

- 1)  $\Pi_{\text{name}} ((\Pi_{\text{pid}} \sigma_{\text{color}='red'} (\text{Pants}) \bowtie \text{Catalog}) \bowtie \text{Suppliers})$
- 2)  $\Pi_{\text{sid}} ((\Pi_{\text{pid}} \sigma_{\text{color}='red' \text{ or } \text{color}='green'} (\text{Pants}) \bowtie \text{Catalog}) \bowtie \text{Suppliers})$
- 3)  $\Pi_{\text{sid}} ((\Pi_{\text{pid}} \sigma_{\text{color}='red'} (\text{Pants}) \bowtie \text{Catalog}) \bowtie \text{Suppliers})$   
 $\cup (\Pi_{\text{sid}} \sigma_{\text{street}='221 Packer Street'} (\text{Suppliers}))$
- 4)  $\Pi_{\text{sid}} ((\Pi_{\text{pid}} \sigma_{\text{color}='red'} (\text{Pants}) \bowtie \text{Catalog}) \cap \Pi_{\text{sid}} ((\Pi_{\text{pid}} \sigma_{\text{color}='green'} (\text{Pants}) \bowtie \text{Catalog}))$
- 5)  $\Pi_{\text{sid}, \text{pid}} (\text{Catalog}) \div \Pi_{\text{pid}} (\text{Pants})$
- 6)  $\Pi_{\text{sid}, \text{pid}} (\text{Catalog}) \div (\Pi_{\text{pid}} (\text{Catalog}) \cap \Pi_{\text{pid}} \sigma_{\text{color}='red'} (\text{Pants}))$
- 8)  $\Pi_{\text{sid}, \text{pid}} (\text{Catalog}) \div (\Pi_{\text{pid}} \sigma_{\text{color}='red'} (\text{Pants}))$   
 $\cup \Pi_{\text{sid}, \text{pid}} (\text{Catalog}) \div (\Pi_{\text{pid}} \sigma_{\text{color}='green'} (\text{Pants}))$
- 7)  $\Pi_{\text{sid}, \text{pid}} (\text{Catalog}) \div (\Pi_{\text{pid}} \sigma_{\text{color}='red' \text{ or } \text{color}='green'} (\text{Pants}))$
- 9)  $\rho (\text{Catalog}) \rightarrow R_1$   
 $\rho (\text{Catalog}) \rightarrow R_2$   
 $\Pi_{R_1.\text{sid}, R_2.\text{sid}} \sigma_{R_1.\text{sid} \neq R_2.\text{sid} \text{ and } R_1.\text{pid} = R_2.\text{pid} \text{ and } R_1.\text{cost} > R_2.\text{cost}} (R_1 \bowtie R_2)$

$$10) \quad p(\text{Catalog}) \rightarrow R_1$$

$$p(\text{Catalog}) \rightarrow R_2$$

$$\bigcap_{R_1.\text{pid} \cap R_1.\text{pid} = R_2.\text{pid} \text{ and } R_1.\text{sid} \neq R_2.\text{sid}} (R_1 \times R_2)$$

## Exercise 2

- 1) Find all suppliers that supply red pants cheaper than 100.
- 2) Find all <sup>(sname)</sup> suppliers that supply red pants cheaper than 100 and supply green pants cheaper than 100.
- 3) Find all sid that supply red pants cheaper than 100 and supply green pants cheaper than 100.
- 4) Find all suppliers that —//—

\* Difference with second is in that we could have few companies with



the same name. 1-A For the 2nd option  
2-A.  
we will have e.g. A. But for  
4th we couldn't have any, since it  
considers sid (unique for companies).