Quiz 4, Fall 2019
CSCI 4380 DB Sys
Time: 20 minutes

Name 1: _____ **RIN:** _____
Name 2: _____ **RIN:** _____
Name 3: _____ **RIN:** _____

Rules.

- Open book and notes. Do not use any electronic tools including your computer.
- You can talk to anyone in class. If you know the answer, help someone else in class.
- Each quiz must be by at least two and at most three people by people in classroom right now. Put your name on one quiz only.
- Quiz ends on time. No late papers will be accepted. By putting your name above, you agree that you understand this and have contributed to this quiz personally.

Question (12+13 points). You are given the following data model for bird watchers and birds (keys are underlined):

`BirdWatchers(bwid, name, homestate, education, email, password)`
`Birds(birdname, scientificName, family, genus, ismigratory)`
`Habitat(birdname, state, howcommon)`
`Observations(oid, birdname, quantity, behavior, odate, otime, latitute, longitude, city, state, bwid, prev_oid)`

Birds have scientific names, family genus and the migratory status (`ismigratory` values are True/False). Birds habitats are `state`s that they are native in with a `howcommon` percentage value. Observations are by a bird watcher (`bwid`) and describe which bird was seen (`birdname`), where they were observed (`latitute, longitude, city, state`), when (`odate, otime`), in which `quantity` and the `behavior` of the birds (such as healthy, aggressive, indistress).

Write the following queries using SQL, using simplest possible expressions:

(a) Return name of birds with the highest number of observations in year `2019`, city `Troy` and state `NY`.

(b) For each birdwatcher, find the average time between two consecutive observations. Return id, name, homestate of each birdwatcher and the average time between two consecutive observations.

Note that the attribute `Observations.prev_oid` is the `oid` of the previous observation by the same watcher, which is NULL if there is no such previous observation. You can find the difference in time between two date and time values as follows: `(odate1+otime1) - (odate2+otime2)` This converts the attributes to a datetime attribute and find the time between them as an interval. In practice, you might need to type cast the result, but no need for it in the quiz.