Databases Foundations
Season 2024-III
Workshop No. 2 — Relational Algebra

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Congratulations, you survive at your first challange. Now, it is time to keep pushing you because *you could give more.* As you undertstand how to design a relational database in a `first but professional version`, you next challenge is to define ways to extract **meaningful information** using **relational algebra**.

In this second challenge, *ApartaApp* wants to see some information about the use of **its software** *The design you made fot the first workshop.* In this way, for each one of the next **requirements** you must write the *relational algebra expresion* and draw the result table to validate your solution.

ApartaApp asked you to deliver a document with the `queries` and the `result tables`, described as follows:

1. Based on the table **Apartment** shows as follows:

ApartmentID	Number	Block	Owner	Area	Rooms
1	101	1	Chad Smith	45	2
2	102	3	Neil Pearl	60	3
3	103	1	Alex Van Halen	75	3
4	304	2	Eddie Van Halen	30	1
5	305	3	David Lee Roth	50	2
6	306	1	Sammy Hagar	70	3
7	207	2	Michael Anthony	40	2
8	308	3	Gary Cherone	55	2
9	409	1	Wolfgang Van Halen	65	3
10	310	2	Valerie Bertinelli	80	3

Projection

filters

(a) Show the *Number* of the apartments with more than 50 *Area*.

(b) Show the *Number* and *Owner* of the apartments with more than 2 *Rooms* and less than 4 *Rooms*.

(c) Show the *Number*, *Owner* and *Area* of the apartments with more than 40 *Area* and less than 70 *Area*.

(d) Show all rows of the table **Apartment** where the *Owner* contains the word *Van Halen*, and called **VanHalenApartments**.

(e) Using next table called **PublicServices**, show the *Number* of the apartments with more than 60 *Area* with all the *PublicServices* available.

ServiceID	Name
1	"Water"
2	"Electricity"
3	"Gas"

2. Based on the table **Owner** shows as follows:

OwnerID	Name	Age	Children	Pets
1	Chad Smith	50	2	1
2	Neil Pearl	45	1	0
3	Alex Van Halen	60	3	2
4	Eddie Van Halen	58	2	1
5	David Lee Roth	55	1	0
6	Sammy Hagar	65	2	1
7	Michael Anthony	70	3	2
8	Gary Cherone	40	1	0
9	Wolfgang Van Halen	30	0	0
10	Valerie Bertinelli	65	2	1

(a) Show the *Name* of the owners with more than 50 *Age*.

(b) Show the *Name* and *Age* of the owners with more than 1 *Children* and less than 3 *Children*.

(c) Show the *Name*, *Age* and *Children* of the of the owners with more than 40 *Age* and less than 60 *Age*.

(d) Show all rows of the table **Owner** where there is a *ar* or *ar* substring in the *Name*, and called **R Owners**.

(e) Show the *Name* of the owners with more than 1 *Pets* and less than 2 *Children*.

3. Based on the table **Reservations** shows as follows:

(a) Show the *ApartmentNumber*, *Owner* and *CommonSpace* of the Reservations with Date $2020 - 01 - 01$ and called **NewYearReservations**.

ReservationsID	ApartmentNumber	Owner	Date	CommonSpace
1	101	Chad Smith	2024-01-01	Soccer Field
2	102	Neil Pearl	2024-01-02	Pool
3	101	Chad Smith	2024-01-02	Gym
4	103	Alex Van Halen	2024-01-03	Pool
5	102	Neil Pearl	2024-01-02	Soccer Field
6	103	Alex Van Halen	2024-01-04	Gym
7	101	Chad Smith	2024-01-05	Pool
8	102	Neil Pearl	2024-01-06	Gym
9	103	Alex Van Halen	2024-01-07	Soccer Field
10	101	Chad Smith	2024-01-08	Pool

(b) Show the *Owner* of the Reservations after $2024-01-02$ date, and the *CommonSpace* is *Pool* or the *ApartmentNumer* is 104 or the *ApartmentNumber* is 102.

(c) Show the *ReservationsID* and *CommonSpace* of the Reservations.

4. Based on the tables showed above, create an *ER Diagram* to show the relationships between the tables. If you think you need an additional entity you could add it.

Deadline: **Saturday, Octuber 5, 2024, 4:00 PM.**