

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

Tutorial N°05

Objectives :

☞ **Mastering TRC (Tuple Relational Calculus) query writing**

☞ **Master querying concepts such as :**

- **Union**
- **Intersection**
- **Difference**
- **Projection**
- **Selection**
- **Joins**
- **Division**
- **Logical quantifiers (\forall, \exists).**

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.