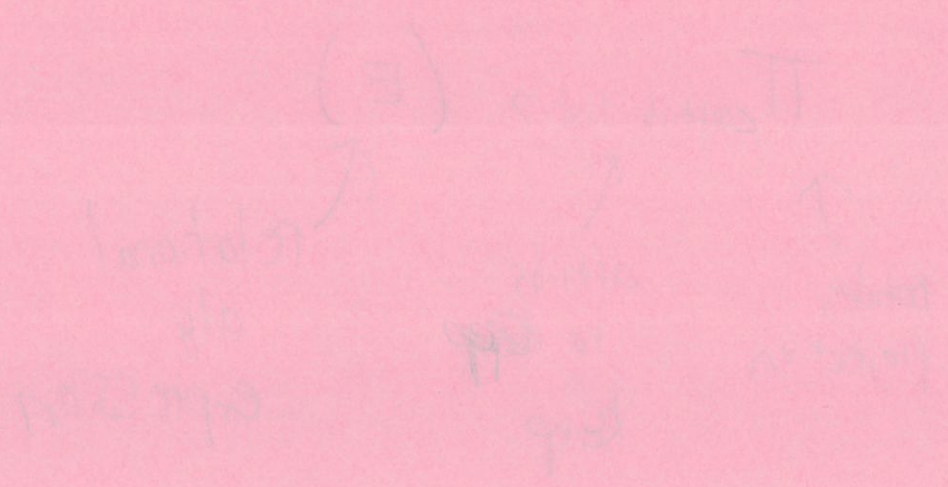


SECRET

SECRET

PROJECT

SECRET



SECRET

SECRET

SECRET

SECRET

SECRET

SECRET



# Relational Algebra

10/12

- ops in the relational model

## SELECT

- filter ~~a relation~~ tuples w/ criteria

notated  $\sigma_{\langle \text{condition} \rangle} (E)$

↑  
notates  
a select

↑  
boolean  
expression

↑  
relational  
alg expression

all employees w/ salary greater than 10k

$\sigma_{\text{Salary} > 40000} (\text{EMPLOYEE})$

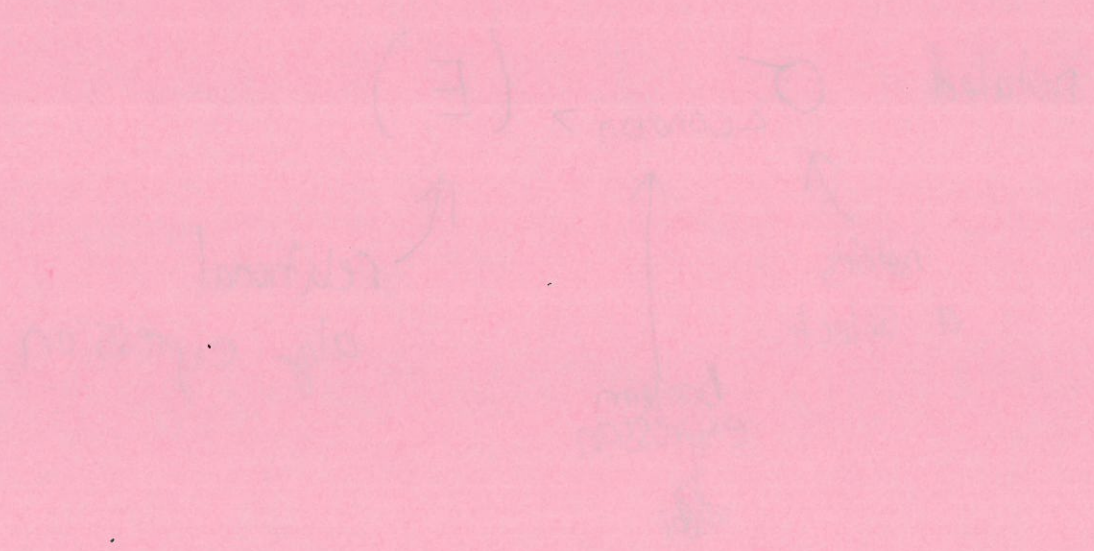
(a)

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5



# EFFECT

— The ~~subject~~ subject of the effect



Effect (EMPLOYEE)



Projection Props

do projections commute? **NO!**

2nd of July

10th of July



# RENAME

ex

SUMMARY  $\leftarrow \pi_{FName, LName, Salary} (EMPLOYEE)$

SUMMARY (First-name, Last-name, pay)  $\leftarrow \pi_{FName, LName} \sim$

$P(\text{First-name, Last-name, pay}) \mid \pi_{FName, LName, Salary} (EMPLOYEE)$

RESULT1

Ssn
123456789
333445555
666884444
453453453

RESULT2

Ssn
333445555
888665555

RESULT1 - RESULT2 =

123456789  
666884444  
453453453

RESULT1  $\cap$  RESULT2

=  
Ssn  
333445555

RESULT1  $\cup$  RESULT2 =

Ssn  
123456789  
333445555  
666884444  
453453453  
888665555



REMARKS

64

2. 10. 1941 (Tues) (10. 10. 1941)

1. 10. 1941 (Tues) (10. 10. 1941)

1. 10. 1941 (Tues) (10. 10. 1941)



# CARTESIAN PRODUCT

in general

$$R(A_1, \dots, A_n) \times S(B_1, \dots, B_m)$$

$$= Q(A_1, \dots, A_n, B_1, \dots, B_m)$$

Names	
First	Last
Alice	A
Bob	B
Charlie	C

Occupation	
Name	Field
Surgeon	Medical
Drummer	Musician

NAMES x OCCUPATIONS			
First	Last	Name	Field
Alice	A	Surgeon	Medical
Bob	B	Surgeon	Medical
Charlie	C	Surgeon	Medical
Alice	A	Drummer	Musician
Bob	B	Drummer	Musician
Charlie	C	Drummer	Musician

Join

$$E_1 \bowtie_{\text{condition}} E_2$$

$$\text{DEPARTMENT} \bowtie_{\text{DEPARTMENT\_Pnumber}} \text{DEPT\_LOCATIONS} \\ = \text{DEPT\_LOCATIONS\_Pnumber}$$



email  
Alex Abramson

$$(m, n) \times (A, B) = (m, n) \times (A, B)$$

Group of  
the field  
of the  
Brown

Time	Time
2	2
3	3
4	4

E. N. N. N.

DEPARTMENT OF MATHEMATICS  
UNIVERSITY OF CALIFORNIA



**DEPARTMENT**

Dname	<u>Dnumber</u>	Dmgr_ssn
Research	5	333445555
Administration	4	987654321
Headquarters	1	888665555

**DEPT\_LOCATIONS**

<u>Dnumber</u>	<u>Dlocation</u>
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston

Dname	<u>Dnumber</u>	Dmgr_ssn	<u>Dnumber</u>	<u>Dlocation</u>
Headquarters	1	888665555	1	Houston
Administration	4	987654321	4	Stafford
Research	5	333445555	5	Bellaire
Research	5	333445555	5	Sugarland
Research	5	333445555	5	Houston



