



091509 -
Week 4 D...

Audio recording started: 5:07 PM Tuesday, September 15, 2009

I. Aggregates

- o SUM, MIN, MAX, CNT, AVG.
 - $G_{A(A_i)}(r)$ $r: R(A_1, A_2, \dots, A_N)$

Ex.

A	B	C
α	2	7
α	β	7
β	β	3
β	β	10

$g_{sum}(r) \rightarrow$

SUM(C)
27

$g_{sum(C), avg(C)}(r)$

SUM(C)	AVG(C)
27	27/4

grouping

$A: g_{\alpha(A_i)}(r)$

Ex $A: g_{sum(C)}(r)$

α	α	7
α	β	7
β	β	3
β	β	10

II

A	SUM(C)
alpha	14
beta	13

A,B $g_{sum(C)}(r)$

I

α	α	7
α	β	7
β	β	3
β	β	10

II

SUM(C)	A	B
7	alpha	alpha
7	alpha	beta
13	beta	beta

$$* \pi_{A,B}(r)$$

generalized project

$$\pi_{3 A \rightarrow B, B+C}(r)$$

A	B
-	-

$3A+B$	$B+C$
-	-

- Relational Algebra - procedural language
- Relational Calculus - declarative language
 - tuple relational calculus
 - domain relational calculus
 - t.r.c. - $\{t \mid \text{cond}(t)\}$
 - d.r.c. - $\{X_1 X_2 \dots X_N \mid \text{cond}(X_1 X_2 \dots X_N)\}$

• Exercises on Relational Algebra

- Emp (Eid, ename, age, salary)
- Works_ON (Eid, did, start_time)
- Dept (Did, location, manager_id)

Q1. Find the names of all employees who are younger than 45 and with salaries in the range of [80K, 100K] (find in first table)

$$\sigma_{\text{AGE} < 45 \wedge \text{SALARY} \leq 100k \wedge \text{salary} \geq 80K}(\text{EMP})$$

salary <---- [80K, 100K]

Q2. Find the ID and the location of the dept. where John Doe works...

EMP	Works	Dept.
ename	Did	Did loc
John Doe		

1 1 1 2

$$\sigma_{w_o_did = Dept\ did} [\sigma_{ename = 'john\ Doe'}(\text{EMP}) \times W_O \times Dept]$$

$$\sigma_{ename}(\text{EMP}) \bowtie W_O \bowtie Dept$$

E.eid D.did
=w_o.eid =w_o.did

$$\pi_{d.eid} \left[\sigma_{ename = 'John\ Doe'}(\text{EMP}) \bowtie W_O \bowtie Dept \right]$$

location

Q3. Find the names and age of all employees who work for dept. #1

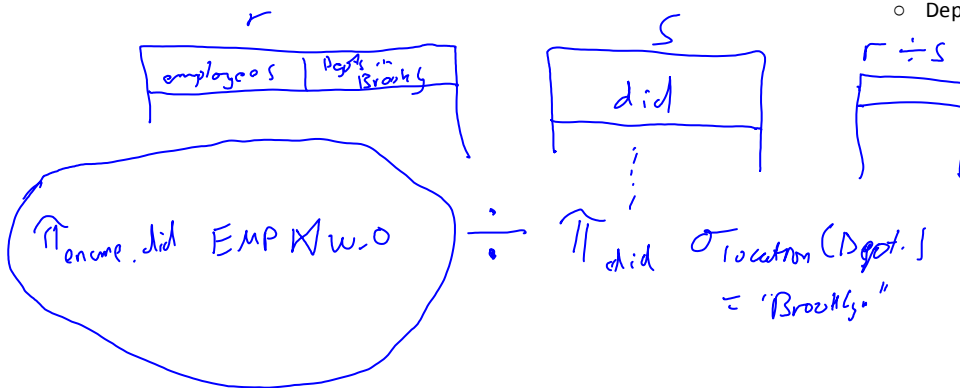
EMP			W_O	
<u>Eid</u>	ename	age	eid	d_id

$$\pi_{\text{ename, age}} \left[\text{EMP} \bowtie_{\substack{\text{d_id=1} \\ \text{W_O d_id=Emp.d_id}}} \text{W_O} \right]$$

$$\pi \left\{ \sigma_{\text{d_id=1}} [\text{EMP} \bowtie \text{W_O}] \right\}$$

Q4. Find the name of employees who work for all dept. in Brooklyn

- Emp (Eid, ename, age, salary)
- Works_ON (Eid, did, pct_time)
- Dept (Did, location, manager_id)



HW
Sect now