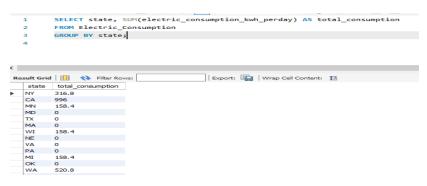# Implementation of Relation Model via MySQL

- Q1 : query retrieves name of the station and there corresponding id from the Stations table :

```
1  •    select station_name, station_id
2       from stations
```

SELECT station_name, station_id FROM Stations ;

station_name	station_id
Con Edison - E 16th Street Service Center	125
PG&E Santa Cruz Service Center	798
PG&E Richmond Service Center	826
Holiday Stationstore #73	16241
U-Haul	19360
Schindler Gas	20182
U-Haul	20551
AmeriGas	21945

- Q2 : This aggregate query calculates the total electric consumption per state from the Electric_Consumption table.

```
1    SELECT state, SUM(electric_consumption_kwh_perday) AS total_consumption
2    FROM Electric_Consumption
3    GROUP BY state;
4
```

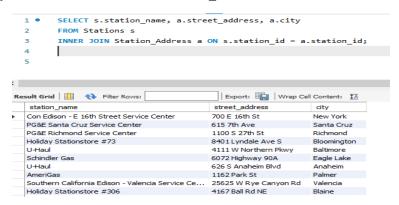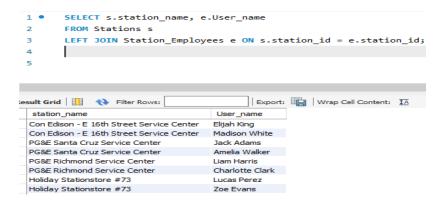| state	total_consumption
NY	316.8
CA	996
MN	158.4
MD	0
TX	0
MA	0
WI	158.4
NE	0
VA	0
PA	0
MI	158.4
OK	0
WA	520.8

SELECT state,
SUM(electric_consumption_kwh_perday)
AS total_consumption
FROM electric_consumption GROUP BY state

- Q3 : query retrieves a list of stations along with their corresponding address details by performing an inner join between the Stations and Station_Address tables.

```
1  •  SELECT s.station_name, a.street_address, a.city
2     FROM Stations s
3     INNER JOIN Station_Address a ON s.station_id = a.station_id;
4     |
5
```

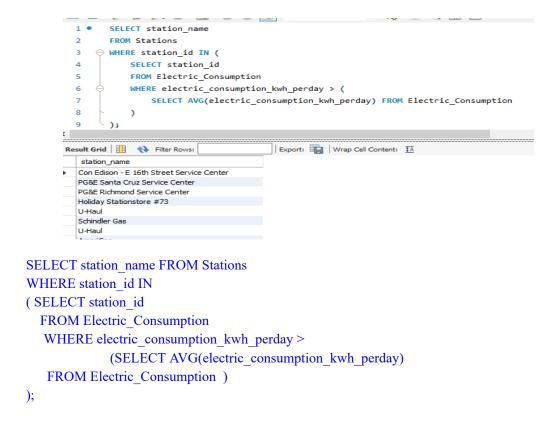| station_name	street_address	city
Con Edison - E 16th Street Service Center	700 E 16th St	New York
PG&E Santa Cruz Service Center	615 7th Ave	Santa Cruz
PG&E Richmond Service Center	1100 S 27th St	Richmond
Holiday Stationstore #73	8401 Lyndale Ave S	Bloomington
U-Haul	4111 W Northern Pkwy	Baltimore
Schindler Gas	6072 Highway 90A	Eagle Lake
U-Haul	626 S Anaheim Blvd	Anaheim
AmeriGas	1162 Park St	Palmer
Southern California Edison - Valencia Service Ce...	25625 W Rye Canyon Rd	Valencia
Holiday Stationstore #306	4167 Ball Rd NE	Blaine

SELECT s.station_name, a.street_address, a.city
FROM Stations s INNER JOIN
Station_Address a ON s.station_id = a.station_id;

- Q4 : This query retrieves a list of all stations along with their employee details, including stations that do not have any employees (LEFT JOIN).
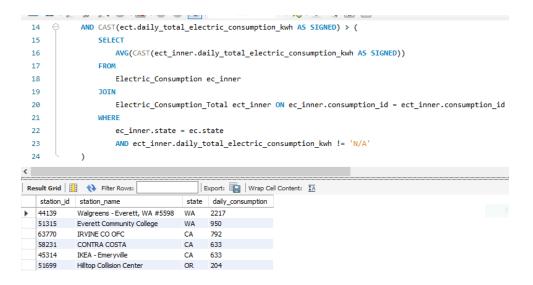
```
1 •   SELECT s.station_name, e.User_name
2     FROM Stations s
3     LEFT JOIN Station_Employees e ON s.station_id = e.station_id;
4     |
5
```

station_name	User_name
Con Edison - E 16th Street Service Center	Elijah King
Con Edison - E 16th Street Service Center	Madison White
PG&E Santa Cruz Service Center	Jack Adams
PG&E Santa Cruz Service Center	Amelia Walker
PG&E Richmond Service Center	Liam Harris
PG&E Richmond Service Center	Charlotte Clark
Holiday Stationstore #73	Lucas Perez
Holiday Stationstore #73	Zoe Evans

SELECT s.station_name, e.User_name
FROM Stations s
LEFT JOIN Station_Employees e
ON s.station_id = e.station_id;

- Q5 : This nested query retrieves stations that have a higher electric consumption than the average consumption for all stations.

```
1 •   SELECT station_name
2     FROM Stations
3   ⊝ WHERE station_id IN (
4         SELECT station_id
5         FROM Electric_Consumption
6   ⊝     WHERE electric_consumption_kwh_perday > (
7             SELECT AVG(electric_consumption_kwh_perday) FROM Electric_Consumption
8         )
9     );
```

station_name
Con Edison - E 16th Street Service Center
PG&E Santa Cruz Service Center
PG&E Richmond Service Center
Holiday Stationstore #73
U-Haul
Schindler Gas
U-Haul

SELECT station_name FROM Stations
WHERE station_id IN
(SELECT station_id
   FROM Electric_Consumption
    WHERE electric_consumption_kwh_perday >
             (SELECT AVG(electric_consumption_kwh_perday)
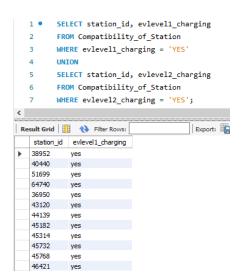   FROM Electric_Consumption)
);

- Q6 : This correlated subquery identifies stations where the daily electric consumption is higher than the average daily consumption of all stations in the same state.

```
14   ⊖      AND CAST(ect.daily_total_electric_consumption_kwh AS SIGNED) > (
15              SELECT
16                  AVG(CAST(ect_inner.daily_total_electric_consumption_kwh AS SIGNED))
17              FROM
18                  Electric_Consumption ec_inner
19              JOIN
20                  Electric_Consumption_Total ect_inner ON ec_inner.consumption_id = ect_inner.consumption_id
21              WHERE
22                  ec_inner.state = ec.state
23                  AND ect_inner.daily_total_electric_consumption_kwh != 'N/A'
24          )
```

station_id	station_name	state	daily_consumption
44139	Walgreens - Everett, WA #5598	WA	2217
51315	Everett Community College	WA	950
63770	IRVINE CO OFC	CA	792
58231	CONTRA COSTA	CA	633
45314	IKEA - Emeryville	CA	633
51699	Hilltop Collision Center	OR	204

```sql
SELECT
    ec.station_id,
    s.station_name,
    ec.state,
    ect.daily_total_electric_consumption_kwh
FROM
    Electric_Consumption ec
JOIN
    Electric_Consumption_Total ect ON ec.consumption_id = ect.consumption_id
JOIN
    Stations s ON ec.station_id = s.station_id
WHERE
    ect.daily_total_electric_consumption_kwh > (
        SELECT
            AVG(ect_inner.daily_total_electric_consumption_kwh)
        FROM
            Electric_Consumption ec_inner
        JOIN
            Electric_Consumption_Total ect_inner ON ec_inner.consumption_id = ect_inner.consumption_id
        WHERE
            ec_inner.state = ec.state
    )
ORDER BY
    ect.daily_total_electric_consumption_kwh DESC
```

- Q7 : This query retrieves a list of stations with either EV Level 1 or EV Level 2 charging compatibility (using UNION).

SELECT station_id, evlevel1_charging
FROM Compatibility_of_Station
WHERE evlevel1_charging = 'YES'
 UNION
SELECT station_id, evlevel2_charging
FROM Compatibility_of_Station
WHERE evlevel2_charging = 'YES';

```
1 •  SELECT station_id, evlevel1_charging
2     FROM Compatibility_of_Station
3     WHERE evlevel1_charging = 'YES'
4     UNION
5     SELECT station_id, evlevel2_charging
6     FROM Compatibility_of_Station
7     WHERE evlevel2_charging = 'YES';
```

station_id	evlevel1_charging
38952	yes
40440	yes
51699	yes
64740	yes
36950	yes
43120	yes
44139	yes
45182	yes
45314	yes
45732	yes
45768	yes
46421	yes

- Q8 : In this query, we retrieve detailed information about electric vehicle (EV) charging stations in California, including the supplier information and station location using Subqueries in Select and From.

SELECT S.station_id, s.supplier_company,
s.sup_rep_name, s.sup_rep_email, S.equipments,
sa.street_address, sa.city,
sa.state, sa.country,
sa.latitude, sa.longitude,
(SELECT COUNT(*)
FROM suppliers_ev_stations
sub_s
WHERE sub_s.station_id =
s.station_id)
AS total_suppliers_per_station
FROM suppliers_ev_stations s
JOIN station_address sa
ON s.station_id = sa.station_id
WHERE sa.state = 'CA';

```
11         sa.latitude,
12         sa.longitude,
13  ⊖    (SELECT COUNT(*)
14         FROM suppliers_ev_stations sub_s
15         WHERE sub_s.station_id = s.station_id) AS total_suppliers_per_station
16    FROM suppliers_ev_stations s
17    JOIN station_address sa ON s.station_id = sa.station_id
18    WHERE sa.state = 'CA';  -- Adjust this if needed (e.g., 'california', 'CA')
19
20
```

station_id	supplier_company	sup_rep_name	sup_rep_email	equipments	street_address	city	state	country	latitude
798	Schneider Electric	Laura White	laura.white@schneider.com	Cables and Connectors, Level 2, Safety Equipm...	615 7th Ave	Santa Cruz	CA	USA	36.969274
826	Schneider Electric	Tom Walker	tom.walker@schneider.com	Maintenance Tools, Level 2, Safety Equipment	1100 S 27th St	Richmond	CA	USA	37.916399
20551	Tesla	Brian White	brian.white@tesla.com	Maintenance Tools, Cables and Connectors, Le...	626 S Anaheim Blvd	Anaheim	CA	USA	33.828164
27325	Tesla	David Brown	david.brown@tesla.com	DC Fast Charger, Maintenance Tools, Safety Eq...	25625 W Rye Canyon Rd	Valencia	CA	USA	34.433772
45314	ChargePoint	Peter Evans	peter.evans@chargepoint.com	Safety Equipment, Level 1, Cables and Connect...	4400 Shellmound St.	Emeryville	CA	USA	37.831159
50950	ABB	Daniel Harris	daniel.harris@abb.com	Maintenance Tools, Level 2, DC Fast Charger	13651 Willard street	Panorama City	CA	USA	34.21803
51716	ChargePoint	Kyle Adams	kyle.adams@chargepoint.com	Safety Equipment, Cables and Connectors, Lev...	73710 Fred Waring Dr	Palm Desert	CA	USA	33.729855
58231	ABB	Lisa Brown	lisa.brown@abb.com	DC Fast Charger, Maintenance Tools, Cables an...	1450 Treat Blvd	Walnut Creek	CA	USA	37.926120
60243	Siemens	Anthony Scott	anthony.scott@siemens.com	DC Fast Charger, Maintenance Tools, Level 1	3200 Park Center Dr	Costa Mesa	CA	USA	33.688974
63770	Schneider Electric	Sarah Lee	sarah.lee@schneider.com	Level 1, Safety Equipment, Cables and Connect...	111 Innovation Dr	Irvine	CA	USA	33.645956
64740	ChargePoint	Mike Harris	mike.harris@chargepoint.com	Level 2, Maintenance Tools, Safety Equipment	863 Mission St	SF	CA	USA	37.782982