Homework 2
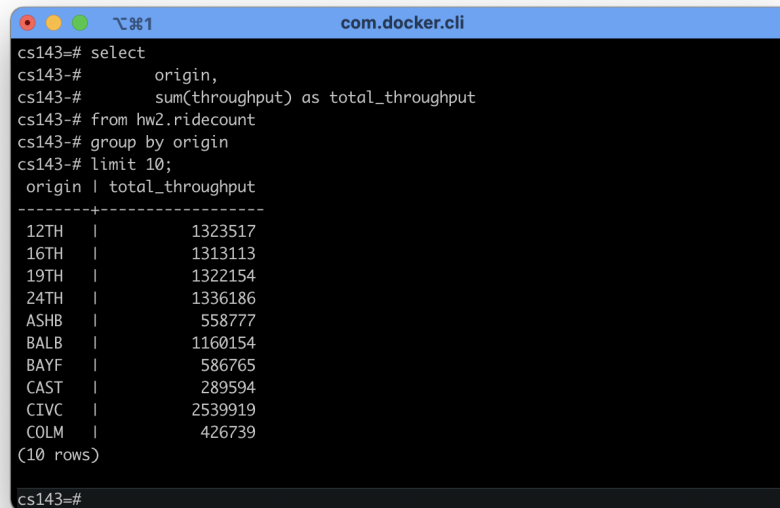
part 1

1a

```
select
        origin,
        sum(throughput) as total_throughput
from hw2.ridecount
group by origin
limit 10;
```


1b

```
select
        name,
        location,
        sum(hw2.ridecount.throughput) as total_throughput
from hw2.station
join hw2.ridecount
on ridecount.origin = station.abbreviation
group by name, location
having sum(hw2.ridecount.throughput) > 100000
limit 10;
```

```
cs143=# select
cs143-#        name,
cs143-#        location,
cs143-#        sum(hw2.ridecount.throughput) as total_throughput
cs143-# from hw2.station
cs143-# join hw2.ridecount
cs143-# on ridecount.origin = station.abbreviation
cs143-# group by name, location
cs143-# having sum(hw2.ridecount.throughput) > 100000
cs143-# limit 10;
                  name                  |   location     | total_throughput
----------------------------------------+----------------+------------------
 12th St. Oakland City Center (12TH) | Oakland        |          1323517
 16th St. Mission (16TH)             | San Francisco  |          1313113
 19th St. Oakland (19TH)             | Oakland        |          1322154
 24th St. Mission (24TH)             | San Francisco  |          1336186
 Ashby (ASHB)                        | Berkeley       |           558777
 Balboa Park (BALB)                  | San Francisco  |          1160154
 Bay Fair (BAYF)                     | San Leandro    |           586765
 Castro Valley (CAST)                | Castro Valley  |           289594
 Civic Center/UN Plaza (CIVC)        | San Francisco  |          2539919
 Coliseum/Oakland Airport (COLS)     | Oakland        |           684904
(10 rows)

cs143=#
```

1c

```
select
        o.location as location_origin,
        d.location as location_destination,
        sum(throughput) as total_rides
from hw2.ridecount r
join hw2.station o
on r.origin = o.abbreviation
join hw2.station d
on r.destination = d.abbreviation
group by location_origin, location_destination
order by total_rides desc
limit 10;
```

```
cs143=# select
cs143-#        o.location as location_origin,
cs143-#        d.location as location_destination,
cs143-#        sum(throughput) as total_rides
cs143-# from hw2.ridecount r
cs143-# join hw2.station o
cs143-# on r.origin = o.abbreviation
cs143-# join hw2.station d
cs143-# on r.destination = d.abbreviation
cs143-# group by location_origin, location_destination
cs143-# order by total_rides desc
cs143-# limit 10;
 location_origin | location_destination | total_rides
-----------------+----------------------+-------------
 San Francisco   | San Francisco        |     6406085
 San Francisco   | Oakland              |     3923381
 Oakland         | San Francisco        |     3835810
 San Francisco   | Berkeley             |     1113659
 Berkeley        | San Francisco        |     1059120
 San Francisco   | Walnut Creek         |      924245
 Walnut Creek    | San Francisco        |      919046
 Oakland         | Oakland              |      869137
 San Francisco   | El Cerrito           |      705177
 El Cerrito      | San Francisco        |      650115
(10 rows)

cs143=#
```

1d

```
select throughput, origin, destination, tstamp
from hw2.ridecount
where throughput = (select max(throughput) from hw2.ridecount);
```

```
cs143=# select throughput, origin, destination, tstamp
cs143-# from hw2.ridecount
cs143-# where throughput = (select max(throughput) from hw2.ridecount);
 throughput | origin | destination |        tstamp
------------+--------+-------------+---------------------
       1826 | 24TH   | CIVC        | 2017-01-21 16:00:00
(1 row)

cs143=#
```

part2

2a

$$\text{Origin, Destination, Hour}\ \gamma_{\text{avg(Throughput)}}\left(\sigma_{\text{Throughput}\neq 0}\left(\text{RideCountWeekday}\right)\right)$$

2b

```
select
        a.location as origin,
        b.location as destination,
        tstamp as date_hour
from hw2.ridecount
join hw2.station a
on hw2.ridecount.origin = a.abbreviation
join hw2.station b
on hw2.ridecount.destination = b.abbreviation
where a.location = 'San Francisco' and b.location = 'San Francisco'
```

$$\Pi_{\text{Origin, Destination, Date, Hour, Throughput}}\ \sigma_{\text{a.location = "San Franscisco" } \wedge \text{ b.location = "San Franscisco"}}$$

$$\left(\left(\left(\text{RideCount} \bowtie_{RideCount.origin=a.abbreviation} \rho_a(station)\right) \bowtie_{RideCount.destination=b.abbreviation} \rho_b(station)\right)\right)$$

part 3

```
create type flag as enum ('online', 'offline', 'lost/stolen');

create table scooter (
    scooter_id smallint not null, -- primary key not null
    status flag not null,
    primary key (scooter_id)
);

create table customer (
    user_id integer not null, -- primary key not null
    ccnum numeric(16),
    expdate timestamptz,
    email varchar(100) not null,
    primary key (user_id)
);

create table trip (
    trip_id integer not null, -- primary key not null
    user_id integer not null, -- foreign key not null
    scooter_id smallint not null, -- foreign key not null
    start_time timestamptz not null default current_timestamp,
    end_time timestamptz,
    pickup point not null,
    dropoff point,
    foreign key (user_id) references customer(user_id),
    foreign key (scooter_id) references scooter(scooter_id),
    primary key (trip_id)
);
```