CHAPTER 6
DISCUSSIONS 2

Discussion 6-8

- Discuss why the following property holds for any two relations *r(R)* and *s(S).*

$$r \bowtie s = s \bowtie r$$

Discussion 6-9

- Discuss why the following property holds for any two relations *r(R)* and *s(S).*

$$\text{If } R=S \text{ then } r \bowtie s = r \cap s .$$

Discussion 6-10

- *Use parenthesis to indicate the proper orders of operations in the following relational algebra expression.*

$$\sigma_p E_1 \cup E_2 \times E_3 \bowtie \rho_N E_3 \cap E_4 - E_5$$

Discussion 6-11

- *Fill the following precedence table for relational algebra operators:* σ, $\cup$, x, $\bowtie$, ρ, $\cap$, $-$, Π

Prec.	Operators	Notes
0	( )	highest
1		
2		
3		
4		

Discussions 6-12

person (*person_name*, *street*, *city*)
company (*company_name*, *city*)
works (*person_name*, *company_name*, *salary*)

- Using the above database schema, represent the following queries in *relational algebra*.

  ***6-12**. Find the name of person who works in every company.*

Division Operation – Example

Relations r, s:

A	B
α	1
α	2
α	3
β	1
γ	1
δ	1
δ	3
δ	4
ϵ	6
ϵ	1
β	2

r

B
1
2

s

$r \div s$:

A
α
β

Division Operation – Example

Relations *r*, *s*:

A	*B*	*C*	*D*	*E*
α	a	α	a	*1*
α	a	γ	a	*1*
α	a	γ	b	*1*
β	a	γ	a	*1*
β	a	γ	b	*3*
γ	a	γ	a	*1*
γ	a	γ	b	*1*
γ	a	β	b	*1*

r

D	*E*
a	*1*
b	*1*

s

r ÷ *s*:

A	*B*	*C*
α	a	γ
γ	a	γ

Division Operation

- Let $r(R)$ and $s(S)$ be relations, and let $S \subseteq R$

$$r \div s = \prod_{R-S}(r) - \prod_{R-S}((\prod_{R-S}(r) \times s) - \prod_{R-S,S}(r))$$

  - $\prod_{R-S,S}(r)$ simply reorders attributes of r
  - $\prod_{R-S}(\prod_{R-S}(r) \times s) - \prod_{R-S,S}(r))$ gives those tuples t in $\prod_{R-S}(r)$ such that for some tuple $u \in s$, $tu \notin r$.