# Lab 1 : Algebraic query language

**We have the database consist of 5 relations:**

Product (ProductCode, Name, PurchasePrice, SellPrice, Type, SupplierCode)

Supplier (SupplierCode, SupplierName, Address)

Employee (EmloyeeID, FullName, Gender, BirthDate, Address)

Invoice (InvoiceID, SellDate, EmployeeID)

InvoiceLine(ProductCode, InvoiceID, Quantity)

**Exercise 1: Write expressions of relational algebra to answer the following queries:**

a. Find name and sell price of televisions supplied by Samsung.
b. Find name and address of all suppliers who supply television product.
c. Find name of all employee who were born in 1983.
d. Find name and type of all products sold in '23/05/2018'.
e. Find name of female employees who sold televisions.
f. Find name and address of suppliers who supply both television and mobile.
g. List name and price of all product sold by employee "Nguyễn Văn A" in April 2018.
h. Find name and price of all mobile products of Samsung sold in April 2018.
i. Find the product with highest SellPrice.
j. Find the amount (quantity * sellPrice) of each invoice line of product sold in 30/04/2018.

a. $\pi_{\text{name, sell price}}(\sigma_{\text{type=television}}(\text{Product}) \bowtie \sigma_{\text{supplier name=Samsung}}(\text{Supplier}))$
b. $\pi_{\text{supplier name, address}}(\text{Supplier} \bowtie \sigma_{\text{type=television}}(\text{Product}))$
c. $\pi_{\text{full name}}(\sigma_{\text{year(birthdate)=1983}}(\text{Employee}))$
d. $\pi_{\text{name, type}}(\sigma_{\text{sell date=23/05/2018}}(\text{Invoice}) \bowtie \text{InvoiceLine} \bowtie \text{Product})$
e. $\pi_{\text{full name}}(\sigma_{\text{gender=female}}(\text{Employee}) \bowtie \sigma_{\text{type=television}}(\text{Product}) \bowtie \text{Invoice} \bowtie \text{InvoiceLine})$
f. $\pi_{\text{supplier name, address}}(\text{Supplier} \bowtie (\sigma_{\text{type=television}}(\text{Product}) \cap \sigma_{\text{type=mobile}}(\text{Product})))$
g. $\pi_{\text{name, price}}(\sigma_{\text{full name=Nguyễn Văn A}}(\text{Employee}) \bowtie \sigma_{\text{year(sell date)=2018 \& month(sell date)=04}}(\text{Invoice}) \bowtie \text{InvoiceLine} \bowtie \text{Product})$

h. $\pi_{\text{name, price}}(\sigma_{\text{supplier name=Samsung}}(\text{Supplier}) \bowtie \sigma_{\text{year(sell date)=2018 \& month(sell date)=04}}(\text{Invoice}) \bowtie \text{InvoiceLine} \bowtie \sigma_{\text{type=mobile}}(\text{Product}))$

i.

j. $\pi_{\text{quantity}}(\text{InvoiceLine} \bowtie \sigma_{\text{sell date=30/04/2018}}(\text{Invoice}))$
$*$
$\pi_{\text{sell price}}(\text{InvoiceLine} \bowtie \sigma_{\text{sell date=30/04/2018}}(\text{Invoice}) \bowtie \text{Product})$