

University of British Columbia, Vancouver

Department of Computer Science

CPSC 304 Project Cover Page

Milestone #: 4

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Group Number: 7

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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia.

CPSC 304 Milestone 4

Repository Link

https://github.students.cs.ubc.ca/CPSC304-2022W-T1/project_f8w2b_l7a2y_q9v6m

Project Description

Parking lot manager (PLM) is a web application that oversees parking spaces, allowing existing users to create parking sessions, view analytics and update their vehicle and personal information. Our application is an inventory tracker that features a parking log, a record of both vacant and occupied parking spaces, and updates instantaneously to ensure individuals are able to gain insight of the usage of the parking spots. Moreover, our application contains a history page, in which users are able to view parking history, ticket history and summary, and have the ability to select the information they wish to view.

Schema Changes

In addition, to allow for more interesting queries, we decided to make some changes:

- one-to-one relationship of vehicleOwner and vehicle => one-to-many
- Updated field types
 - Specifically made chars into varchars so varying data length can be added
 - Added type SERIAL (PostgreSQL) which is basically just an integer that auto increments for id creation of tickets and parkingSessions
- Changed relationship between vehicleOwner and personalDetails
 - Rather than using (name, address) as key for personalDetails, we made it use the foreign key to the owner id. It didn't make sense to use (name, address) when we already created a key ownerID.
- Removed foreign keys constraint for (name, address) for vehicleOwner
- Updated foreign key for tickets (licensePlate -> sessionId)
 - since each ticket will be assigned for a specific parking session, it makes sense to connect it to sessionId rather than licensePlate.
 - This is a one to one relationship with partial participation for parking session and full participation for tickets

Sections header quick navigating

- Queries (All required queries)
- Schema Screenshots (Screenshots of the initial schema)
- Initialization Screenshots (Screenshots of each relation after initialization)
- Required Query Results (Screenshots of action/result of required queries)

Queries

```
INSERT Query
(Reference: function addVehicle in queries/queries.ts)

INSERT INTO vehicle (licensePlate, modelName, ownerID, height, color)
VALUES ($1, $2, $3, $4, $5) RETURNING *
```

```

DELETE Query
(Reference: function deleteVehicle in queries/queries.ts)

DELETE FROM vehicle WHERE ownerID = $1 AND licensePlate = $2 RETURNING *

```

```

UPDATE Query
(Reference: function updateUserProfile in queries/queries.ts)

UPDATE vehicle SET
  modelname = $1,
  height = $2,
  color = $3
WHERE licenseplate = $4 RETURNING *

```

```

SELECTION QUERY

//Table 1
(Reference: function getParkingHistory in queries/queries.ts)

let projectionAttr = '';
if(attr && attr.length) {
  projectionAttr = attr.join(', ');
  projectionAttr += ', ';
}

let query = `SELECT
  p.lotID AS parkingLotId,
  p.startTime,
  p.isActive,
  p.sessionid,
  CONCAT(l.postalCode, ' ', l.city, ' ', l.province) AS parkingLotAddress,
  p.licensePlate AS vehicleLicensePlate, ` + projectionAttr +
`CASE
  WHEN a.accessibilityType IS NOT NULL THEN a.accessibilityType
  END AS accessibilityType,
CASE
  WHEN a.accessibilityType IS NULL THEN FALSE
  ELSE TRUE
END AS isAccessibilitySpot,
CASE
  WHEN e.plugType IS NULL THEN FALSE
  ELSE TRUE
END AS isElectricSpot,
(SELECT MIN(pa.timestamp) FROM parkingactivities as pa WHERE pa.timestamp > p.starttime
  AND pa.licenseplate = p.licenseplate
  AND pa.lotid = p.lotid
  AND pa.spotid = p.spotid
  AND pa.activitytype IN ('removed', 'out')) as sessionend,
t.ticketnumber
FROM parkingSessions p
JOIN parkingSpots ps
  ON p.spotID = ps.spotID AND p.lotID = ps.lotID
JOIN parkingLots pl
  ON ps.lotID = pl.lotID
JOIN location l
  ON pl.postalCode = l.postalCode
JOIN vehicle v
  ON p.licensePlate = v.licensePlate
JOIN vehicleOwner vo
  ON v.ownerID = vo.ownerID
LEFT JOIN accessibilitySpots a
  ON p.spotID = a.spotID AND p.lotID = a.lotID
LEFT JOIN electricSpots e

```

```

        ON p.spotID = e.spotID AND p.lotID = e.lotID
    LEFT JOIN tickets t
        ON t.sessionid = p.sessionid
    WHERE vo.username = $1 `;

if (licensePlate !== null && licensePlate !== undefined) {
    return executeQuery(query + ` AND p.licensePlate = $2 ORDER BY p.isActive DESC, p.startTime DESC`, [username, licensePlate]);
} else {
    return executeQuery(query + ` ORDER BY p.isActive DESC, p.startTime DESC`, [username]);
}

//Table 2
(Reference: function getTicketHistory in queries/queries.ts)

let projectionAttr = '';
if(attr && attr.length) {
    projectionAttr = attr.join(', ');
    projectionAttr += ', ';
}
// t.ticketNumber,
// p.sessionid,
// t.details

let query = `SELECT p.licensePlate,
    p.startTime + (p.allottedTime / 3600 * interval '1 hour') AS dateReceived,
    t.paid, ` + projectionAttr +
    ` t.ticketnumber
FROM parkingSessions p
JOIN vehicle v
    ON p.licensePlate = v.licensePlate
JOIN vehicleOwner vo
    ON v.ownerID = vo.ownerID
JOIN tickets t
    ON p.sessionID = t.sessionID
WHERE vo.username = $1 `;

if (licensePlate !== null && licensePlate !== undefined) {
    return executeQuery(query + ` AND p.licensePlate = $2`, [username, licensePlate]);
} else {
    return executeQuery(query, [username]);
}

```

```

Projection QUERY
(Reference: function getSummary in queries/queries.ts)

let projectionAttr = '';
if(attr && attr.length) {
    projectionAttr = attr.join(', ');
    projectionAttr += ', ';
}

let query = `SELECT
    p.lotID AS parkingLotID, ` +
    projectionAttr +
    ` p.licensePlate AS vehicleLicensePlate,
    COUNT(DISTINCT p.sessionID) AS count
FROM parkingSessions p
JOIN parkingSpots ps
    ON p.spotID = ps.spotID AND p.lotID = ps.lotID
JOIN parkingLots pl
    ON ps.lotID = pl.lotID
JOIN location l
    ON pl.postalCode = l.postalCode
JOIN vehicle v
    ON p.licensePlate = v.licensePlate
JOIN vehicleOwner vo
    ON v.ownerID = vo.ownerID
WHERE vo.username = $1 `;

if (licensePlate !== null && licensePlate !== undefined) {

```

```

    return executeQuery(query + ` AND p.licensePlate = $2 GROUP BY p.licensePlate, p.lotID, l.postalCode`, [username, licensePlate]);
} else {
    return executeQuery(query + ` GROUP BY p.licensePlate, p.lotID, l.postalCode`, [username]);
}

```

JOIN Query
(Reference: function getVehicles in queries/queries.ts)

```

SELECT
    v.licensePlate,
    v.modelName AS model,
    v.height,
    v.color,
    CASE
        WHEN ev.plugType IS NOT NULL THEN ev.plugType
    END AS plugType,
    array_agg(p.permitType) AS permits,
    CASE
        WHEN ev.plugType IS NULL THEN FALSE
        ELSE TRUE
    END AS isElectric
FROM vehicle v
LEFT JOIN electricVehicle ev
    ON v.licensePlate = ev.licensePlate
LEFT JOIN permits p
    ON v.licensePlate = p.licensePlate
JOIN vehicleOwner vo
    ON v.ownerID = vo.ownerID
WHERE vo.username = $1
AND v.licensePlate = $2 GROUP BY v.licensePlate, ev.plugType LIMIT 1

```

AGGREGATION WITH GROUP BY Query
(Reference: function getParkingLotStats in queries/queries.ts)

```

SELECT
    vo.name,
    a.email,
    COUNT(DISTINCT t.ticketnumber) as num_tickets
FROM tickets as t
INNER JOIN parkingsessions as ps
    ON ps.sessionid = t.sessionid
INNER JOIN vehicle as v
    ON v.licenseplate = ps.licenseplate
INNER JOIN vehicleowner as vo
    ON vo.ownerid = v.ownerid
INNER JOIN accounts as a
    ON a.username = vo.username
WHERE ps.lotid = $1 AND ps.startTime > CURRENT_TIMESTAMP - INTERVAL '60 day'
GROUP BY a.username, vo.ownerid
HAVING COUNT(DISTINCT t.ticketnumber) > 3

```

AGGREGATION WITH HAVING Query
(Reference: function getParkingLotStats in queries/queries.ts)

```

SELECT
    vo.name,
    a.email,
    COUNT(*) as parked
FROM parkingactivities as pa
INNER JOIN vehicle as v
    ON v.licenseplate = pa.licenseplate
INNER JOIN vehicleowner as vo

```

```

    ON vo.ownerid = v.ownerid
    INNER JOIN accounts as a
        ON a.username = vo.username
    WHERE pa.timestamp > CURRENT_TIMESTAMP - INTERVAL '60 day'
        AND pa.activitytype = 'in'
        AND pa.lotid = $1
    GROUP BY a.username, vo.ownerid
    HAVING COUNT(*) > 3

```

NESTED AGGREGATION Query
(Reference: function getOverview in queries/queries.ts)

```

SELECT COUNT(DISTINCT v.licenseplate), vo.name
FROM vehicleowner as vo
INNER JOIN vehicle as v
    ON vo.ownerid = v.ownerid
GROUP BY vo.ownerid
HAVING COUNT(DISTINCT v.licenseplate) >
    (SELECT AVG(c) FROM
        (SELECT COUNT(v2.licenseplate) as c
        FROM vehicleowner as vo2
        INNER JOIN vehicle as v2
            ON vo2.ownerid = v2.ownerid
        GROUP BY vo2.ownerid) AS ic)

```

DIVISION Query
(Reference: function getOverview in queries/queries.ts)

```

SELECT vo.name, a.email
FROM parkingSessions ps0
JOIN vehicle v0
    ON ps0.licensePlate = v0.licensePlate
JOIN vehicleowner vo
    ON vo.ownerid = v0.ownerid
JOIN accounts a
    ON a.username = vo.username
WHERE ps0.startTime > CURRENT_TIMESTAMP - INTERVAL '60 day'
    AND NOT EXISTS
        ((SELECT lotID
        FROM parkingSpots)
        EXCEPT
        (SELECT ps1.lotID
        FROM parkingSessions ps1
        JOIN vehicle v1
            ON ps1.licensePlate = v1.licensePlate
            WHERE v1.ownerID = v0.ownerID))
GROUP BY vo.name, a.email

```

Schema Screenshots

```
postgres=# \d
          List of relations
 Schema |        Name         | Type  | Owner
-----+----------------+-----+-
 public | accessibilityspots | table | postgres
 public | accounts          | table | postgres
 public | chargers          | table | postgres
 public | electricspots     | table | postgres
 public | electricvehicle   | table | postgres
 public | location           | table | postgres
 public | manufacturer      | table | postgres
 public | model              | table | postgres
 public | parkingactivities | table | postgres
 public | parkinglots        | table | postgres
 public | parkingsessions   | table | postgres
 public | parkingsessions_sessionid_seq | sequence | postgres
 public | parkingspots       | table | postgres
 public | permits            | table | postgres
 public | permittype         | table | postgres
 public | personaldetails    | table | postgres
 public | tickets             | table | postgres
 public | tickets_ticketnumber_seq | sequence | postgres
 public | vehicle             | table | postgres
 public | vehicleowner        | table | postgres
(20 rows)
```

```

postgres=# \d accessibilityspots
           Table "public.accessibilityspots"
  Column   |      Type       | Collation | Nullable | Default
  spotid    | integer        |           | not null |
  lotid     | integer        |           | not null |
  accessibilitytype | character varying(100) |           | not null | 'accessibility'::character varying
Indexes:
  "accessibilityspots_pkey" PRIMARY KEY, btree (spotid, lotid)
Foreign-key constraints:
  "accessibilityspots_spotid_lotid_fkey" FOREIGN KEY (spotid, lotid) REFERENCES parkingspots(spotid, lotid) ON UPDATE CASCADE ON DELETE CASCADE

postgres=# \d accounts
           Table "public.accounts"
  Column   |      Type       | Collation | Nullable | Default
  username | character varying(100) |           | not null |
  password | character varying(100) |           | not null |
  email    | character varying(100) |           | not null |
Indexes:
  "accounts_pkey" PRIMARY KEY, btree (username)
  "accounts_email_key" UNIQUE CONSTRAINT, btree (email)
Referenced by:
  TABLE "vehicleowner" CONSTRAINT "vehicleowner_username_fkey" FOREIGN KEY (username) REFERENCES accounts(username) ON UPDATE CASCADE ON DELETE CASCADE

postgres=# \d chargers
           Table "public.chargers"
  Column   |      Type       | Collation | Nullable | Default
  plugtype | character varying(50) |           | not null |
Indexes:
  "chargers_pkey" PRIMARY KEY, btree (plugtype)
Referenced by:
  TABLE "electricspots" CONSTRAINT "electricspots_plugtype_fkey" FOREIGN KEY (plugtype) REFERENCES chargers(plugtype) ON UPDATE CASCADE ON DELETE CASCADE
  TABLE "electricvehicle" CONSTRAINT "electricvehicle_plugtype_fkey" FOREIGN KEY (plugtype) REFERENCES chargers(plugtype) ON UPDATE CASCADE ON DELETE CASCADE

postgres=# \d electricspots;
           Table "public.electricspots"
  Column   |      Type       | Collation | Nullable | Default
  spotid    | integer        |           | not null |
  lotid     | integer        |           | not null |
  plugtype  | character varying(50) |           | not null | 'J1772'::character varying
Indexes:
  "electricspots_pkey" PRIMARY KEY, btree (spotid, lotid)
Foreign-key constraints:
  "electricspots_plugtype_fkey" FOREIGN KEY (plugtype) REFERENCES chargers(plugtype) ON UPDATE CASCADE ON DELETE CASCADE
  "electricspots_spotid_lotid_fkey" FOREIGN KEY (spotid, lotid) REFERENCES parkingspots(spotid, lotid) ON UPDATE CASCADE ON DELETE CASCADE

```

```

postgres=# \d electricvehicle
          Table "public.electricvehicle"
  Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
licenseplate | character varying(10) |           | not null |
plugtype    | character varying(50)  |           | not null |
Indexes:
"electricvehicle_pkey" PRIMARY KEY, btree (licenseplate)
Foreign-key constraints:
"electricvehicle_licenseplate_fkey" FOREIGN KEY (licenseplate) REFERENCES vehicle(licenseplate) ON UPDATE CASCADE ON DELETE CASCADE
"electricvehicle_plugtype_fkey" FOREIGN KEY (plugtype) REFERENCES chargers(plugtype) ON UPDATE CASCADE ON DELETE CASCADE

postgres=# \d location
          Table "public.location"
  Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
postalcode | character varying(6) |           | not null |
city       | character varying(256) |          | not null |
province   | character varying(256) |          | not null |
Indexes:
"location_pkey" PRIMARY KEY, btree (postalcode)
Referenced by:
TABLE "parkinglots" CONSTRAINT "parkinglots_postalcode_fkey" FOREIGN KEY (postalcode) REFERENCES location(postalcode) ON UPDATE CASCADE ON DELETE CASCADE

postgres=# \d manufacturer
          Table "public.manufacturer"
  Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
manufacturerid | integer    |           | not null |
name         | character varying(100) |          | not null |
address      | character varying(100) |          | not null |
Indexes:
"manufacturer_pkey" PRIMARY KEY, btree (manufacturerid)
"manufacturer_name_key" UNIQUE CONSTRAINT, btree (name)
Referenced by:
TABLE "model" CONSTRAINT "model_manufacturerid_fkey" FOREIGN KEY (manufacturerid) REFERENCES manufacturer(manufacturerid) ON UPDATE CASCADE ON DELETE CASCADE

postgres=# \d model
          Table "public.model"
  Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
modelname   | character varying |           | not null |
manufacturerid | integer    |           | not null |
Indexes:
"model_pkey" PRIMARY KEY, btree (modelname)
Foreign-key constraints:
"model_manufacturerid_fkey" FOREIGN KEY (manufacturerid) REFERENCES manufacturer(manufacturerid) ON UPDATE CASCADE ON DELETE CASCADE
Referenced by:
TABLE "vehicle" CONSTRAINT "vehicle_modelname_fkey" FOREIGN KEY (modelname) REFERENCES model(modelname) ON UPDATE CASCADE ON DELETE CASCADE

```

```

postgres=# \d parkingactivities
          Table "public.parkingactivities"
  Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
 timestamp | timestamp with time zone |           | not null |
 licenseplate | character varying(10) |           | not null |
 spotid | integer |           | not null |
 lotid | integer |           | not null |
 activitytype | character varying(50) |           | not null |
Indexes:
 "parkingactivities_pkey" PRIMARY KEY, btree ("timestamp", spotid, lotid)
Foreign-key constraints:
 "parkingactivities_licenseplate_fkey" FOREIGN KEY (licenseplate) REFERENCES vehicle(licenseplate) ON UPDATE CASCADE ON DELETE CASCADE
 "parkingactivities_spotid_lotid_fkey" FOREIGN KEY (spotid, lotid) REFERENCES parkingspots(spotid, lotid) ON UPDATE CASCADE ON DELETE CASCADE

postgres=# \d parkinglots
          Table "public.parkinglots"
  Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
 lotid | integer |           | not null |
 capacity | integer |           | not null | 10
 postalcode | character varying(6) |           | not null |
 heightlimit | integer |           | not null |
Indexes:
 "parkinglots_pkey" PRIMARY KEY, btree (lotid)
Foreign-key constraints:
 "parkinglots_postalcode_fkey" FOREIGN KEY (postalcode) REFERENCES location(postalcode) ON UPDATE CASCADE ON DELETE CASCADE
Referenced by:
 TABLE "parkingspots" CONSTRAINT "parkingspots_lotid_fkey" FOREIGN KEY (lotid) REFERENCES parkinglots(lotid) ON UPDATE CASCADE ON DELETE CASCADE

postgres=# \d parkingsessions;
          Table "public.parkingsessions"
  Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
 sessionid | integer |           | not null | nextval('parkingsessions_sessionid_seq)::regclass
 licenseplate | character varying(10) |           | not null |
 spotid | integer |           | not null |
 lotid | integer |           | not null |
 allottedtime | integer |           | not null |
 isactive | boolean |           | not null | false
 starttime | timestamp with time zone |           | not null |
 ischarging | boolean |           | not null | false
Indexes:
 "parkingsessions_pkey" PRIMARY KEY, btree (sessionid)
Foreign-key constraints:
 "parkingsessions_licenseplate_fkey" FOREIGN KEY (licenseplate) REFERENCES vehicle(licenseplate) ON UPDATE CASCADE ON DELETE CASCADE
 "parkingsessions_spotid_lotid_fkey" FOREIGN KEY (spotid, lotid) REFERENCES parkingspots(spotid, lotid) ON UPDATE CASCADE ON DELETE CASCADE
Referenced by:
 TABLE "tickets" CONSTRAINT "tickets_sessionid_fkey" FOREIGN KEY (sessionid) REFERENCES parkingsessions(sessionid) ON UPDATE CASCADE ON DELETE CASCADE

```

```

postgres=# \d parkingsessions_sessionid_seq
      Sequence "public.parkingsessions_sessionid_seq"
 Type | Start | Minimum | Maximum | Increment | Cycles? | Cache
-----+-----+-----+-----+-----+-----+-----+
 integer | 1 | 1 | 2147483647 | 1 | no | 1
Owned by: public.parkingsessions.sessionid

postgres=# \d parkingspots;
          Table "public.parkingspots"
  Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
 spotid | integer |           | not null |
 lotid | integer |           | not null |
 availabletime | integer |           | not null | 3600
 spottype | character varying(100) |           | not null | 'normal'::character varying
 height | integer |           | not null |
Indexes:
 "parkingspots_pkey" PRIMARY KEY, btree (spotid, lotid)
Foreign-key constraints:
 "parkingspots_lotid_fkey" FOREIGN KEY (lotid) REFERENCES parkinglots(lotid) ON UPDATE CASCADE ON DELETE CASCADE
Referenced by:
 TABLE "accessibilityspots" CONSTRAINT "accessibilityspots_spotid_lotid_fkey" FOREIGN KEY (spotid, lotid) REFERENCES parkingspots(spotid, lotid) ON UPDATE CASCADE ON DELETE CASCADE
 TABLE "electricspots" CONSTRAINT "electricspots_spotid_lotid_fkey" FOREIGN KEY (spotid, lotid) REFERENCES parkingspots(spotid, lotid) ON UPDATE CASCADE ON DELETE CASCADE
 TABLE "parkingactivities" CONSTRAINT "parkingactivities_spotid_lotid_fkey" FOREIGN KEY (spotid, lotid) REFERENCES parkingspots(spotid, lotid) ON UPDATE CASCADE ON DELETE CASCADE
 TABLE "parkingsessions" CONSTRAINT "parkingsessions_spotid_lotid_fkey" FOREIGN KEY (spotid, lotid) REFERENCES parkingspots(spotid, lotid) ON UPDATE CASCADE ON DELETE CASCADE

```

```

postgres=# \d permits
           Table "public.permits"
  Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
licenseplate | character varying(10) |          | not null |
permittype | character varying(50) |          | not null |
Indexes:
"permits_pkey" PRIMARY KEY, btree (licenseplate, permittype)
Foreign-key constraints:
"permits_licenseplate_fkey" FOREIGN KEY (licenseplate) REFERENCES vehicle(licenseplate) ON UPDATE CASCADE ON DELETE CASCADE
"permits_permittype_fkey" FOREIGN KEY (permittype) REFERENCES permittype(title) ON UPDATE CASCADE ON DELETE CASCADE

postgres=# \d permittype
           Table "public.permittype"
  Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
title | character varying(50) |          | not null |
Indexes:
"permittype_pkey" PRIMARY KEY, btree (title)
Referenced by:
 TABLE "permits" CONSTRAINT "permits_permittype_fkey" FOREIGN KEY (permittype) REFERENCES permittype(title) ON UPDATE CASCADE ON DELETE CASCADE

postgres=# \d personaldetails
           Table "public.personaldetails"
  Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
ownerid | integer |          | not null |
phonenumber | character varying(20) |          | not null | 'They/Them/Theirs'::character varying
pronouns | character varying(100) |          | not null |
gender | character varying(50) |          | not null | 'Other'::character varying
dob | date |          | not null |
Indexes:
"personaldetails_pkey" PRIMARY KEY, btree (ownerid)
Foreign-key constraints:
"personaldetails_ownerid_fkey" FOREIGN KEY (ownerid) REFERENCES vehicleowner(ownerid) ON UPDATE CASCADE ON DELETE CASCADE

```



```

postgres=# \d tickets
           Table "public.tickets"
  Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
ticketnumber | integer |          | not null | nextval('tickets_ticketnumber_seq'::regclass)
cost | integer |          | not null | 10
paid | boolean |          | not null | false
details | character varying |          |
sessionid | integer |          |
Indexes:
"tickets_pkey" PRIMARY KEY, btree (ticketnumber)
Foreign-key constraints:
"tickets_sessionid_fkey" FOREIGN KEY (sessionid) REFERENCES parkingsessions(sessionid) ON UPDATE CASCADE ON DELETE CASCADE

postgres=# \d tickets_ticketnumber_seq
        Sequence "public.tickets_ticketnumber_seq"
  Type | Start | Minimum | Maximum | Increment | Cycles? | Cache
-----+-----+-----+-----+-----+-----+-----+
integer | 1 | 1 | 2147483647 | 1 | no | 1
Owned by: public.tickets.ticketnumber

postgres=# \d vehicle
           Table "public.vehicle"
  Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
licenseplate | character varying(10) |          | not null |
modelname | character varying |          | not null |
ownerid | integer |          | not null |
height | integer |          | not null |
color | character varying(6) |          | not null | '000000'::character varying
Indexes:
"vehicle_pkey" PRIMARY KEY, btree (licenseplate)
Foreign-key constraints:
"vehicle_modelname_fkey" FOREIGN KEY (modelname) REFERENCES model(modelname) ON UPDATE CASCADE ON DELETE CASCADE
"vehicle_ownerid_fkey" FOREIGN KEY (ownerid) REFERENCES vehicleowner(ownerid) ON UPDATE CASCADE ON DELETE CASCADE
Referenced by:
 TABLE "electricvehicle" CONSTRAINT "electricvehicle_licenseplate_fkey" FOREIGN KEY (licenseplate) REFERENCES vehicle(licenseplate) ON UPDATE CASCADE ON DELETE CASCADE
DE
 TABLE "parkingactivities" CONSTRAINT "parkingactivities_licenseplate_fkey" FOREIGN KEY (licenseplate) REFERENCES vehicle(licenseplate) ON UPDATE CASCADE ON DELETE CASCADE
ASCA
 DE
 TABLE "parkingsessions" CONSTRAINT "parkingsessions_licenseplate_fkey" FOREIGN KEY (licenseplate) REFERENCES vehicle(licenseplate) ON UPDATE CASCADE ON DELETE CASCADE
DE
 TABLE "permits" CONSTRAINT "permits_licenseplate_fkey" FOREIGN KEY (licenseplate) REFERENCES vehicle(licenseplate) ON UPDATE CASCADE ON DELETE CASCADE

```

```

postgres=# \d vehicleowner
          Table "public.vehicleowner"
   Column |      Type       | Collation | Nullable | Default
-----+-----+-----+-----+-----+
ownerid | integer      |           | not null |
username | character varying(100) |           | not null |
address | character varying(100) |           | not null |
name    | character varying(100) |           | not null |
Indexes:
"vehicleowner_pkey" PRIMARY KEY, btree (ownerid)
Foreign-key constraints:
"vehicleowner_username_fkey" FOREIGN KEY (username) REFERENCES accounts(username) ON UPDATE CASCADE ON DELETE CASCADE
Referenced by:
TABLE "personaldetails" CONSTRAINT "personaldetails_ownerid_fkey" FOREIGN KEY (ownerid) REFERENCES vehicleowner(ownerid) ON UPDATE CASCADE ON DELETE CASCADE
TABLE "vehicle" CONSTRAINT "vehicle_ownerid_fkey" FOREIGN KEY (ownerid) REFERENCES vehicleowner(ownerid) ON UPDATE CASCADE ON DELETE CASCADE

```

Initialization Screenshots

```

postgres=# SELECT * FROM chargers;
          plugtype
-----
J1772
Mennekes
GB/T
CCS1
CHAdeMO
(5 rows)

```

```
postgres=# select * FROM electricspots;
spotid | lotid | plugtype
```

1	1	J1772
2	1	J1772
3	1	J1772
4	1	J1772
5	1	J1772
6	1	CHAdMO
7	1	CCS1
8	1	GB/T
9	1	Mennekes
10	1	Mennekes
20	1	J1772
21	1	J1772
30	1	J1772
31	1	J1772
40	1	J1772
1	2	J1772
2	2	J1772
3	2	J1772
4	2	J1772
5	2	J1772
6	2	CHAdMO
7	2	CCS1
8	2	GB/T
9	2	Mennekes
10	2	Mennekes
11	2	J1772
12	2	J1772
13	2	J1772
14	2	J1772
15	2	J1772
20	2	J1772
21	2	J1772
30	2	J1772
31	2	J1772
40	2	J1772
1	3	J1772
2	3	J1772
3	3	J1772
4	3	J1772
5	3	CHAdMO
1	4	J1772
2	4	J1772
3	4	J1772
4	4	J1772
5	4	CHAdMO
1	5	J1772
2	5	J1772
3	5	J1772
4	5	J1772
5	5	J1772
6	5	CHAdMO

```
7 | 5 | CCS1
8 | 5 | GB/T
9 | 5 | Mennekes
10 | 5 | Mennekes
20 | 5 | J1772
21 | 5 | J1772
30 | 5 | J1772
31 | 5 | J1772
40 | 5 | J1772
(60 rows)
```

```
postgres=# select * From electricvehicle;
licenseplate | plugtype
```

CF346E	J1772
DE310T	J1772
XNK656	J1772
7065GL	Mennekes
DPU597	Mennekes
MBG091	Mennekes
CAT62X	J1772

```
(7 rows)
```

```

postgres=# \d
              List of relations
 Schema |      Name       | Type  | Owner
-----+-----+-----+-----+
 public | accessibilityspots | table | asad
 public | accounts        | table | asad
 public | chargers        | table | asad
 public | electricspots   | table | asad
 public | electricvehicle | table | asad
 public | location         | table | asad
 public | manufacturer    | table | asad
 public | model            | table | asad
 public | parkingactivities| table | asad
 public | parkinglots      | table | asad
 public | parkingsessions  | table | asad
 public | parkingsessions_sessionid_seq | sequence | asad
 public | parkingspots     | table | asad
 public | permits           | table | asad
 public | permittype        | table | asad
 public | personaldetails   | table | asad
 public | tickets            | table | asad
 public | tickets_ticketnumber_seq | sequence | asad
 public | vehicle            | table | asad
 public | vehicleowner       | table | asad
(20 rows)

```

```
postgres=#
```

```

postgres=# SELECT * FROM location;
 postalcode | city | province
-----+-----+-----+
 V6T1Z4    | Vancouver | BC
 V6T1Z2    | Vancouver | BC
 V6T2A1    | Vancouver | BC
 V6T1Z3    | Vancouver | BC
 V6T1Z1    | Vancouver | BC
(5 rows)

```

```

postgres=# SELECT * FROM manufacturer;
 manufacturerid | name | address
-----+-----+-----+
 1 | Tesla Motors | 13101 Tesla Rd, Austin, TX 78725, USA
 2 | Volkswagen Group | Berliner Ring 2, 38440 Wolfsburg, Germany
 3 | Toyota Motor Corporation | Toyota-Cho, Toyota City, Aichi Prefecture 471-8571, Japan
 4 | Ford Motor Company | 1 American Road Dearborn, MI 48126 United States
 5 | BMW | Petuelring 130, Munich, Germany
(5 rows)

```

```

postgres=# SELECT * FROM model;
   modelname    | manufacturerid
-----+-----
 Model 3          | 1
 Model X          | 1
 Model Y          | 1
 Model S          | 1
Atlas           | 2
Taos            | 2
ID .4           | 2
Jetta           | 2
Prius Prime      | 3
GR86            | 3
Tundra           | 3
Sienna           | 3
Mustang          | 4
Shelby           | 4
Escape            | 4
F-150            | 4
iX               | 4
X3               | 4
8 Series Gran Coup|-
M5 Competition    | 4
(20 rows)

```

```

postgres=# SELECT * FROM parkingactivities;
 timestamp        | licenseplate | spotid | lotid | activitytype
-----+-----+-----+-----+-----+
2022-11-01 07:29:18-07 | CF346E       | 21     | 1     | in
2022-11-01 07:59:29-07 | CF346E       | 21     | 1     | out
2022-11-11 06:29:10-08 | CF346E       | 21     | 1     | in
2022-11-11 06:59:29-08 | CF346E       | 21     | 1     | out
2022-11-22 06:29:10-08 | CF346E       | 21     | 1     | in
2022-11-22 06:59:29-08 | CF346E       | 21     | 1     | out
2022-11-21 06:29:10-08 | CF346E       | 21     | 1     | in
2022-11-21 06:59:29-08 | CF346E       | 21     | 1     | out
2022-11-01 08:05:35-07 | CA762X       | 2      | 1     | in
2022-11-01 10:05:35-07 | CA762X       | 2      | 1     | removed
2022-11-05 08:05:35-07 | CA762X       | 2      | 1     | in
2022-11-05 10:05:35-07 | CA762X       | 2      | 1     | removed
2022-11-10 07:05:35-08 | CA762X       | 2      | 1     | in
2022-11-10 09:05:35-08 | CA762X       | 2      | 1     | removed
2022-11-22 07:05:35-08 | CA762X       | 2      | 1     | in
2022-11-22 09:05:35-08 | CA762X       | 2      | 1     | removed
2022-11-01 10:19:05-07 | DE310T       | 5      | 1     | in
2022-11-01 10:30:19-07 | DE310T       | 5      | 1     | out
2022-11-02 10:19:05-07 | DE310T       | 1      | 1     | in
2022-11-02 10:30:19-07 | DE310T       | 1      | 1     | out
2022-11-03 10:19:05-07 | DE310T       | 1      | 2     | in
2022-11-03 10:30:19-07 | DE310T       | 1      | 2     | out
2022-11-04 10:19:05-07 | DE310T       | 1      | 3     | in
2022-11-04 10:30:19-07 | DE310T       | 1      | 3     | out
2022-11-05 10:19:05-07 | DE310T       | 1      | 4     | in
2022-11-05 10:30:19-07 | DE310T       | 1      | 4     | out
2022-11-06 09:19:05-08 | DE310T       | 1      | 5     | in
2022-11-06 09:30:19-08 | DE310T       | 1      | 5     | out
2022-11-01 11:01:09-07 | XNK656       | 31     | 1     | in
2022-11-01 19:01:09-07 | XNK656       | 31     | 1     | removed
2022-11-04 11:01:09-07 | XNK656       | 31     | 1     | in
2022-11-04 19:01:09-07 | XNK656       | 31     | 1     | removed
2022-11-06 10:01:09-08 | XNK656       | 31     | 1     | in
2022-11-06 18:01:09-08 | XNK656       | 31     | 1     | removed
2022-11-01 16:30:03-07 | KD978P       | 46     | 1     | in
2022-11-01 16:48:40-07 | KD978P       | 46     | 1     | out
2022-11-02 06:59:48-07 | 896REN       | 16     | 2     | in
2022-11-02 07:59:48-07 | 896REN       | 16     | 2     | removed
2022-11-02 08:23:36-07 | 7065GL       | 9      | 2     | in
2022-11-02 08:48:01-07 | 7065GL       | 9      | 2     | out
2022-11-02 10:10:38-07 | GDM839       | 17     | 2     | in
2022-11-02 11:10:38-07 | GDM839       | 17     | 2     | removed
2022-11-02 13:31:07-07 | DPU597       | 10     | 2     | in
2022-11-02 14:31:07-07 | DPU597       | 10     | 2     | removed
2022-11-02 19:45:49-07 | 985HDE       | 48     | 2     | in
2022-11-02 20:30:28-07 | 985HDE       | 48     | 2     | out
2022-11-03 11:00:15-07 | DHR427       | 11     | 3     | in
2022-11-03 11:38:29-07 | DHR427       | 11     | 3     | out
2022-11-03 11:05:39-07 | 245AFC       | 8      | 3     | in
2022-11-03 12:05:39-07 | 245AFC       | 8      | 3     | removed
2022-11-03 11:06:08-07 | 144PKF       | 17     | 3     | in

```

2022-11-03 11:39:10-07	144PKF	17	3	out
2022-11-03 11:27:19-07	645RTM	6	3	in
2022-11-03 11:37:20-07	645RTM	6	3	out
2022-11-04 15:39:00-07	589WGN	31	5	in
2022-11-04 23:39:03-07	589WGN	31	5	removed
2022-11-04 17:18:49-07	CD7172	12	1	in
2022-11-04 19:18:49-07	CD7172	12	1	removed
2022-11-04 19:07:58-07	MBG091	10	2	in
2022-11-04 21:07:58-07	MBG091	10	2	removed
2022-11-05 12:05:28-07	229K BX	16	1	in
2022-11-05 12:27:01-07	VVF388	10	4	in
2022-11-05 13:00:49-07	BH909R	25	4	in
2022-11-06 12:00:49-08	BH909R	25	4	in
2022-11-07 12:00:49-08	BH909R	25	4	in
2022-11-08 12:00:49-08	BH909R	25	4	in
2022-11-09 12:00:49-08	BH909R	25	4	in
2022-11-05 13:05:28-07	229K BX	16	1	removed
2022-11-05 15:27:01-07	VVF388	10	4	removed
2022-11-05 14:00:49-07	BH909R	25	4	removed
2022-11-06 13:00:49-08	BH909R	25	4	removed
2022-11-07 13:00:49-08	BH909R	25	4	removed
2022-11-08 13:00:49-08	BH909R	25	4	removed
2022-11-09 13:00:49-08	BH909R	25	4	removed

(74 rows)

postgres=# select * from parkingsessions;							
sessionid	licenseplate	spotid	lotid	allottedtime	isactive	starttime	ischarging
1	CF346E	21	1	7200	f	2022-11-01 07:29:10-07	f
2	CF346E	21	1	7200	f	2022-11-11 06:29:10-08	f
3	CF346E	21	1	7200	f	2022-11-22 06:29:10-08	f
4	CF346E	21	1	7200	f	2022-11-21 06:29:10-08	f
5	CA762X	2	1	7200	f	2022-11-01 08:05:35-07	f
6	CA762X	2	1	7200	f	2022-11-05 08:05:35-07	f
7	CA762X	2	1	7200	f	2022-11-10 07:05:35-08	f
8	CA762X	2	1	7200	f	2022-11-22 07:05:35-08	f
9	DE310T	5	1	7200	f	2022-11-01 10:19:05-07	f
10	DE310T	1	1	3600	f	2022-11-02 10:19:05-07	f
11	DE310T	1	2	3600	f	2022-11-03 10:19:05-07	f
12	DE310T	1	3	3600	f	2022-11-04 10:19:05-07	f
13	DE310T	1	4	3600	f	2022-11-05 10:19:05-07	f
14	DE310T	1	5	3600	f	2022-11-06 09:19:05-08	f
15	XNK656	31	1	28800	f	2022-11-01 11:01:09-07	f
16	XNK656	31	1	28800	f	2022-11-04 11:01:09-07	f
17	XNK656	31	1	28800	f	2022-11-06 10:01:09-08	f
18	KD978P	46	1	3600	f	2022-11-01 16:30:03-07	f
19	896REN	16	2	3600	f	2022-11-02 06:59:48-07	f
20	706SGL	9	2	3600	f	2022-11-02 08:23:36-07	f
21	GDM839	17	2	3600	f	2022-11-02 10:10:38-07	f
22	DPU597	10	2	3600	f	2022-11-02 13:31:07-07	f
23	985HDE	48	2	10800	f	2022-11-02 19:45:49-07	f
24	DHR427	11	3	3600	f	2022-11-03 11:00:15-07	f
25	245AFC	8	3	3600	f	2022-11-03 11:05:39-07	f
26	144PKF	17	3	3600	f	2022-11-03 11:06:08-07	f
27	645RTM	6	3	3600	f	2022-11-03 11:27:19-07	f
28	589WGN	31	5	28800	f	2022-11-04 15:39:00-07	f

23		985HDE		48		2		10800		f		2022-11-02	19:45:49-07		f
24		DHR427		11		3		3600		f		2022-11-03	11:00:15-07		f
25		245AFC		8		3		3600		f		2022-11-03	11:05:39-07		f
26		144PKF		17		3		3600		f		2022-11-03	11:06:08-07		f
27		645RTM		6		3		3600		f		2022-11-03	11:27:19-07		f
28		589WGN		31		5		28800		f		2022-11-04	15:39:00-07		f
29		CD7172		12		1		7200		f		2022-11-04	17:18:49-07		f
30		MBG091		10		2		3600		f		2022-11-04	19:07:58-07		f
31		229KBX		16		1		3600		f		2022-11-05	12:05:28-07		f
32		VVF388		10		4		10800		f		2022-11-05	12:27:01-07		f
33		BH909R		25		4		3600		f		2022-11-05	13:00:49-07		f
34		BH909R		25		4		3600		f		2022-11-06	12:00:49-08		f
35		BH909R		25		4		3600		f		2022-11-07	12:00:49-08		f
36		BH909R		25		4		3600		f		2022-11-08	12:00:49-08		f
37		BH909R		25		4		3600		f		2022-11-09	12:00:49-08		f

(37 rows)

lotid		capacity		postalcode		heightlimit
1		50		V6T1Z4		
2		50		V6T1Z2		
3		25		V6T2A1		
4		25		V6T1Z3		
5		50		V6T1Z1		

(5 rows)

last_value		log_cnt		is_called
37		29		t

(1 row)

```
postgres=# select * from parkingspots;
spotid | lotid | availabletime | spottype | height
-----+-----+-----+-----+-----+
      1 |     1 |        7200 | normal   |
      2 |     1 |        7200 | normal   |
      3 |     1 |        7200 | normal   |
      4 |     1 |        7200 | normal   |
      5 |     1 |        7200 | normal   |
      6 |     1 |        7200 | normal   |
      7 |     1 |        7200 | normal   |
      8 |     1 |        7200 | normal   |
      9 |     1 |        7200 | normal   |
     10 |     1 |        7200 | normal   |
     11 |     1 |        7200 | normal   |
     12 |     1 |        7200 | normal   |
     13 |     1 |        3600 | normal   |
     14 |     1 |        3600 | normal   |
     15 |     1 |        3600 | normal   |
     16 |     1 |        3600 | normal   |
     17 |     1 |        1600 | normal   |
     18 |     1 |        3600 | normal   |
     19 |     1 |        3600 | normal   |
     20 |     1 |        7200 | normal   |
     21 |     1 |        7200 | vip      |
     22 |     1 |        7200 | vip      |
     23 |     1 |        7200 | vip      |
     24 |     1 |        3600 | vip      |
     25 |     1 |        3600 | vip      |
     26 |     1 |        7200 | vip      |
     27 |     1 |        7200 | vip      |
```

27	1	7200	vip
28	1	7200	vip
29	1	3600	vip
30	1	7200	vip
31	1	28800	company
32	1	28800	company
33	1	28800	company
34	1	28800	company
35	1	28800	company
36	1	28800	company
37	1	28800	company
38	1	28800	company
39	1	28800	company
40	1	28800	company
41	1	7200	reserved
42	1	1600	reserved
43	1	3600	reserved
44	1	3600	reserved
45	1	3600	reserved
46	1	3600	reserved
47	1	3600	reserved
48	1	3600	reserved
49	1	3600	reserved
50	1	3600	reserved
1	2	3600	normal
2	2	3600	normal
3	2	3600	normal
4	2	3600	normal
5	2	3600	normal
6	2	3600	normal

5	2	3600	normal
6	2	3600	normal
7	2	3600	normal
8	2	3600	normal
9	2	3600	normal
10	2	3600	normal
11	2	3600	normal
12	2	3600	normal
13	2	3600	normal
14	2	3600	normal
15	2	3600	normal
16	2	3600	normal
17	2	3600	normal
18	2	3600	normal
19	2	3600	normal
20	2	3600	normal
21	2	3600	reserved
22	2	3600	reserved
23	2	3600	reserved
24	2	10800	reserved
25	2	3600	reserved
26	2	3600	reserved
27	2	3600	reserved
28	2	3600	reserved
29	2	10800	reserved
30	2	3600	reserved
31	2	3600	reserved
32	2	3600	reserved
33	2	3600	reserved
34	2	10800	reserved

33	2	3600 reserved
34	2	10800 reserved
35	2	3600 reserved
36	2	3600 reserved
37	2	3600 reserved
38	2	3600 reserved
39	2	10800 reserved
40	2	3600 reserved
41	2	10800 vip
42	2	10800 vip
43	2	10800 vip
44	2	3600 vip
45	2	3600 vip
46	2	10800 vip
47	2	10800 vip
48	2	10800 vip
49	2	3600 vip
50	2	3600 vip
1	3	3600 normal
2	3	3600 normal
3	3	3600 normal
4	3	3600 normal
5	3	3600 normal
6	3	3600 normal
7	3	3600 normal
8	3	3600 normal
9	3	3600 normal
10	3	3600 normal
11	3	3600 reserved
12	3	3600 reserved

12	3	3600 reserved
13	3	3600 reserved
14	3	3600 reserved
15	3	3600 reserved
16	3	3600 vip
17	3	3600 vip
18	3	3600 vip
19	3	3600 vip
20	3	3600 vip
21	3	28800 company
22	3	28800 company
23	3	28800 company
24	3	28800 company
25	3	28800 company
1	4	3600 normal
2	4	3600 normal
3	4	3600 normal
4	4	3600 normal
5	4	10800 normal
6	4	3600 normal
7	4	3600 normal
8	4	3600 normal
9	4	3600 normal
10	4	10800 normal
11	4	3600 normal
12	4	3600 normal
13	4	3600 normal
14	4	3600 normal
15	4	10800 normal
16	4	3600 normal

17		4		3600		normal	
18		4		3600		normal	
19		4		3600		normal	
20		4		3600		normal	
21		4		3600		reserved	
22		4		3600		reserved	
23		4		3600		reserved	
24		4		3600		reserved	
25		4		3600		reserved	
1		5		7200		normal	
2		5		7200		normal	
3		5		7200		normal	
4		5		7200		normal	
5		5		7200		normal	
6		5		7200		normal	
7		5		7200		normal	
8		5		7200		normal	
9		5		7200		normal	
10		5		7200		normal	
11		5		3600		normal	
12		5		3600		normal	
13		5		3600		normal	
14		5		3600		normal	
15		5		10800		normal	
16		5		3600		normal	
17		5		3600		normal	
18		5		3600		normal	
19		5		3600		normal	
20		5		3600		normal	
21		5		3600		vip	

23	5	3600	vip	
24	5	3600	vip	
25	5	3600	vip	
26	5	3600	vip	
27	5	3600	vip	
28	5	3600	vip	
29	5	3600	vip	
30	5	7200	vip	
31	5	28800	company	
32	5	28800	company	
33	5	28800	company	
34	5	28800	company	
35	5	28800	company	
36	5	28800	company	
37	5	28800	company	
38	5	28800	company	
39	5	28800	company	
40	5	28800	company	
41	5	7200	reserved	
42	5	3600	reserved	
43	5	3600	reserved	
44	5	3600	reserved	
45	5	3600	reserved	
46	5	3600	reserved	
47	5	3600	reserved	
48	5	3600	reserved	
49	5	3600	reserved	
50	5	3600	reserved	

(200 rows)

```
postgres=# select * from permits;
licenseplate | permittype
-----+-----
CF346E      | vip
CF346E      | company
CF346E      | reserved
XNK656      | company
KD978P      | reserved
KD978P      | accessibility
896REN      | infant
896REN      | reserved
GDM839      | accessibility
GDM839      | vip
GDM839      | infant
GDM839      | company
985HDE      | vip
DHR427      | reserved
144PKF      | vip
144PKF      | accessibility
144PKF      | reserved
144PKF      | infant
144PKF      | company
645RTM      | accessibility
589WGN      | company
589WGN      | infant
CD7172      | infant
BH909R      | reserved
BH909R      | vip
(25 rows)
```

```
postgres=# select * from permittype
postgres-# ;
      title
-----
    vip
  company
reserved
  infant
accessibility
(5 rows)
```

```

postgres=# select * from personaldetails;
   ownerid | phononenumber | pronouns | gender | dob
-----+-----+-----+-----+-----+
      1 | 604-339-4819 | He/Him/His | Male   | 2004-08-20
      2 | 778-998-0756 | She/Her/Hers | Female | 1969-02-23
      3 | 604-684-1519 | They/Them/Theirs | Non-Binary | 1977-05-02
      4 | 604-418-1518 | He/Him/His | Male   | 1980-06-14
      5 | 604-707-3783 | She/Her/Hers | Female | 2001-02-07
      6 | 604-904-2212 | They/Them/Theirs | Other   | 1987-12-10
      7 | 604-837-2507 | She/Her/Hers | Female | 1973-11-15
      8 | 604-696-1931 | They/Them/Theirs | Non-Binary | 2003-06-22
      9 | 604-721-2960 | He/Him/His | Male   | 1992-01-11
     10 | 604-618-3150 | He/Him/His | Male   | 1978-05-25
     11 | 604-331-3096 | She/Her/Hers | Female | 1981-09-20
     12 | 604-677-5911 | He/Him/His | Male   | 1970-08-22
     13 | 604-319-3438 | She/Her/Hers | Female | 2000-12-25
     14 | 604-903-5346 | She/Her/Hers | Female | 1995-06-25
     15 | 604-341-9314 | She/Her/Hers | Female | 1976-04-21
     16 | 604-877-3085 | He/Him/His | Male   | 1979-09-10
     17 | 604-986-6573 | She/Her/Hers | Female | 1999-12-16
     18 | 604-329-9002 | He/Him/His | Male   | 1984-05-25
     19 | 604-923-1466 | He/Him/His | Male   | 1966-10-05
     20 | 604-696-4478 | They/Them/Theirs | Other   | 1994-11-27
(20 rows)

```

```

postgres=# select * from tickets_ticketnumber_seq;
 last_value | log_cnt | is_called
-----+-----+-----+
      20 |      13 | t
(1 row)

```

```
postgres=# select * from tickets;
   ticketnumber | cost | paid | details | sessionid
-----+-----+-----+-----+-----+
      1 |    50 | t    |        |      5
      2 |    50 | t    |        |      6
      3 |    50 | t    |        |      7
      4 |    50 | t    |        |      8
      5 |    50 | t    |        |     15
      6 |    50 | t    |        |     16
      7 |    50 | t    |        |     17
      8 |    50 | f    |        |     19
      9 |    50 | t    |        |     21
     10 |    50 | t    |        |     22
     11 |    50 | t    |        |     25
     12 |    50 | f    |        |     28
     13 |    50 | f    |        |     29
     14 |    50 | t    |        |     31
     15 |    50 | t    |        |     32
     16 |    50 | t    |        |     33
     17 |    50 | t    |        |     34
     18 |    50 | t    |        |     35
     19 |    50 | t    |        |     36
     20 |    50 | t    |        |     37
(20 rows)
```

```

postgres=# select * from vehicle;
licenseplate |      modelname      | ownerid | height | color
-----+-----+-----+-----+-----+
CF346E       | Model 3           |    1    | 1443  | FF0000
CF346B       | Model 3           |    2    | 1443  | FF0000
CF346C       | Model 3           |    3    | 1443  | FF0000
CA762X       | Model X            |    2    | 1684  | FFFFFF
DE310T       | Model Y            |    3    | 1624  | 000000
XNK656       | Model S            |    4    | 1445  | 0000FF
KD978P       | Atlas              |    5    | 1780  | 808080
896REN       | Taos               |    6    | 1654  | 00FF00
706SGL       | ID.4               |    7    | 1654  | COCOCO
GDM839       | Jetta              |    8    | 1471  | FF0000
DPU597       | Prius Prime         |    9    | 1473  | FFFFFF
985HDE       | GR86               |   10   | 1310  | 000000
DHR427       | Tundra              |   11   | 1984  | 0000FF
245AFC       | Sienna              |   12   | 1776  | 808080
144PKF       | Mustang             |   13   | 1394  | 00FF00
645RTM       | Shelby              |   14   | 1384  | COCOCO
589WGN       | Escape              |   15   | 1679  | FF0000
CD7172       | F-150               |   16   | 2026  | FFFFFF
MBG091       | iX                  |   17   | 1696  | 000000
229KBX       | X3                  |   18   | 1676  | 0000FF
VVF388       | 8 Series Gran Coupé |   19   | 1407  | 808080
BH909R       | M5 Competition       |   20   | 1473  | 00FF00
(22 rows)

```

ownerid	username	address	name
1	jim	1567 Hastings St, Vancouver BC V6C 1B4 Canada	Nash Krajcik
2	asad	4737 Cordova St, Vancouver BC V6B 1E1 Canada	Joannie Bernhard
3	richard	3622 Cardero St, Vancouver BC S4P 3Y2 Canada	Cristal Fung
4	cohelm	3002 Cordova St, Vancouver BC V6B 1E1 Canada	Duncan Ratke
5	flyjean	978 St George St, Vancouver BC V5T 1Z7 Canada	Alessandro Bernier
6	henrymb	122 Keith Road, North Vancouver BC V5T 2C1 Canada	Emmet Stone
7	kreater	3256 Robson St, Vancouver BC V6B 3K9 Canada	Lauriane Blick
8	mongodw	4421 Cardero St, Vancouver BC S4P 3Y2 Canada	Lia Kim
9	peritai	4770 Hastings St, Vancouver BC V6C 1B4 Canada	Olaf Bartell
10	quovati	3627 Hastings St, Vancouver BC V6C 1B4 Canada	Emmanuelle Nguyen
11	belloq	1814 Robson St, Vancouver BC V6B 3K9 Canada	Lorenza Heathcote
12	blesta	3155 Tolmie St, Vancouver BC V6A 4E6 Canada	Oswald Son
13	clemati	3922 Tanner St, Vancouver BC V5R 2T4 Canada	Linnie Lang
14	dayspice	2054 Keith Road, North Vancouver BC V5T 2C1 Canada	June Faye
15	instanton	3812 James St, Vancouver BC V5W 3C3 Canada	Vena Ullrich
16	ofbene	1144 St George Street, Vancouver BC V5T 1Z7 Canada	Green Wilkinson
17	prodigyle	4308 Keith Road, North Vancouver BC V5T 2C1 Canada	Daisha Prohaska
18	simonfreak	2797 James St, Vancouver BC V5W 3C3 Canada	Kenyatta Knight
19	monser	1574 Jade St, West Vancouver BC V7V 1Y8 Canada	Kory Brakus
20	prankia	3536 Cardero St, Vancouver BC S4P 3Y2 Canada	Mable Huel

(20 rows)

```
postgres=# SELECT * FROM accessibilityspots;
spotid | lotid | accessibilitytype
-----+-----+-----
    11  |    1  | infant
    12  |    1  | infant
    13  |    1  | accessibility
    14  |    1  | accessibility
    15  |    1  | accessibility
    16  |    2  | infant
    17  |    2  | accessibility
    18  |    2  | accessibility
    19  |    2  | accessibility
    22  |    2  | accessibility
       6  |    3  | accessibility
       7  |    3  | accessibility
       6  |    4  | accessibility
       7  |    4  | infant
    11  |    5  | infant
    12  |    5  | infant
    13  |    5  | accessibility
    14  |    5  | accessibility
    15  |    5  | accessibility
    16  |    5  | infant
    17  |    5  | accessibility
    18  |    5  | accessibility
    19  |    5  | accessibility
    22  |    5  | accessibility
(24 rows)
```

```

postgres=# SELECT * FROM accounts;
   username   |    password   |          email
-----+-----+-----+
      jim     |      jim     | nash_krajcik@gmail.com
      asad    |      asad    | joannie.bernhard69@hotmail.com
richard     |    richard   | cristal7@hotmail.com
cohelm     |    ruperost   | duncan.ratke95@gmail.com
flyjean    |    ateudotr   | alessandro.bernier@yahoo.com
henrymb    |    tionat    | emmet11@gmail.com
kreater    |    olemeter   | lauriane.blick@gmail.com
mongodw    |    lowere    | lia96@yahoo.com
peritai    |    nteo      | olaf_bartell95@yahoo.com
quovati    |    itidis    | emmanuelle10@hotmail.com
bellog     |    gthumpton  | lorenza.heathcote@yahoo.com
blesta     |    oclishunutc | oswald46@gmail.com
clemati    |    y5623vruhuu | linnie78@gmail.com
dayspice   |    u2n77jj2zf  | june40@yahoo.com
instanton  |    6t46yfdk8q76r | vena_ullrich82@hotmail.com
ofbene     |    578apple   | green.wilkinson@yahoo.com
prodigyle  |    titishy   | daisha_prohaska28@hotmail.com
simonfreak |    9r83yzb   | kenyatta1@hotmail.com
monser     |    twisomedynapa | kory_brakus@yahoo.com
prankia    |    fc5p2d856n | mable.huel13@gmail.com
(20 rows)

```

REQUIRED QUERY RESULTS

Insertion

```

postgres=# SELECT * FROM vehicle WHERE ownerid = 2;
 licenseplate | modelname | ownerid | height | color
-----+-----+-----+-----+
 CF346B | Model 3 | 2 | 1443 | FF0000
 CA762X | Model X | 2 | 1684 | FFFFFF
 NEWLIC | Atlas | 2 | 696 | 000000
(3 rows)

```

License	Height (mm)
<input type="text" value="Test"/>	<input type="text" value="696"/>
Model	Permits
<input type="text" value="iX"/>	<input checked="" type="checkbox"/> vip <input type="checkbox"/> company <input type="checkbox"/> reserved <input checked="" type="checkbox"/> infant <input type="checkbox"/> accessibility
Color	<input type="checkbox"/> Is your vehicle electric?
<input type="button" value="Red"/>	
<input type="button" value="Add"/>	

```
postgres=# SELECT * FROM vehicle WHERE ownerid = 2;
licenseplate | modelname | ownerid | height | color
-----+-----+-----+-----+
CF346B      | Model 3   |    2 | 1443 | FF0000
CA762X      | Model X   |    2 | 1684 | FFFFFF
NEWLIC       | Atlas     |    2 | 696  | 000000
Test         | iX        |    2 | 696  | ff0000
(4 rows)
```

Deletion

```
postgres=# SELECT * FROM electricvehicle WHERE licenseplate = 'CA762X';
licenseplate | plugtype
-----+-----
CA762X      | J1772
(1 row)

postgres=# SELECT * FROM vehicle WHERE licenseplate = 'CA762X';
licenseplate | modelname | ownerid | height | color
-----+-----+-----+-----+
CA762X      | Model X   |    2 | 1684 | FFFFFF
(1 row)
```

CA762X + ⌂ ⌁ ⌂ ⌂

Model X

- Height: 1684
- Color: #FFFFFF
- Electric: Yes
- Plug Type: J1772
- Permits: accessibility, company, infant, reserved

CF346B + ⌂ ⌁ ⌂ ⌂

Model 3

- Height: 1443
- Color: #FF0000
- Electric: No

NEWLIC + ⌂ ⌁ ⌂ ⌂

Atlas

- Height: 696
- Color: #000000
- Electric: No
- Permits: vip, accessibility, company, infant, reserved

[Add Vehicle](#)

```
postgres=# SELECT * FROM electricvehicle WHERE licenseplate = 'CA762X';
licenseplate | plugtype
-----+-----
(0 rows)
```

```
postgres=# SELECT * FROM vehicle WHERE licenseplate = 'CA762X';
licenseplate | modelname | ownerid | height | color
-----+-----+-----+-----+
(0 rows)
```

UPDATE

```

postgres=# select * from vehicleowner
postgres-# ;
   ownerid | username    | address                                | name
-----+-----+-----+-----+
      1 | jim        | 1567 Hastings St, Vancouver BC V6C 1B4 Canada | Nash Krajcik
      2 | asad       | 4737 Cordova St, Vancouver BC V6B 1E1 Canada | Joannie Bernhard
      3 | richard    | 3622 Cardero St, Vancouver BC S4P 3Y2 Canada | Cristal Fung
      4 | cohelm     | 3002 Cordova St, Vancouver BC V6B 1E1 Canada | Duncan Ratke
      5 | flyjean    | 978 St George St, Vancouver BC V5T 1Z7 Canada | Alessandro Bernier
      6 | henrymb    | 122 Keith Road, North Vancouver BC V5T 2C1 Canada | Emmet Stone
      7 | kreater    | 3256 Robson St, Vancouver BC V6B 3K9 Canada | Lauriane Blick
      8 | mongodw    | 4421 Cardero St, Vancouver BC S4P 3Y2 Canada | Lia Kim
      9 | peritai    | 4770 Hastings St, Vancouver BC V6C 1B4 Canada | Olaf Bartell
     10 | quovati   | 3627 Hastings St, Vancouver BC V6C 1B4 Canada | Emmanuelle Nguyen
     11 | bellog     | 1814 Robson St, Vancouver BC V6B 3K9 Canada | Lorenza Heathcote
     12 | blesta     | 3155 Tolmie St, Vancouver BC V6A 4E6 Canada | Oswald Son
     13 | clemati    | 3922 Tanner St, Vancouver BC V5R 2T4 Canada | Linnie Lang
     14 | dayspice   | 2054 Keith Road, North Vancouver BC V5T 2C1 Canada | June Faye
     15 | instanton  | 3812 James St, Vancouver BC V5W 3C3 Canada | Vena Ullrich
     16 | ofbene     | 1144 St George Street, Vancouver BC V5T 1Z7 Canada | Green Wilkinson
     17 | prodigyle  | 4308 Keith Road, North Vancouver BC V5T 2C1 Canada | Daisha Prohaska
     18 | simonfreak | 2797 James St, Vancouver BC V5W 3C3 Canada | Kenyatta Knight
     19 | monser     | 1574 Jade St, West Vancouver BC V7V 1Y8 Canada | Kory Brakus
     20 | prankia    | 3536 Cardero St, Vancouver BC S4P 3Y2 Canada | Mable Huel
(20 rows)

```

Height (mm)

✓

Model

✓ ▾

Permits

vip company reserved
 infant accessibility

Color

✓

Update

```
postgres=# SELECT * FROM vehicle WHERE ownerid = 2;
 licenseplate | modelname | ownerid | height | color
-----+-----+-----+-----+
 CF346B      | Model 3   |     2  | 1443  | FF0000
 CA762X      | Model X   |     2  | 1684  | FFFFFF
 NEWLIC       | Atlas     |     2  | 696   | 000000
 Test         | ID.4     |     2  | 100   | 059fff
(4 rows)
```

SELECTION

Allotted Time Charging used? Spot ID Spot Type

Vehicle	Session ID	Start Date	Start Time	Active	Received Ticket	Allotted Time (mins)	Parking Lot	Parking Lot Address	Spot Type	Accessibility Type	End Date
CA762X	8	2022-11-22	15:05:35.000Z	No	Yes	7200	1	V6T124 Vancouver, BC	normal	-	2022-11-22T17:05:35.000Z
CA762X	7	2022-11-10	15:05:35.000Z	No	Yes	7200	1	V6T124 Vancouver, BC	normal	-	2022-11-10T17:05:35.000Z
CA762X	6	2022-11-05	15:05:35.000Z	No	Yes	7200	1	V6T124 Vancouver, BC	normal	-	2022-11-05T17:05:35.000Z
CA762X	5	2022-11-01	15:05:35.000Z	No	Yes	7200	1	V6T124 Vancouver, BC	normal	-	2022-11-01T17:05:35.000Z

[Parking History](#) [Ticket History](#) [Summary](#)

Session ID Details Cost

Vehicle	Ticket Number	Date Received	Time Received	Paid?	Details
CA762X	1	2022-11-01	17:05:35.000Z	Yes	
CA762X	2	2022-11-05	17:05:35.000Z	Yes	
CA762X	3	2022-11-10	17:05:35.000Z	Yes	
CA762X	4	2022-11-22	17:05:35.000Z	Yes	

```

postgres=# SELECT
postgres-#   p.lotID AS parkingLotId, p.startTime,
postgres-#   p.isActive, p.sessionid,
postgres-#   CONCAT(l.postalCode, ',', l.city, ',', l.province) AS parkingLotAddress,
postgres-#   p.licensePlate AS vehicleLicensePlate, p.allottedTime, ps.spottype,
postgres-#   CASE
postgres-#     WHEN a.accessibilityType IS NOT NULL THEN a.accessibilityType
postgres-#   END AS accessibilityType,
postgres-#   CASE
postgres-#     WHEN a.accessibilityType IS NULL THEN FALSE
postgres-#     ELSE TRUE
postgres-#   END AS isAccessibilitySpot,
postgres-#   CASE
postgres-#     WHEN e.plugtype IS NULL THEN FALSE
postgres-#     ELSE TRUE
postgres-#   END AS isElectricSpot,
(SELECT MIN(pa.timestamp) FROM parkingactivities as pa WHERE pa.timestamp > p.starttime
  AND pa.licenseplate = p.licenseplate
  AND pa.lotid = p.lotid
  AND pa.spotid = p.spotid
  AND pa.activitytype IN ('removed', 'out')) as sessionend,
t.ticketnumber
FROM parkingSessions p
JOIN parkingSessions ps
  ON p.spotID = ps.spotID AND p.lotID = ps.lotID
JOIN parkingLots pl
  ON ps.lotID = pl.lotID
JOIN location l
  ON pl.postalCode = l.postalCode
JOIN vehicle v
  ON p.licensePlate = v.licensePlate
JOIN vehicleOwner vo
  ON v.ownerID = vo.ownerID
LEFT JOIN accessibilitySpots a
  ON p.spotID = a.spotID AND p.lotID = a.lotID
LEFT JOIN electricSpots e
  ON p.spotID = e.spotID AND p.lotID = e.lotID
LEFT JOIN tickets t
  ON t.sessionid = p.sessionid
WHERE vo.username = 'asad';
parkinglotid | starttime | inactive | parkinglotaddress | vehiclelicenseplate | allottedtime | spottype | accessibilitytype | isaccessibilityspot | iselectricspot | sessionend | ticketnumber
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
  1 | 2022-11-01 08:05:35-07 | f | 5 | V6T1Z4 Vancouver, BC | CA762X | 7200 | normal | | f
  | t | 2022-11-01 10:05:35-07 | | 1 |
  1 | 2022-11-05 08:05:35-07 | f | 6 | V6T1Z4 Vancouver, BC | CA762X | 7200 | normal | | f
  | t | 2022-11-05 10:05:35-07 | | 2 |
  1 | 2022-11-10 07:05:35-08 | f | 7 | V6T1Z4 Vancouver, BC | CA762X | 7200 | normal | | f
  | t | 2022-11-10 09:05:35-08 | | 3 |
  1 | 2022-11-22 07:05:35-08 | f | 8 | V6T1Z4 Vancouver, BC | CA762X | 7200 | normal | | f
  | t | 2022-11-22 09:05:35-08 | | 4 |
(4 rows)

```

```

postgres=# SELECT p.licensePlate,
postgres-#           p.startTime + (p.allottedTime / 3600 * interval '1 hour') AS dateReceived,
postgres-#           t.paid, t.details,
postgres-#           t.ticketnumber
postgres-#   FROM parkingSessions p
postgres-#   JOIN vehicle v
postgres-#     ON p.licensePlate = v.licensePlate
postgres-#   JOIN vehicleOwner vo
postgres-#     ON v.ownerID = vo.ownerID
postgres-#   JOIN tickets t
postgres-#     ON p.sessionID = t.sessionID
postgres-# WHERE vo.username = 'asad';
postgres-# licenseplate | datereceived | paid | details | ticketnumber
-----+-----+-----+-----+
CAT62X | 2022-11-01 10:05:35-07 | t    |          |      1
CAT62X | 2022-11-05 10:05:35-07 | t    |          |      2
CAT62X | 2022-11-10 09:05:35-08 | t    |          |      3
CAT62X | 2022-11-22 09:05:35-08 | t    |          |      4
(4 rows)

```

PROJECTION

PLM

Analytics History Vehicles jim ▾

Parking History Ticket History Summary

Postal Code City Province

Vehicle	Parking Lot ID	Postal Code	City	Province	Number of times parked
CF346E	1	V6T1Z4	Vancouver	BC	4

```

postgres=# SELECT
postgres-#   p.lotID AS parkinglotID,
postgres-#   p.licensePlate AS vehicleLicensePlate,
postgres-#   COUNT(DISTINCT p.sessionID) AS count
postgres-#   FROM parkingSessions p
postgres-#   JOIN parkingSpots ps
postgres-#     ON p.spotID = ps.spotID AND p.lotID = ps.lotID
postgres-#   JOIN parkingLots pl
postgres-#     ON ps.lotID = pl.lotID
postgres-#   JOIN location l
postgres-#     ON pl.postalCode = l.postalCode
postgres-#   JOIN vehicle v
postgres-#     ON p.licensePlate = v.licensePlate
postgres-#   JOIN vehicleOwner vo
postgres-#     ON v.ownerID = vo.ownerID
postgres-# WHERE vo.username = 'jim'
postgres-# GROUP BY p.licensePlate, p.lotID, l.postalCode;
postgres-# parkinglotid | vehiclelicenseplate | count
-----+-----+-----+
1    | CF346E          |      4
(1 row)

```

JOIN

localhost:3000/vehicle/CA762X/update

PLM Analytics History Vehicles asad ▾

Height (mm) Model
 ✓ ✓ ▾

Permits Color
 vip company reserved infant accessibility ✓

Plug Type
 ✓ ▾

```

postgres=# SELECT
postgres-#   v.licensePlate,
postgres-#   v.modelName AS model,
postgres-#   v.height,
postgres-#   v.color,
postgres-#   CASE
postgres-#     WHEN ev.plugType IS NOT NULL THEN ev.plugType
postgres-#   END AS plugType,
postgres-#   array_agg(p.permitType) AS permits,
postgres-#   CASE
postgres-#     WHEN ev.plugType IS NULL THEN FALSE
postgres-#     ELSE TRUE
postgres-#   END AS isElectric
postgres-# FROM vehicle v
postgres-# LEFT JOIN electricVehicle ev
postgres-#   ON v.licensePlate = ev.licensePlate
postgres-# LEFT JOIN permits p
postgres-#   ON v.licensePlate = p.licensePlate
postgres-# JOIN vehicleOwner vo
postgres-#   ON v.ownerID = vo.ownerID
postgres-# WHERE vo.username = 'asad'
postgres-# AND v.licensePlate = 'CA762X' GROUP BY v.licensePlate, ev.plugType LIMIT 1
postgres-# ;
      licenseplate |  model  | height | color  | plugtype | permits | iselectric
-----+-----+-----+-----+-----+-----+
  CA762X       | Model X | 1684  | FFFFFF | J1772    | {NULL}  | t
(1 row)

```

Aggregation With Group By

Overview

For last 60 days

Number of people parked at any parking lot: 20

Number of people parked at all parking lots: 1

- Name: Cristal Fung, Email: cristal7@hotmail.com

Number of people with over average (1.10) vehicles: 2

- Name: Joannie Bernhard, Vehicles: 2
- Name: Cristal Fung, Vehicles: 2

Parking Lot Stats

For last 60 days

V6T1Z2 Vancouver, BC

Average number of vehicle parked per day: 0.27

Users with 3+ tickets:

- Name: Joannie Bernhard, Email: joannie.bernhard69@hotmail.com, Tickets: 4

Users who parked 3+ times:

- Name: Joannie Bernhard, Email: joannie.bernhard69@hotmail.com, Times Parked: 4
- Name: Nash Krajcik, Email: nash_krajcik@gmail.com, Times Parked: 4

```
postgres=# SELECT vo.name, a.email, COUNT(DISTINCT t.ticketnumber) as num_tickets
postgres-#   FROM tickets as t
postgres-#   INNER JOIN parkingsessions as ps ON ps.sessionid = t.sessionid
postgres-#   INNER JOIN vehicle as v ON v.licenseplate = ps.licenseplate
postgres-#   INNER JOIN vehicleowner as vo ON vo.ownerid = v.ownerid
postgres-#   INNER JOIN accounts as a ON a.username = vo.username
postgres-#   WHERE ps.lotid = 1
postgres-#       AND ps.startTime > CURRENT_TIMESTAMP - INTERVAL '60 day'
postgres-#   GROUP BY a.username, vo.ownerid
postgres-#   HAVING COUNT(DISTINCT t.ticketnumber) > 3;
      name    |      email      | num_tickets
-----+-----+-----+
 Joannie Bernhard | joannie.bernhard69@hotmail.com |          4
(1 row)
```

Aggregation With Group By And Having

Overview

For last 60 days

Number of people parked at any parking lot: 20

Number of people parked at all parking lots: 1

- Name: Cristal Fung, Email: cristal7@hotmail.com

Number of people with over average (1.10) vehicles: 2

- Name: Joannie Bernhard, Vehicles: 2
- Name: Cristal Fung, Vehicles: 2

Parking Lot Stats

For last 60 days

V6T1Z2 Vancouver, BC

Average number of vehicle parked per day: 0.27

Users with 3+ tickets:

- Name: Joannie Bernhard, Email: joannie.bernhard69@hotmail.com, Tickets: 4

Users who parked 3+ times:

- Name: Joannie Bernhard, Email: joannie.bernhard69@hotmail.com, Times Parked: 4
- Name: Nash Krajcik, Email: nash_krajcik@gmail.com, Times Parked: 4



```
postgres=# SELECT vo.name, a.email, COUNT(*) as parked
postgres-#   FROM parkingactivities pa
postgres-#   INNER JOIN vehicle v ON v.licenseplate = pa.licenseplate
postgres-#   INNER JOIN vehicleowner vo ON vo.ownerid = v.ownerid
postgres-#   INNER JOIN accounts a ON a.username = vo.username
postgres-#   WHERE pa.timestamp > CURRENT_TIMESTAMP - INTERVAL '60 day'
postgres-#         AND pa.activitytype = 'in'
postgres-#         AND pa.lotid = 1
postgres-#   GROUP BY a.username, vo.ownerid
postgres-#   HAVING COUNT(*) > 3;
      name |           email           | parked
-----+-----+-----+
 Joannie Bernhard | joannie.bernhard69@hotmail.com |    4
 Nash Krajcik     | nash_krajcik@gmail.com     |    4
(2 rows)
```

Nested Aggregation

Overview

For last 60 days

Number of people parked at any parking lot: 20

Number of people parked at all parking lots: 1

- Name: Cristal Fung, Email: cristal7@hotmail.com

Number of people with over average (1.10) vehicles: 2

- Name: Joannie Bernhard, Vehicles: 2
- Name: Cristal Fung, Vehicles: 2



Parking Lot Stats

For last 60 days

V6T1Z2 Vancouver, BC

Average number of vehicle parked per day: 0.27

Users with 3+ tickets:

- Name: Joannie Bernhard, Email: joannie.bernhard69@hotmail.com, Tickets: 4

Users who parked 3+ times:

- Name: Joannie Bernhard, Email: joannie.bernhard69@hotmail.com, Times Parked: 4
- Name: Nash Krajcik, Email: nash_krajcik@gmail.com, Times Parked: 4

```
postgres=# SELECT COUNT(DISTINCT v.licenseplate), vo.name
postgres-#   FROM vehicleowner as vo
postgres-#     INNER JOIN vehicle as v ON vo.ownerid = v.ownerid
postgres-#   GROUP BY vo.ownerid
postgres-# HAVING COUNT(DISTINCT v.licenseplate) >
postgres-# (SELECT AVG(c)
postgres(#   FROM (SELECT COUNT(v2.licenseplate) as c
postgres(#     FROM vehicleowner as vo2
postgres(#       INNER JOIN vehicle as v2 ON vo2.ownerid = v2.ownerid
postgres(#         GROUP BY vo2.ownerid) AS ic
postgres(#      );
count | name
-----+
 2 | Joannie Bernhard
 2 | Cristal Fung
(2 rows)
```

Division

Overview

For last 60 days

Number of people parked at any parking lot: 20

Number of people parked at all parking lots: 1

- Name: Cristal Fung, Email: cristal7@hotmail.com



Number of people with over average (1.10) vehicles: 2

- Name: Joannie Bernhard, Vehicles: 2
- Name: Cristal Fung, Vehicles: 2

Parking Lot Stats

For last 60 days

V6T1Z2 Vancouver, BC

Average number of vehicle parked per day: 0.27

Users with 3+ tickets:

- Name: Joannie Bernhard, Email: joannie.bernhard69@hotmail.com, Tickets: 4

Users who parked 3+ times:

- Name: Joannie Bernhard, Email: joannie.bernhard69@hotmail.com, Times Parked: 4
- Name: Nash Krajcik, Email: nash_krajcik@gmail.com, Times Parked: 4

```

postgres=# SELECT vo.name, a.email
postgres-#   FROM parkingSessions ps0
postgres-#   JOIN vehicle v0 ON ps0.licensePlate = v0.licensePlate
postgres-#   JOIN vehicleowner vo ON vo.ownerid = v0.ownerid
postgres-#   JOIN accounts a ON a.username = vo.username
postgres-#   WHERE ps0.startTime > CURRENT_TIMESTAMP - INTERVAL '60 day'
postgres-#         AND NOT EXISTS
postgres-#             ((SELECT lotID
postgres-#                  FROM parkingSpots)
postgres-#             EXCEPT
postgres-#             (SELECT ps1.lotID
postgres-#                  FROM parkingSessions ps1
postgres-#                  JOIN vehicle v1 ON ps1.licensePlate = v1.licensePlate
postgres-#                  WHERE v1.ownerID = v0.ownerID))
postgres-#   GROUP BY vo.name, a.email;
      name    |      email
-----+-----
 Cristal Fung | cristal7@hotmail.com
(1 row)

```