University of Larbi Ben Mhidi Oum El Bouaghi
Faculty of Exact Sciences and Life and Natural Sciences
Department of Mathematics and Computer Science

Study stream : Computer Science
Level: 2nd Year Bachelor's Degree
Module: Information Systems
Instructor: Dr. Bouneb M.

Practical work N°03

Objectives:

☞***Master the needs analysis phase and the study of existing systems.***

☞***Learn how to define an entity.***

☞***Learn how to define an association.***

☞***Learn how to define cardinalities.***

☞***Master the steps of developing a Conceptual Data Model (CDM).***

Exercise N°1 :

In the context of automating library management, a Q&A session took place between the IT specialist (Interviewer) and the library manager:

- *Interviewer: "What are your objectives?"*
- *Librarian: "What I want is to manage all the books in our library, the authors, and the borrowers."*
- *Interviewer: "Describe the functioning of the library."*
- *Librarian: "The books are all defined by a reference, a title, a type, a year, a summary, the edition, and an author whose name, surname, date of birth, and country of origin are known. Each book has several copies. For each copy, we note its reference number, purchase date, purchase price, whether it is borrowed, or if it is present in the library. For each member, we need to know their reference, name, surname, address, phone number, and email. Additionally, for each borrowing of a copy, we need to record the borrowing date and the borrowing period."*
- *Interviewer: "Is there always an author for a book?"*
- *Librarian: "Yes, there is at least one author. Sometimes there can be multiple authors for a single book."*
- *Interviewer: "Can a member borrow multiple books?"*
- *Librarian: "Yes, but they might not borrow any books at all, and logically, a book is borrowed by only one member at a time."*

- *Interviewer: "How do you record the borrowing period?"*
- *Librarian: "We record the borrowing period in terms of the number of days from the borrowing date."*

Questions :

1. *Cite the entities evoked in this system.*
2. *Define the associations evoked in the system.*
3. *Define the business rules of this information system.*
4. *Develop the data dictionary.*
5. *Define the functional dependencies in this system (define the primary key for each entity).*
6. *Draw the conceptual data model (CDM) by using power designer.*

Exercise N°2:

We want to formalize the film production information system. In this system, an actor is defining by a last name, first name and phone number. Each actor can play role in many films. A film is defining by a title and a country and a film achieved by only one producer but a producer can achieved many films. The producer is defining by a last name, first name and phone number. Internet user can rate films, he is defining by a last name, first name, e-mail. Each internet user can rate any or many films and each film can be rated by any or many internet users.

Questions :

1. *Cite the entities mentioned in this system.*
2. *Define the associations evoked in the system.*
3. *Define the business rules of this information system.*
4. *Develop the data dictionary.*
5. *Define the functional dependencies in this system (define the primary key for each entity).*
6. *Draw the conceptual data model (CDM) by using power designer.*

Exercise N°3:

We are interested in the stock management system of a company with multiple stores. In the company's stores, products are managed and identified by their reference number, description, unit sale price, and quantity in stock. A product can be in stock in several stores, where each store is identified by an internal code and an address. In case of stock depletion, a numbered

and dated command is placed with suppliers for replenishment. A product is sold by one or more suppliers, and a supplier is characterized by a number, a name, and an address.

Questions:

1. *Establish the conceptual data schema for this system.*
2. *Create this conceptual data model (CDM) using PowerDesigner.*

Exercise N°4:

Let there be a company X that has clients, suppliers, and manufacturing units. For each product, there is a number, a description, a weight, and a color.

Each manufacturing unit (depot) can produce (store) several products. The production of a product is planning, and we know the estimated end dates of production and the expected quantities produced.

Each supplier is identifying by a number, a name, and an address.

Each client is identifying by a number, a name, a city, and a phone number.

We know the actual quantities in stock in each depot.

We also know the quantities and prices that exist in the command.

Each command generally involves several products and has a unique number.

Questions:

1. *Establish the conceptual data schema for this system.*
2. *Create this conceptual data model (CDM) using PowerDesigner.*