CS281 Lecture Notes 09.03.2015-13.03.2015

Note Takers
Ecem Zeliha Postacı
Duygu Ağar
Cemal Mert Bigali

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S(Suppliers)

S#	Sname	Status	City
S1	Smith	20	London
S2	Jones	10	Paris
S3	Blake	30	Paris
S4	Clark	20	London
S5	Adams	30	Athens

P(Parts)

P#	Pname	Color	Weight	City
P1	Nat	Red	12	London
P2	Bolt	Green	17	Paris
P3	Screw	Blue	17	Rome
P4	Screw	Red	14	London
P5	Cam	Blue	12	Paris
P6	Cog	Red	19	London

SP(S#, P#, Qty)

S#	P#	Qty
S1	P1	300
S1	P2	200
S1	P3	400
S1	P4	200
S1	P5	100
S1	P6	100
S2	P1	300
S2	P2	400
S3	P2	200
S4	P2	200
S4	P4	300
S4	P5	300

Just obtain supplier no and cities : $R=\pi_{s\#,city}(S)$

R (S#, city)

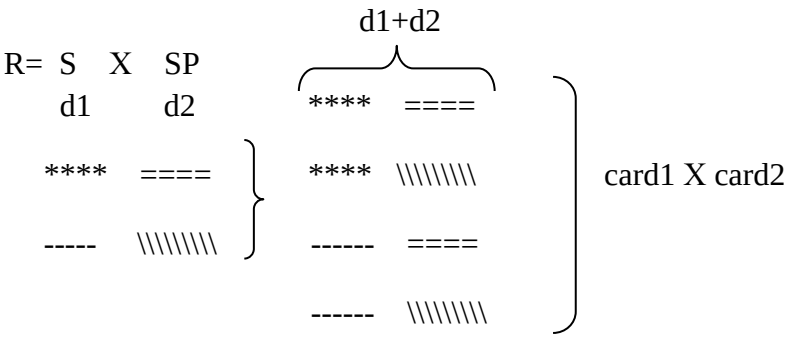
S1 London

S2 Paris

…….

S5 Athens

Cartesian Product



R (S.S#, Sname, Status, City, SP.S#, P#, Qty)

S1 Smith 20 London S1 P1 300

S1 Smith 20 London S1 P2 200

…….....

S5 Adams 30 Athens S4 P5 400

5 X 12 = 60 tuples

Examle: Find the names of all supppliers who supply part 1.

$\pi_{Sname}(\sigma_{S.S\# = SP.S\#}(\sigma_{S\#=P1}(S \text{ X } SP)))$

Join ∞

$R \infty_c S = \sigma_c(R \text{ X } S)$ c:condition

$= (S \infty_{S.S\#=SP.S\# \cap P\#=1} SP)$

$\pi_{Sname}(\sigma_{P\#=P1}(\underbrace{S \infty SP}_{\text{Natural Join}}))$

In natural join check the equalities of all common attributes.

In natural join, we only keep one of the common attributes.

R= S ∞ SP R(S#, Sname, status, city, P#,Qty)

Associativity

$(R \infty S) \infty T = R \infty (S \infty T)$

$R \infty S = S \infty R$

Example: The names of all suppliers who supply some parts from their city which have a weight > 15.

$\pi_{sname}(\sigma_{weight>15}(S \infty SP \infty P))$

Example: Find tuples for all suppliers who live in Paris or have a status > 20.

$[\sigma_{city=Paris}(S) \cup \sigma_{status>20}(S)] = [\sigma_{city=Paris \cup status>20}(S)]$

Example: Find tuples for all suppliers who live in Paris and have a status > 20.

$[\sigma_{city=Paris}(S) \cap \sigma_{status>20}(S)] = [\sigma_{city=Paris \cap status>20}(S)]$

13.03.2015

$\sigma_{c1 \cap c2}(R) = \sigma_{c1}(R) \cap \sigma_{c2}(R)$

$\sigma_{c1 \cup c2}(R) = \sigma_{c1}(R) \cup \sigma_{c2}(R)$

$\sigma_{c}(R) = R - \sigma_{c}(R) - (R - S)$

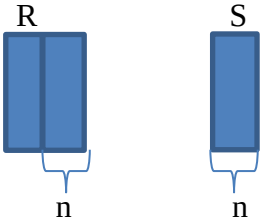
$R \cap S = R$

$R \infty_{c} S = \sigma_{c}(R \times S)$

Division

Dividend / Division

R / S



R1 (A, B)

a1	b1
a1	b2
a2	b1
a3	b1
a4	b2
a5	b1
a5	b2

R2 (B)

b1
b2

R = R1 / R2

R(A)

a1
a5

Mosty used for "all type" queries.

R2 (B) R = R1 / R2 R (A)

b1

a1
a2
a3
a5

R2 (B) R = R1 / R2 R (A) R2(B) R(A)

Ø

a1 b1 Ø
a2 b2
a3 b3
a4
a5

Consider the following database

S(Suppliers)
S(S#, Sname, Status, City)
P(Parts)
P(P#, None, Color, Weight, City)
SP(Supplier – Parts)
SP(S#, P#, Qty)

1) Get the supplier's name who supply all parts.

$\pi_{\#S,\ \#P}(SP) / \pi_{P\#}(P) = R$

1)a) Get supplier's name who supply all parts.

$\pi_{Sname}(R \infty_{R.S\#=S.S\#} S)$

2) Get the suppliers numbers for suppliers who supply at least all those parts suppliedby supplier S2.

$\pi_{\#S,\ \#P}(SP) / \pi_{P\#}(\sigma_{S=S2}(SP)) = R$

$\sigma_{S\#=S2}(R) \rightarrow$ This eliminates S2 from the result list

The Textbook Database
Sailors(sid,sname, rating, age**)**
Boats(bid, bname, color)
Reserves(sid, bid, day**)**

1)Find the names of sailors who have reserved boat number 103.

$\pi_{sname}(\sigma_{bid=103}(Reserves) \infty\ Sailors)$

$R1 = \sigma_{bid=103}(Reserves)$

$R2 = R1 \infty\ Sailors$

$R3 = \pi_{sname}(R2)$

2)Find the names of sailors who have reserved a red boat.

$\pi_{sname}((\sigma_{color=red}(Boats) \infty\ Reserves \infty\ Sailors)$

more efficient version

$\pi_{sname}(\pi_{sid}(\pi_{bid}(\sigma_{color=red}(Boats)) \infty\ Reserves)) \infty\ Sailors$

Emp (eno, ename, salary)

e1	Ali	12
e2	Oya	15
e3	Zeynep	20

1)Find employee with the max salary.
Emp X Emp = (eno1 sal1 eno2 sal2)
E1 = Employee
E2 = Employee
E1 X E2 (E1.eno E1.sal E2.eno E2.sal)

e1	10	e1	10
e1	10	e2	15
e1	10	e3	20
e2	15	e1	10
e2	15	e2	15
e2	15	e3	20
e3	20	e1	10
e3	20	e2	15
e3	20	e3	20

$\pi_{eno1}(\sigma_{sal1 < sal2}(E))$ →

10
15

2)All employees except the max employee.

$Emp - (R_{max} \infty\ Emp)$