

1..

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	80	3

a) Number ; more than 50 Area      b) Number and Owner ; more 2 Rooms <sup>1</sup> less 4 Rooms

Number

102

103

306

308

409

310

$\pi$  number ( $\sigma$  Area > 50) (Apartment)

Number

Owner

102 Neil Pearl

103 Alex Van Halen

306 Sammy Hagar

409 Wolfgang Van Halen

310 Valerie Bertinelli

$\pi$  number, Owner ( $\sigma$  Rooms > 2 <sup>1</sup>  $\sigma$  Rooms < 4)  
(apartments)

c) Number, Owner and Area; more 40 Area ^ less 70 Area

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

Number, Owner, Area ( $\sigma \text{Area} > 40 \wedge \sigma \text{Area} < 70$ )  
(Apartments)

d) All rows; Owner have Van Halen

Van Halen Apartments ID	Number	Block	Owner	Area	Rooms
$\rho$ Van Halen Apartments 1	103	1	Alex Van Halen	75	3
$\sigma$ Owner like Van Halen 2 (Van Halen Apartments)	304	2	Eddie Van Halen	30	1
3	409	1	Wolfgang Van Halen	65	3

e) Number; more than 60 Area

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

TI number ( $\sigma \text{Area} > 60$  (Apartments))  $\times$  (Public Services)

2..

Owner ID	Name	Age	Children	Pets
1	Chad Smith	50	2	1
2	Neil Pearl	45	1	0
3	Alex Van Haden	60	3	2
4	Eddie Van Haden	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 Haden	30	0	0
10	Valerie Bertinelli	65	2	1

a) Name; more 50 Age

Name

Alex Van Haden

Eddie Van Haden

David Lee Roth

Sammy Hagar

Michael Anthony

Valerie Bertinelli

$\pi$  Name ( $\& \text{Age} > 50$ ) (Owners)

b) Name and Age; more 1 children ^  
less 3 children

Name Age

Chad Smith 50

Eddie Van Haden 58

Sammy Hagar 65

Valerie Bertinelli 65

$\pi$  name, Age ( $\& \text{Children} > 1 \wedge \& \text{Children} < 3$ )  
(owners)

c) Name, Age and Children; more 40 Age ^ less 60 Age

Name	Age	Children	
Chad Smith	50	2	
Neil Pearl	45	1	Time, age, children ( $\sigma \text{Age} > 40 \wedge \sigma \text{Age} < 60$ ) (Owners)
Eddie Van Hellen	58	2	
David Lee Roth	55	1	

d) All rows; Name substituting "ar"

P Owners ID	Name	Age	Childrens	Pets	
1	Neil Pearl	45	1	0	P R Owners
2	Sammy Hagar	65	2	1	$\sigma \text{name like "ar"}$ (R Owners)
3	Gary Cherone	40	1	0	

e) Name; more 1 Pet ^ less 2 Children

Name Time ( $\sigma \text{Pets} > 1 \wedge \sigma \text{children} < 2$ ) (Owners)

3..	Reservation 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 Hellen	2024-01-03	Pool
5		102	Neil Pearl	2024-01-02	Soccer field
6		103	Alex Van Hellen	2024-01-04	Gym
7		101	Chad Smith	2024-01-05	Pool
8		102	Neil Pearl	2024-01-06	Gym
9		103	Alex Van Hellen	2024-01-07	Soccer field
10		101	Chad Smith	2024-01-08	Pool



a) Owner and CommonSpace, Date 2020-01-01

ApartmentNumber Owner CommonSpace NewYearReservation  
 (ApartmentNumber, Owner, CommonSpace  
 & Date 2020-01-01 (NewYearReservation))

b) Owner, after 2024-01-02 ^ CommonSpace Pool v ApartmentNumber 104 v  
 ApartmentNumber 102

Owner

Alex Van Halen

Chad Smith

Neil Pearl

$\Pi$  Owners (Date > "2024-01-02" ^ CommonSpace  
 = "Pool" v ApartmentNumber = 104  
 v ApartmentNumber = 102) (Reservation)

c) ReservationID and CommonSpace

ReservationID

CommonSpace

1

Soccer field

2

Pool

3

Gym

4

Pool

5

Soccer field

6

Gym

7

Pool

8

Gym

9

Soccer field

10

Pool

$\Pi$  ReservationID, CommonSpace  
 (Reservation)

4.

