

Conception Avancée de Bases de Données



Traduction en cours

Opérateurs
Relationnels
Et Arbres de requêtes

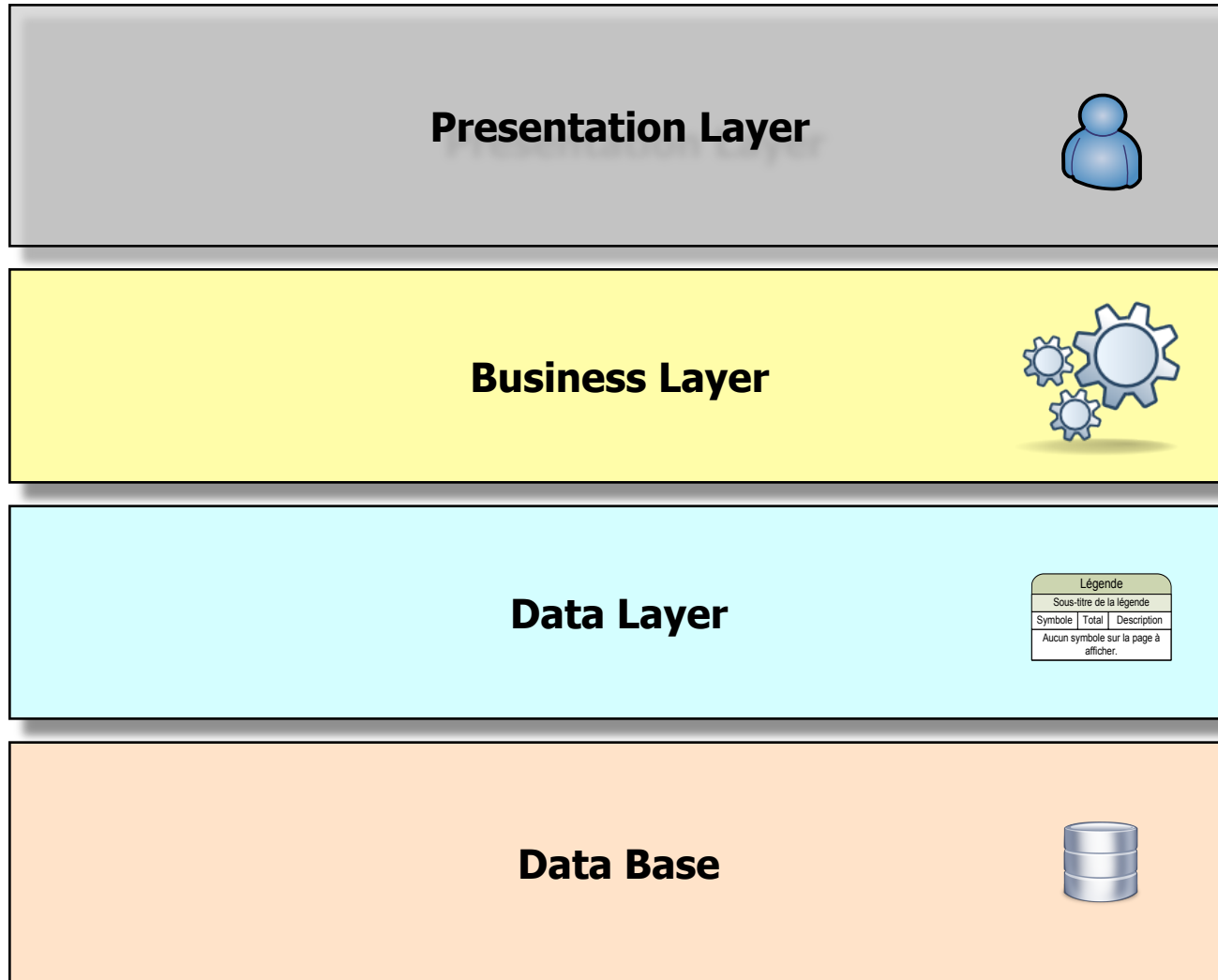


Π

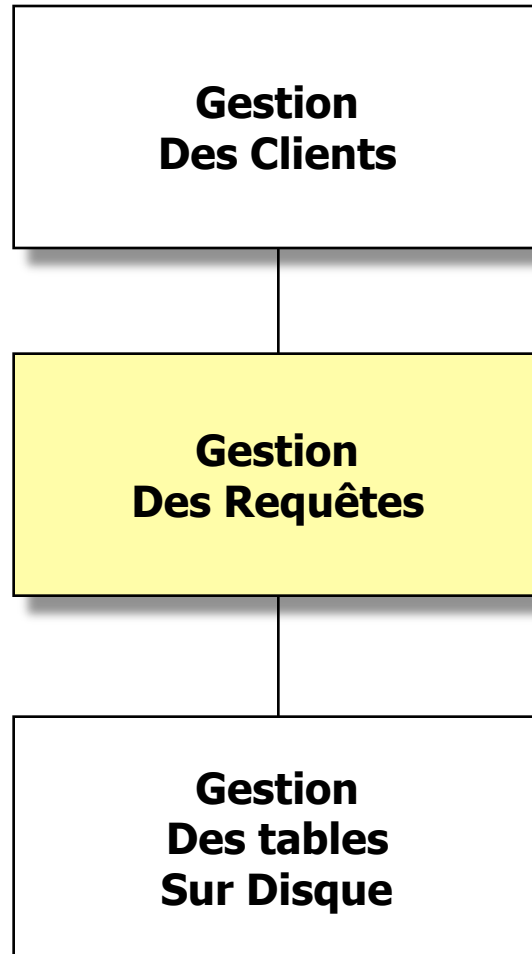
σ

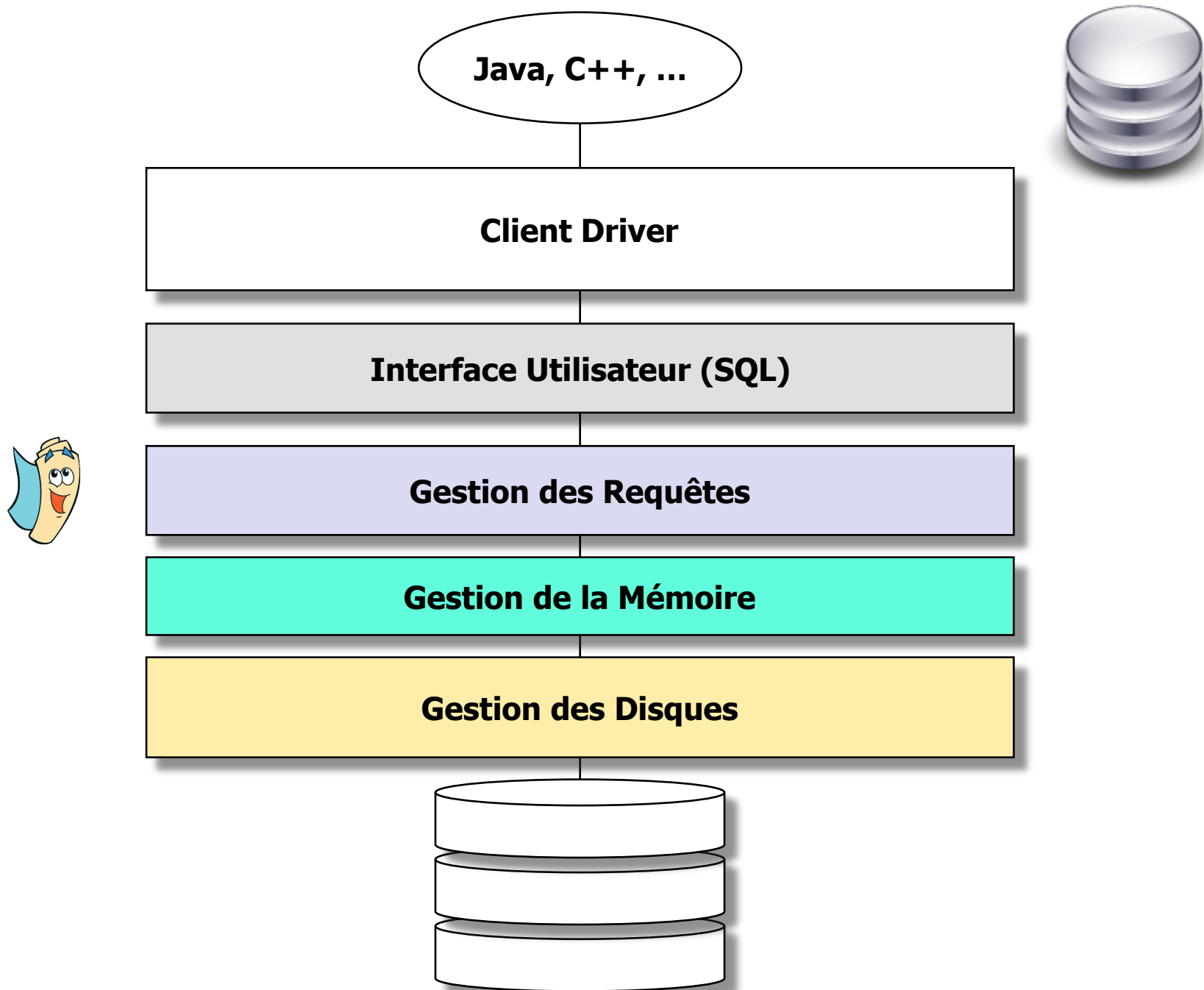
Sigma minuscule

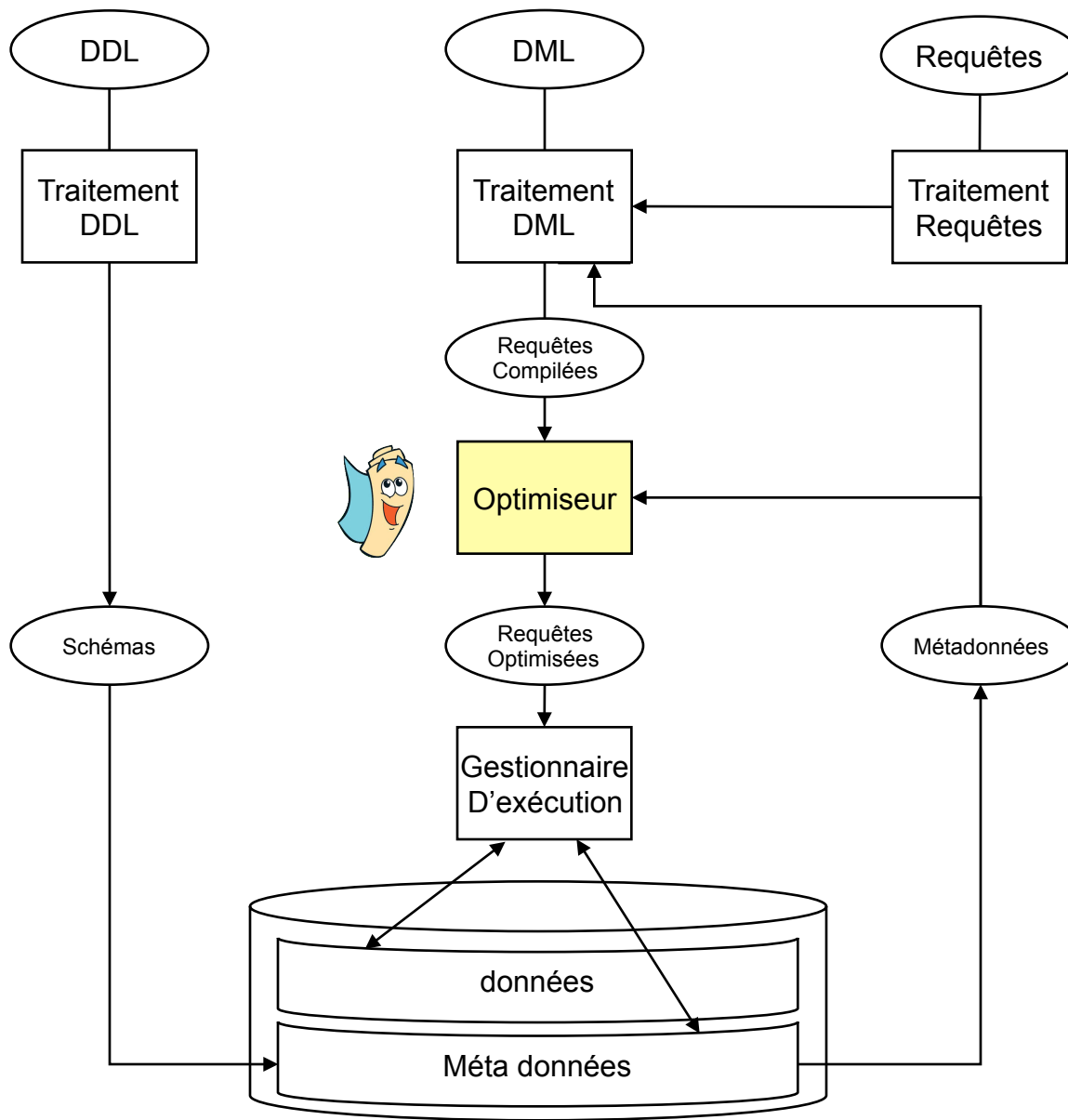
Layered Architecture



Big Picture







D'après C.J DATE

DDL : langage de définition des données; DML : langage de manipulation des données

Relational Operators



- SELECT $\rightarrow \sigma$ (sigma)
- PROJECT $\rightarrow \pi$ (pi)
- PRODUCT $\rightarrow \times$ (times)
- JOIN $\rightarrow (|\times|) \bowtie$ (bow-tie)
- UNION $\rightarrow \cup$ (cup)
- INTERSECTION $\rightarrow \cap$ (cap)
- DIFFERENCE $\rightarrow -$ (minus)
- RENAME $\rightarrow \rho$ (rho)

Opérateurs pour la jointure



- Produit Cartésien
- Sélection
- Projection

Produit Cartésien



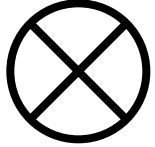
Rappel :

Si $E = \{a,b,c\}$ et $F = \{1,2\}$

$E \times F = \{(a,1),(a,2),(b,1),(b,2),(c,1),(c,2)\}$.

$E \times F$	a	b	c
1	(a,1)	(b,1)	(c,1)
2	(a,2)	(b,2)	(c,2)

Produit Cartésien



R

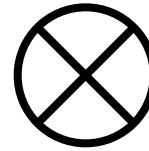
A	B	C
9	3	9
5	6	1
2	8	1

S

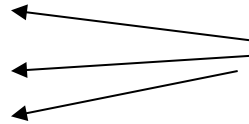
D	E	F
1	2	9
5	7	3
9	1	2

R  **S**

Produit Cartésien

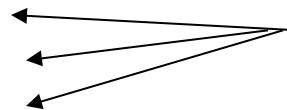


A	B	C
9	3	9
5	6	1
2	8	1



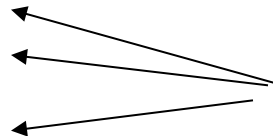
1	2	9
---	---	---

A	B	C
9	3	9
5	6	1
2	8	1



5	7	3
---	---	---

A	B	C
9	3	9
5	6	1
2	8	1



9	1	2
---	---	---

R

S

Produit Cartésien



A	B	C	D	E	F
9	3	9	1	2	9
5	6	1	1	2	9
2	8	1	1	2	9

A	B	C	D	E	F
9	3	9	5	7	3
5	6	1	5	7	3
2	8	1	5	7	3

R  S

A	B	C	D	E	F
9	3	9	9	1	2
5	6	1	9	1	2
2	8	1	9	1	2

Produit Cartésien



R

S

A	B	C
9	3	9
5	6	1
2	8	1

D	E	F
1	2	9
5	7	3
9	1	2



A	B	C	D	E	F
9	3	9	1	2	9
5	6	1	1	2	9
2	8	1	1	2	9

R  **S**

Produit Cartésien

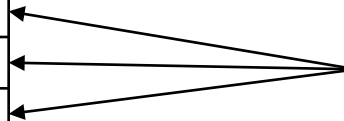


R

S

A	B	C
9	3	9
5	6	1
2	8	1

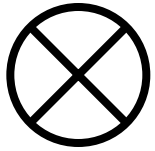
D	E	F
1	2	9
5	7	3
9	1	2



R  **S**

A	B	C	D	E	F
9	3	9	1	2	9
5	6	1	1	2	9
2	8	1	1	2	9
9	3	9	5	7	3
5	6	1	5	7	3
2	8	1	5	7	3

Produit Cartésien

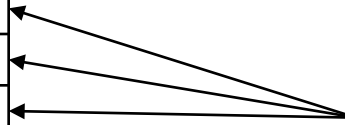


R

S

A	B	C
9	3	9
5	6	1
2	8	1

D	E	F
1	2	9
5	7	3
9	1	2



R  **S**

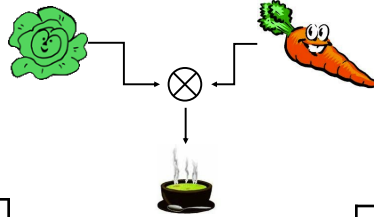
A	B	C	D	E	F
9	3	9	1	2	9
5	6	1	1	2	9
2	8	1	1	2	9
9	3	9	5	7	3
5	6	1	5	7	3
2	8	1	5	7	3
9	3	9	9	1	2
5	6	1	9	1	2
2	8	1	9	1	2

Produit Cartésien



R

A	B	C
9	3	9
5	6	1
2	8	1



S

D	E	F
1	2	9
5	7	3
9	1	2

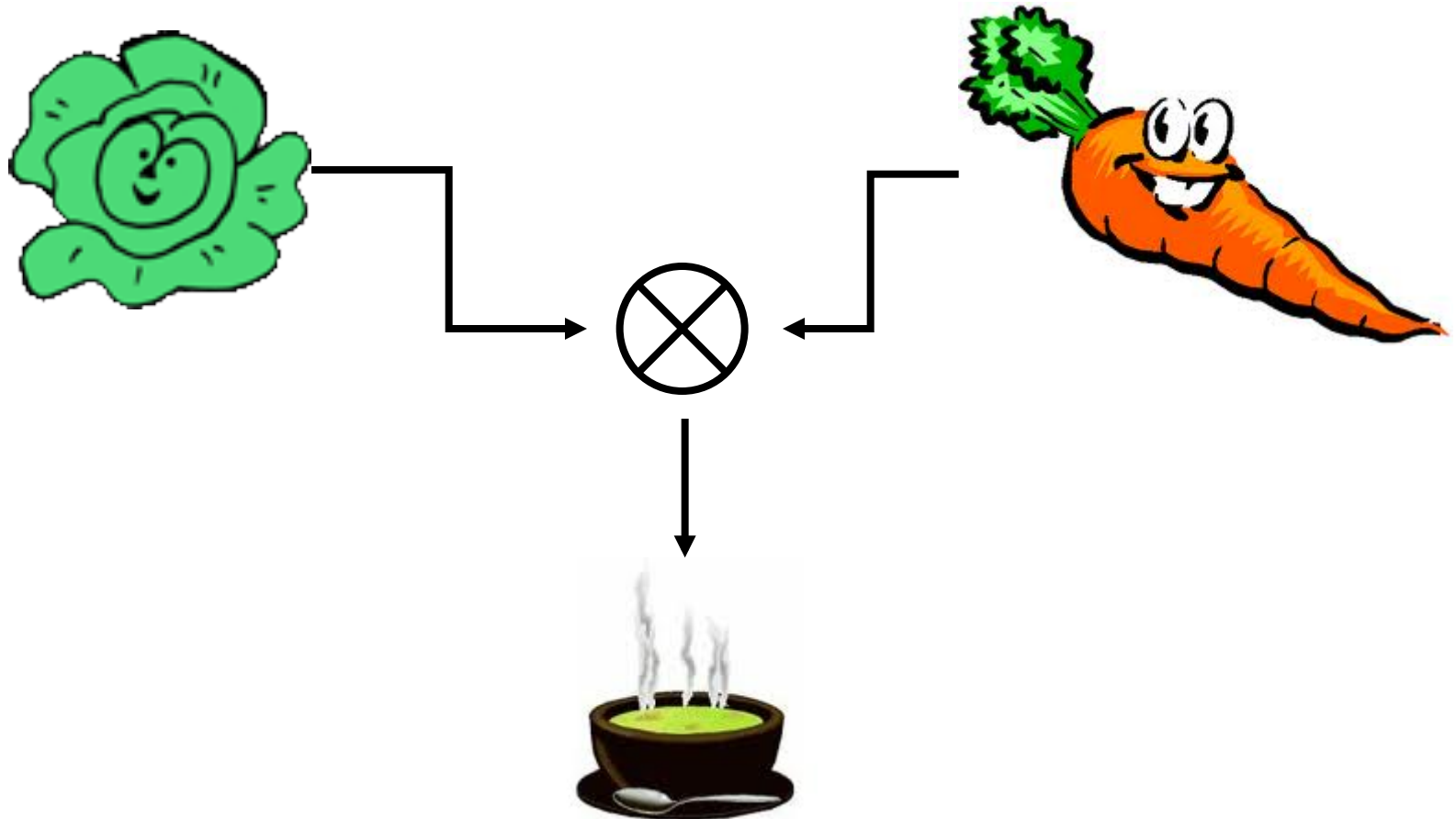
R  **S**

A	B	C	D	E	F
9	3	9	1	2	9
5	6	1	1	2	9
2	8	1	1	2	9
9	3	9	5	7	3
5	6	1	5	7	3
2	8	1	5	7	3
9	3	9	9	1	2
5	6	1	9	1	2
2	8	1	9	1	2

Pas de sémantique



- On mélange les choux et les carottes



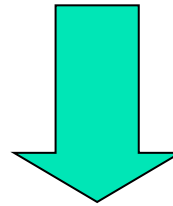
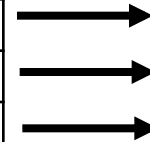
Sélection : On enlève des lignes



σ

Sigma

A	B	C	D	E
2	8	9	1	2
2	8	9	3	9
2	9	3	9	2
9	2	8	9	2
2	8	9	3	9
2	9	3	9	2



A	B	C	D	E
2	8	9	1	2
2	8	9	3	9
2	9	3	9	2

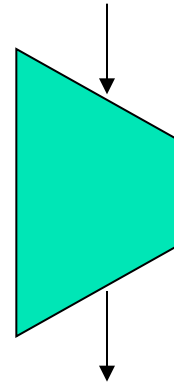
Symbole : On enlève des lignes



σ

Sigma

A	B	C	D	E
2	8	9	1	2
2	8	9	3	9
2	9	3	9	2
9	2	8	9	2
2	8	9	3	9
2	9	3	9	2



A	B	C	D	E
2	8	9	1	2
2	8	9	3	9
2	9	3	9	2

notation



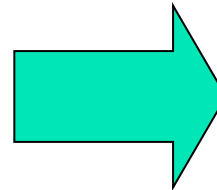
σ <predicate> (<relation>)

Projection : On enlève des colonnes



Π

A	B	C	D	E
2	8	9	1	2
2	8	9	3	9
2	9	3	9	2
9	2	8	9	2
2	8	9	3	9
2	9	3	9	2



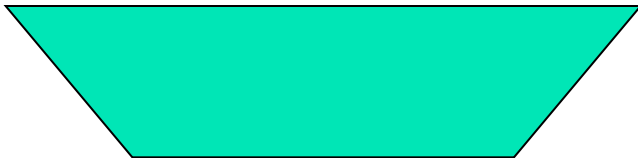
A	C	E
2	9	2
2	9	9
2	3	2
9	8	2
2	9	9
2	3	2



Symbole : On enlève des colonnes



A	B	C	D	E
2	8	9	1	2
2	8	9	3	9
2	9	3	9	2
9	2	8	9	2
2	8	9	3	9
2	9	3	9	2



A	C	E
2	9	2
2	9	9
2	3	2
9	8	2
2	9	9
2	3	2

π

notation



$\pi \langle \text{attribute1}, \text{attribute2}, \text{attribute } n \rangle (\langle \text{relation} \rangle)$

