

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

### *Tutorial N°04*

**Objective: Understand Relational Algebra**

☞ **Understand set operations:**

- *Union*
- *Intersection*
- *Difference*

☞ **Understand specific operations:**

- *Projection*
- *Selection (Restriction)*
- *Join*
- *Division*

**Exercise 01 :**

Given the following relations in extension:

*Film:*

<i>Num-Film</i>	<i>Title</i>	<i>Duration</i>	<i>Production</i>	<i>ID-Category</i>
10	<i>Camille claudel</i>	150	<i>Gaumont</i>	<i>COM</i>
20	<i>Window to the heart</i>	120	<i>Pathé</i>	<i>COM</i>
25	<i>Cinderella</i>	140	<i>UGC</i>	<i>CAR</i>
50	<i>Super world II</i>	10	<i>Universal</i>	<i>DOCU</i>
.....	.....	.....	.....	.....

*Category:*

<i>ID-Category</i>	<i>Category-Label</i>
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<i>COM</i>	<i>Comedy</i>
<i>CAR</i>	<i>Cartoon</i>
<i>DOCU</i>	<i>Documentary</i>
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*Q1. Provide the titles of existing films.*

*Q2. Which films were produced by Pathé?*

*Q3. We would like to obtain the titles of the films as well as the labels of their categories.*

*Q4. Provide the number, titles of the films, and labels of their categories only for films longer than 100 minutes.*

**Exercise 2:**

*Given the following relational schemas:*

- *PILOT (Numpil, Name-pil, Adr, Sal)*
- *PLANE (Num-plane, Name-plane, Cap, Loc)*
- *FLIGHT (#Num-FL, #Numpil, #Num-plane, City\_Dep, City\_Arr, H\_Dep, H\_Arr)*

*Q1. List the planes with a capacity greater than 350 passengers.*

*Q2. Provide the numbers and names of planes located in Constantine.*

*Q3. Provide the numbers of pilots on duty and the departure cities of their flights.*

*Q4. Provide all the information about the pilots in the company and their flights.*

*Q5. Which pilots residing in Algiers have a salary greater than 220,000 DA?*

*Q6. Which planes (number and name) are located in Constantine or have a capacity less than 350 passengers?*

*Q7. Provide a list of flights departing from Constantine to Algiers after 6 PM.*

*Q8. Provide the numbers of pilots who are not on duty.*

*Q9. Which flights (number, departure city) are conducted by pilots numbered 100 or 204?*

*Q10. Provide the numbers of flights departing from Constantine with pilots from Constantine.*

*Q11. Which flights are conducted with a plane that is not located in Constantine?*

*Q12. Which pilots (number and name) conduct at least one flight departing from Constantine with a plane of capacity greater than 300 seats?*

*Q13. Which pilots residing in Algiers with a salary over 220,000 DA conduct a flight departing from Constantine with an Airbus?*

*Q14. Provide the numbers of flights departing from or arriving in Constantine with a plane located in Algiers.*

*Q15. Which pilots (number, name) live in the same city as pilot Ali?*

*Q16. Provide the numbers of pilots on duty other than Ali.*

*Q17. Which cities are served from the destination city of a flight departing from Algiers?*

*Q18. Which planes (their numbers) are located in the same city as plane number 100?*

*Q19. Which pilots (numbers and names) reside in the same city as pilot Ali and earn a salary greater than his?*

*Q20. Which pilots (numbers and names) conduct a flight departing from their city of residence?*

### **Exercise 3:**

*Consider the "cinema" database with the following relational schema:*

- *CITY (PostalCode, CityName)*
- *CINEMA (CinemaNum, CinemaName, Address, #PostalCode)*
- *ROOM (RoomNum, Capacity, #CinemaNum)*
- *FILM (ExploitationNum, Title, Duration, DistCode)*
- *SCREENING (#ExploitationNum, #CinemaNum, #RoomNum, WeekNum, NB-Entry)*

*Q1. Provide Titles of films lasting at least two hours.*

*Q2. Provide Names of cities hosting a cinema named "Elmodjahed."*

*Q3. Provide Names of cinemas located in Oran or having at least one room with more than 100 seats.*

*Q4. Provide Names, addresses, and cities of cinemas showing the film "Star Wars" in week 18.*

*Q5. Provide Exploitation numbers of films shown in all rooms.*

*Q6. Provide Titles of films that have not been shown.*