Directed work 2 (TD)

Normalization & SQL

Exercise 1

A- Let's consider the two relations: "supplier" and "person"

Supplier

Sno	Sname	Status	City
S1	Smith	20	London
S2	Jones	10	Paris
S3	Black	30	Paris
S4	Clak	20	London
S5	Adams	30	Athens

Person

NAME	SEXE
{John, Jean, Ivan}	Male
{Mary, Marie}	Female

1- Extract all the Functional Dependencies (FDs) from the "supplier" relation.

2- In which normal form are "supplier" and "person"?

3- Normalize "supplier" and "person."

B- Consider the relational schema R(A, B, C, D, E, F) and the set of functional dependencies FD as follows: FD = {A → CD, B → E, AC → F}.

1- Using the Armstrong's axioms, prove A → F ∈ FD^+

2- Determine the candidate key of R.

3- Determine the normal form of R (provide justification), assuming that all attributes are atomic.

4- If R is not in 3NF, propose a normalization (decomposition) of R into 3NF.

Exercise 2

Consider the relational schema of the BDCOM database:

PRODUCT (ProdID, Label, Price)

CUSTOMER (CustID, Lastname, Firstname, City)

ORDER (OrderID, #CustID, OrderDate)

ORDER_DETAIL (#OrderID, #ProdID, Quantity)

Where: ProdID is the product identifier, Price is the unit price of the product, CustID is the customer identifier, OrderID is the order identifier, and OrderDate is the order date.

1- Express the following queries using SQL:

   Q1: Provide the names (Firstname, Lastname) of customers who live in the city “Adrar”.

   Q2: Provide the number of customers per city.

   Q3: Give the product IDs that have never been ordered.

   Q4: Provide the ID, last name, and first name of the customer who ordered the largest quantity of the product named "Cement" during the year 2022 (Cement is the product label).

2- Based on the relational schema of the BDCOM database, deduce its corresponding entity/association schema.