

Quiz 1, Fall 2019
CSCI 4380 DB Sys
Time: 25 minutes

Name 1: _____ Signature: _____
Name 2: _____ Signature: _____
Name 3: _____ Signature: _____

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 signing your name above, you agree that you understand this and have contributed to this quiz personally. Unsigned quizzes will not be graded.

Question (Points: a-9 b-8 c-8). You are given the following data model for bird watchers describing the birds they saw for understanding the size of bird populations (adapted from Backyard Bird Database):

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

Keys are underlined. There are many **birdwatchers** (people who enter where they saw birds) and birds (identified by **birdname**). Birds have scientific names, family genus and the migratory status (**ismigratory** values are True/False). Birds have habitats, **state** that they are native in and **howcommon** they are for a specific state. Observations are by a bird watcher (**bwid**) and describe which bird was seen (**birdname**), where they were observed (**latitude**, **longitude**, **city**, **state**), when (**odate**, **otime**), in which **quantity** and the **behavior** of the birds (such as healthy, aggressive, indistress).

Answer the following questions:

- (a) For the following, circle one of yes/no based on the relations above and its keys, and write a short one line explanation:

Can a given bird be observed multiple times at the same date, time, latitude, longitude by two different bird watchers? YES-NO

Can a bird have two different habitats? YES-NO

Can a bird have two different ismigratory values ? YES-NO

(b) Write the following query using relational algebra:

Return the bird name of all birds that have been observed once, but never since 2018 (you can use `>` or `<` '1/1/2018').

(c) Write the following query using relational algebra:

Return the bird name and habitat states of all **migratory** birds with **genus** value **Buteo**. (Buteo is a hawk family including red tailed hawks).