Assignment - 1

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Question 1.1.1

a) Primary Key:

- Customers : "CustomerId"
- Orders : "OrderId"
- OrderDetails : "OrderID", "ProductID"
- Products : "ProductId".

b) Foreign Key:

+ Customers:
  - Orders: Attribute "CustomerID"
  - OrderDetails:
    - "OrderID" is Reffering orders
    - "ProductID" Reffering Products.

Question 1.1.2

$\Pi_{\text{lastname, Firstname}}(\text{Customers})$

Question 1.1.3

$\Pi_{\text{category}}(\text{Products})$.

Question 1.1.4

Π Name, price (Products)

Question 1.1.5

Π Name (σ Price <= 35 (Products))

Question 1.1.6

Π Name (σ Price >= 10 $\wedge$ Price <= 100 (Products))

Question 1.1.7

Π Lastname, Firstname (σ Orderdate = 'March 2022' (Customer $\bowtie$ Orders))

Question 1.1.8

$S_1 \leftarrow \Pi_{Lastname, Firstname}\ {}_{G}\text{Count}(CustomerID)$ as Order_count (Customer $\bowtie$ Orders)

$S_2 \leftarrow \Pi_{Lastname, Firstname}\ (\sigma_{Order\_count > 2}\ (S_1))$

Question 1.1.9

$$\Pi_{\text{CustomerID, Lastname, Firstname, address, city}} \left(\sigma_{\text{TotalAmount} > 300} (\text{Customers} \bowtie \text{orders})\right)$$

Question 1.1.10

$$S_1 \leftarrow \sigma_{\text{name} = \text{"productA"}} (\text{OrderDetails} \bowtie \text{Products})$$

$$S_2 \leftarrow {}_{\text{CustomerID}}\gamma_{\text{sum(Quantity * price)}} \text{ as amt\_spent } (S_1 \bowtie \text{orders})$$

$$S_3 \leftarrow \gamma_{\text{max(amt\_spent)}} (S_2)$$

$$\Pi_{\text{Last name, Firstname}} (S_3 \bowtie S_2 \bowtie \text{Customers}).$$

Question 1.1.11

$$\Pi_{\text{Name, Category}} (\sigma_{\text{price} > 100} (\text{Products}))$$

Question 1.1.12

$$\Pi_{\text{Name}} (\sigma_{\text{category} = \text{"Electronics"}} (\text{Products}))$$

Question 1.1.13

$$\Pi_{\text{Name}} \gamma_{\text{max(sum(Quantity * price))}} (\text{orderdetails} \bowtie \text{products})$$

Question 1.1.14

$S_1 \leftarrow \Pi_{ProductID}\, \mathcal{G}_{sum(Quantity)\ as\ Totalsales}(Order\ Details)$

$S_2 \leftarrow \Pi_{ProductID, (S_1.Totalsales * Product.Price)\ as\ Total\_amt\_Sales}(A \bowtie Products)$

$S_3 \leftarrow \Pi_{ProductID}$

$\mathcal{G}_{max(Total\_amt\_sales)\ as\ highest,}$

$min(Total\_amt\_sales)\ as\ lowest,$

$avg(Total\_amt\_sales)\ as\ average\ (S_2)$

Question 1.1.15

$S_1 \leftarrow \Pi_{CustomerID, Lastname, Firstname, 'Atlanta', 'G'}(\sigma_{Last\ Name = 'smith'}(Customers))$

$Customers \leftarrow Customers - (\sigma_{Lastname = 'Smith'}(Customer))$

$Customer \leftarrow Customers \cup S_1.$

Question 1.1.16

$S1 \leftarrow \Pi_{OrderID, CustomerID, TotalAmount * 1.05, OrderDate}(\sigma_{TotalAmount > 100,000}(orders))$

$S2 \leftarrow \Pi_{OrderID, CustomerID, TotalAmount * 1.1, orderdate}(\sigma_{TotalAmount \leq 100000}(orders))$

Question 1.1.17

Customers $\leftarrow$ Customers $\cup$ {"Eloog", "Manny", "Sammy", "30th King dr", "Washington", "DC"}.

Orders $\leftarrow$ Orders $\cup$ {4, "Eloog", "Feb 2022", 10}

Orderdetails $\leftarrow$ orderdetails $\cup$ {4, 1, 10}.