

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

**Practical work N°04**

**Objectives:**

- ☞ Understand the concept of inheritance in the Conceptual Data Model (CDM).**
- ☞ Learn how to create a parent entity.**
- ☞ Learn how to create a child entity.**
- ☞ Understand the XT inheritance constraint: exclusion and totality.**
- ☞ Understand the X inheritance constraint: exclusion.**
- ☞ Understand the T inheritance constraint: totality.**
- ☞ Master the creation of a CDM with inheritance using PowerDesigner.**

<b>Summary</b>	
<b>Inheritance Operator</b>	<b>Signification</b>
<b>XT Inheritance Constraint:</b>	<i>Exclusion and Totality – All cases are described and mutually exclusive</i>
<b>X Inheritance Constraint:</b>	<i>Exclusion – Not all cases are describing; those that are describing are mutually exclusive.</i>
<b>T Inheritance Constraint: Totality.</b>	<i>Totality – All cases are describing and are not mutually exclusive.</i>
<b>No Inheritance Constraint:</b>	<i>Not all cases may be describing; there is no exclusion for those that are.</i>

**Exercise 01: (XT Inheritance Constraint)**

*In a bank, a client holds accounts: each client is describing by a client number and a client name. Each account has a number, a title, a balance, and an opening date; and these accounts are either:*

- Current accounts: they have a specific property: the authorized overdraft amount;*
- Savings accounts: they have a specific property: the interest rate;*

*In this bank, an account is either a current account or a savings account (no other types of accounts).*

**Question:**

*Elaborate the CDM for this information system using PowerDesigner.*

**Exercise 02:( X Inheritance Constraint)**

*We consider the same information system of the bank. All clients have a number, a last name, and a first name, but some have specific properties:*

- *For an individual, the city of residence.*
- *For a company, the company name and the serial code.*
- *For an administration: the ministry and the serial code.*

*A client is one of these three cases, or another case that does not have any of these specific properties.*

**Question:**

*Maintain the CDM for this information system using PowerDesigner.*

**Exercise 03:( T Inheritance Constraint: Totality)**

*We return to the example of managing cinematic data from the practical work N°3.*

*A film knows by its title, year of release, and country of origin. We manage individuals who are either actors or director; however, an actor can also direct films (and vice versa...). Individuals are either actors or directors, but one does not exclude the other; and there are no other cases.*

- *Each individual has an identity number, a last name, and a first name.*
- *Each actor has a type of role.*
- *Each director has a number of films directed.*

**Question:**

*Elaborate the CDM for this information system using PowerDesigner.*

**Exercise 04: (No Inheritance Constraint)**

*We consider the information system for vehicle management. A vehicle can be a car, motorcycle, boat, airplane, amphibious vehicle, or also amphibious vehicles that can fly. As you can see, there are no classification constraints.*

**Question :**

*Elaborate the CDM for this information system using PowerDesigner.*