

① Table Apartment.

Apartment ID	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	86	3

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

π Number (σ Area > 50) (Apartment)

Number

102

103

306

308

409

310

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

π Number, Owner (σ Rooms > 2 \wedge σ Rooms < 4) (Apartment)

Number

Owner

102

Neil Pearl

103

Alex Van Halen

306

Sammy Hagar

409

Wolfgang Van Halen

310

Valerie Bertinelli

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

π Number, Owner, Area (σ Area $> 40 \wedge \sigma$ Area < 70) (Apartment)

Number	Owner	Area
101	Chad Smith	45
102	Neil Pear	60
305	David Lee Roth	50
308	Gary Cherone	55
409	Wolfgang Van Halen	65

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

ρ Van Halen Apartments (σ Owner LIKE "Van Halen") (Apartment)

Van Halen Apartments.

Van Halen Apartment ID	Apartment ID	Number	Block	Owner	Area	Rooms
1	3	103	1	Alex Van Halen	75	3
2	4	304	2	Eddie Van Halen	30	1
3	9	409	1	Wolfgang Van Halen	65	3

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

Service ID	Name
1	"Water"
2	"Electricity"
3	"Gas"

π Number (σ Area > 60 (Apartment)) \times Public Services

Number	Service ID	Name
103	1	"Water"
103	2	"Electricity"
103	3	"Gas"
306	1	"Water"
306	2	"Electricity"
306	3	"Gas"
409	1	"Water"
409	2	"Electricity"
409	3	"Gas"
310	1	"Water"
310	2	"Electricity"
310	3	"Gas"

②. Table Owner.

Owner ID	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.

π Name (σ Age > 50 (Owner))

Name

Alex Van Halen
Eddie Van Halen
David Lee Roth
Sammy Hagar
Michael Anthony
Valerie Bertinelli

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

π Name, Age, Children (σ Age > 40 \wedge σ Age < 60 (Owner))

Name	Age	Children
Chad Smith	50	2
Neil Pearl	45	1
Eddie Van Halen	58	2
David Lee Roth	55	1

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

π Name, Age (σ Children > 1 \wedge σ Children < 3) (Owner)

Name	Age
Chad Smith	50
Eddie Van Halen	58
Sammy Hagar	65
Valerie Bertinelli	65

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

P B Owners (σ Name LIKE "ar" (Owner))

B Owners ID	Owner ID	Name	Age	Childrens	Pets
1	2	Neil Pearl	45	1	0
2	6	Sammy Hagar	65	2	1
3	8	Gary Cherone	40	1	0

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

π Name (σ Pets > 1 \wedge σ Children < 2) (Owner)

Empty table \Rightarrow Name

③. Based on the table Reservations shows as follows:

Reservations ID	Apartment Number	Owner	Date	Common Space
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

(a). Show the Apartment Number, Owner and Common Space of the Reservations with Date 2020-01-01 and called New Year Reservations

P New Year Reservations (~~DATE~~ π Apartment Number, Owner, Common Space (σ Date = 2020-01-01) (Reservations))

New Year Reservations (Empty table)

Apartment Number Owner Common Space

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

π Owner (σ Date > "2024-01-02" \wedge σ CommonSpace = "Pool" \vee σ ApartmentNumber = 104 \vee σ ApartmentNumber = 102) (Reservation)

Owner

Alex Van Halen

Chad Smith.

Neil Pearl.

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

π ReservationsID, CommonSpace (Reservations)

ReservationsID	CommonSpace
1	Soccer Field
2	Pool
3	Gym
4	Pool
5	Soccer Field.
6	Gym
7	Pool
8	Gym
9	Soccer Field
10	Pool

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.

