Exercise 1.

1. Find name and sell price of televisions supplied by Samsung.

(Name, SellPrice) (σ Type = ‘television’ (Product) ⋈ σ SupplierName = ‘Samsung’ (Supplier))

1. Find name and address of all suppliers who supply television product.

π (Name, Address) (σ Type = ‘television’ (Product) ⋈ σ (Supplier))

1. Find name of all employee who were born in 1983.

π (FullName) ( σ (BirthDate >= ‘01/01/1983’ AND BirthDate < ‘01/01/1984’ ) (Employee))

1. Find name and type of all products sold in ‘23/05/2018’.

π (Name, type) ((Product ⋈ InvoiceLine) ⋈ σ SellDate = ‘23/05/2018’ (Invoice))

1. Find name of female employees who sold televisions.

π (FullName) ((Product ⋈ InvoiceLine) ⋈ ( Invoice ⋈ σ Gender = ‘Female’ (Employee))

1. Find name and address of suppliers who supply both television and mobile.

π (SupplierName, Address) (σ Type = ‘television’ (Product ⋈ Supplier)) ∩ π (SupplierName, Address) (σ Type = ‘mobile’ (Product ⋈ Supplier))

1. List name and price of all product sold by employee “Nguyễn Văn A” in April 2018.

π (Name, SellPrice) (σ Fullname = ’Nguyễn Văn A’ (Employee) ⋈ σ (SellDate >= ’01/04/2018’ AND SellDate <= ’30/04/2018’) (Invoice)) ⋈ (Product ⋈ InvoiceLine))

1. Find name and price of all mobile products of Samsung sold in April 2018.

π (Name,PurchasePrice) ((InvoiceLine ⋈ σ (SellDate >= ’01/04/2018’ AND SellDate <= ’30/04/2018’) (Invoice)) ⋈ (σ Type = ‘moblie’ (Product) ⋈ σ SupplierName = ‘Samsung’ (Supplier)) )

1. Find the product with highest SellPrice.

σ SellPrice = MAX(SellPrice) (Product)

1. Find the amount (quantity \* sellPrice) of each invoice line of product sold in 30/04/2018.

π (Quantity \* SellPrice -> Amount ) ((Product ⋈ InvoiceLine) ⋈ σ SellDate = ‘30/04/2018’ (Invoice))

Exercise 2.

1. The sell price must be higher than the purchase price.

σ (SellPrice <= PurchasePrice) (Product) = ∅

1. A product of Samsung must be television, mobile or tablet.

σ (SupplierName = ‘SamSung’ AND Type != ‘television’ AND Type != ‘mobile’ AND Type != ‘tablet’) (Product ⋈ InvoiceLine) = ∅

1. No supplier of mobile’s or tablet’s may also supply food.

R1 := σ (Type = 'mobile' OR Type = 'tablet') (Product ⨝ Supplier)

R2 := σ (Type = 'food') (Product ⨝ Supplier)

σ (SupplierCode ∈ R1.SupplierCode ∧ SupplierCode ∈ R2.SupplierCode) (Supplier) = ∅

1. No product may appear more than one time in an invoice.

R1 := σ (InvoiceLine)

σ(InvoiceLine.Productcode = R1.Productcode && InvoiceLine.InvoiceId = R1.InvoiceID && InvoiceLine.quantity = R1.quantity) (R1⋈InvoiceLine) = ∅

1. The quantity of each product in each invoice should be greater than 0.

σ (quantity <=0) (InvoiceLine) = ∅

1. There is no invoice without product.

π ProductCode (InvoiceLine) – π ProductCode (Product) = ∅

1. If purchase price is less than 500.000 VND, the sell price could not be greater than 9.000.000 VND.

σ (PurchasePrice < 500000 AND SellPrice >= 9000000) (Product) = ∅

1. The sell price could not be greater than 2 times the purchase price.

σ (SellPrice > PurchasePrice \* 2) (Product) = ∅

1. The gender of an employee should be “Nam” or “Nữ”.

σ (Gender != ‘Nam’ AND Gender != ‘Nữ’) (Employee) = ∅

1. With the same purchase price, the sell price of two products could not have the difference more than 0.5 times of the purchase price.

R1 := σ (Product)

R2 := σ(Product)

σ (R1.PurchasePrice = R2.PurchasePrice AND (ABS(R1.SellPrice - R2.SellPrice) > 0.5 \* R1.PurchasePrice) (R1 ⋈ R2 )= ∅