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: DataBase
Instructor: Dr. Bouneb M.

Tutorial N°04

Objectives :

☞ Mastering TRC (Tuple Relational Calculus) query writing

☞Master querying concepts such as :

- ***Union***
- ***Intersection***
- ***Difference***
- ***Projection***
- ***Selection***
- ***Joins***
- ***Division***
- ***Logical quantifiers (∀, ∃).***

Exercise 1:

Let the following database schema:

PRODUCT *(Num-pro, Name-pro, Qte-Sock, Color).*

SALE *(Num-sale, Name-Client, Num-pro, Qte-Sale).*

PURCHASE *(Num-Pur, Num-pro, Qte-Pur, Name-Supplier).*

Express the following queries in ***tuple relational calculus TRC****:*

Q1. Provide the list of names and colors of all products.

Q2. Find the names and stock quantities of red-colored products.

Q3. For each product in stock with a quantity greater than 100 and red in color, provide the supplier name who sold the product, and customer name who bought the product.

Exercise 02:

Let the following database schema:

EMPLOYEE *(Num-E, Name, #Position, City-E).*

PAY *(Position, Salary).*

PROJECT *(Num-Proj, Name-Proj, Budget, City-Proj).*

WORK *(#Num-E, #Num-Proj , Resp, Duration).*

*Express the following queries in **tuple relational calculus TRC**:*

Q1: Provide the names of all employees.
Q2: Find the names and budgets of all projects.
Q3: Identify the job positions that have at least one employee.
Q4: Find the employees who work in Algiers.
Q5: Determine the cities that contain either an employee or a project.
Q6: Identify the cities that contain projects but no employees.
Q7: Provide the names of projects with a budget greater than 1000000 DA.
Q8: Find the names and budgets of projects where employee number 20 works.
Q9. Find the names of employees living in a city where there is at least one project.
Q10. List the cities that contain both a project and an employee.
Q11. Provide the names of employees working on a project with a budget exceeding 1,000,000 DA.
Q12. Identify the positions held by employees working on projects located in their own city of residence.
Q13. Find the employees who are not working on any project.
Q14. Find the employees who have worked more than 30 days on at least one project.

Exercise 03:
Let the following schema of database:

GUEST(Guest-ID, Name, City)
MEAL(Meal-ID, Meal-Name, Type, Price)
INVITE(Guest-ID, Meal-ID, Date)

*Express the following queries in **tuple relational calculus TRC**:*

Q1: Identify vegetarian meals chosen by at least one guest.
Q3: Find the names of guests who have not yet chosen a meal.
Q3: List the names and cities of guests who have chosen a meal with a price exceeding 500 DA.
Q4: Find meals ID that have been chosen by all guest.