1d, 1e and Part 2

(1d)

$$\Pi_{hour,\ \frac{trips}{100}}(\sigma_{(hour>=7\ \wedge\ hour<10)\ \vee\ (hour>=17\ \wedge\ hour<19)}(hourly\_ridership))$$

(1e)

$$\Pi_{Station,\ DateTime,\ Riders,\ Condition}(\sigma_{(Condition='sunny'\ \vee\ Condition='rainy')}(Occupancy \bowtie Weather))$$

(2a)

```
CREATE TYPE scooter_status AS ENUM('online','offline','lost/stolen')
CREATE TABLE Scooter(
    QR_Code integer NOT NULL,
    Status scooter_status NOT NULL,
    Location point NOT NULL,
    Home_Assignment circle,
    PRIMARY KEY (QR_code)
);

CREATE TABLE User(
    User_ID varchar(6) NOT NULL,
    Credit_Num varchar(16),
    Security_Code varchar(3) CHECK (NOT(Credit_Num NULL AND Security_Code
NULL)),
    Email varchar(30) NOT NULL
);
```

(2b)

```
CREATE TABLE trip(
    Trip_ID varchar  NOT NULL,
    In_Progress boolean,
    Distance numeric(4,2) NOT NULL CHECK (Distance >= 0),
    Activation_location point,
    Park_location point,
    Start_time timestamptz,
    End_time timestamptz,
    Duration interval NOT NULL CHECK (Interval >= 0)
    PRIMARY KEY (Trip_ID)
    FOREIGN KEY(QR_Code)
    FOREIGN KEY(User_ID)
);
```

(2c)

The advantage of inserting the row and modifying the row is that you bypass dealing with phone issues (if it dies or doesn't have service mid-

ride, what happens to your data?). However, caching data on the phone and then uploading to DB makes it so that your actual DB requires less modification. I would prefer to risk losing some user data (and in the case of issues, just lose that money) than the insert+modify b/c I would imagine the "cost" of perpetually modifying the DB would be greater.
Would you include the number of minutes the trip lasted in the Trip table? why or why not?
- Yes b/c you need that info to charge the user; although you can always EXTRACT the number of minutes (duration) from the records of start_time & end_time, you would need to perform this function for every single trip, so makes sense to store it as an attribute

What are the advantages/disadvantages of including charge to user in the Trip table?
- disadvantage: would need to store user ID as a foreign key, wasteful b/c can always compute from duration of trip
- advantage: wouldn't have to use a join trip & user tables in a query to figure out how much a user was charged for a given trip