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A superkey is a set of attributes of a relation schema that can be used to uniquely identify tuples of a relation.

A key is a minimal set of attributes ..

R	A	B	C

K	A	B	C
	a	1	true

R			
	a	1	false

R	A	B	C
	a	1	true
	a	1	false

R	A	B	C
	a	1	true
	b	1	true

X

select deptid, count(*)
from ~~Dept d~~, Faculty f
~~where f.deptid = d.deptid~~
group by deptid

select r.facultyid, count(research)
from Faculty f, ResearchInterest r
where r.facultyid = f.faculty and f.deptid = "CS"
groupby r.facultyid

ResearchInt (facid, research) RI(A,B)

$$\Pi_{facid}\left(\sigma_{\substack{facid = A \\ \text{AND} \\ research \neq B}}\left(RI \times \rho_{RI(A,B)}(RI)\right)\right)$$

facids w/ at least 2 research Interest

select name
from Students
where major = "Physics" & ~~AND~~ age < 20 AND
GPA > 3.5

$$\Pi_{name}\left(\sigma_{\substack{major = Physics \\ AND \\ age < 20 \\ AND \\ GPA > 3.5}}(Students)\right)$$

dept.name

select , f.name
from Dept d , faculty f
where d.chair-facultyid = f.facultyid

$$\Pi_{name}\left(\sigma_{\substack{chair\text{-}facultyid \\ = \\ facultyid}}(\text{Dept} \times \text{Faculty})\right)$$

$t_1\, t_2$ same key value $\Rightarrow$ same rest of attr

$t_1 t_2$ $\neg$ same rest of attrs $\Rightarrow$ $\neg$ same key value.

$R \bowtie S = \{ (3,4), (5,6) \}$

$\sigma_{R.A = S.A} (R \times S)$

$\sigma_{R.B = S.B} (R \times S)$

R	A	B
	1	2
	3	4
	5	6

S	A	B
	3	4
	5	6
	2	1

Output				
	3	4	3	4
	5	6	5	6

Output				
	3	4	3	4
	5	6	5	6

$(R - S) \cup (S - R)$

R	A	B
	a	b

S	A	B
	a	b

$R - S = \emptyset$

$R \cap S = \{(a, b)\}$

$R - S \neq R \cap S$

R	A	B

S	A	B

$R - S = \emptyset$

$R \cap S = \emptyset$

$\boxed{R - S = R \cap S}$

R	A	B
	a_1	b_2
	a_2	b_1

S	A	B
	a_1	b_1
	a_2	b_2

$R - S = R$

$R \cap S = \emptyset$

R	A	B

S		
	a_1	b_1