CSE 132A **Homework# 1** **Winter 2023**

Due February 2, 11:59pm PST (see instructions below)

This is an **individual** *assignment.*

The usual criteria of academic integrity apply.

We will use the database schema from the SQL assignment (with the same constraints):

frequents	drinker	bar

serves	bar	beer	price

likes	drinker	beer

Consider the following queries (the second is Q6 from the SQL assignment):

1. List the drinkers who like every beer served at 'The Swan'. The answer should have one attribute *drinker*. Note that, if 'The Swan' does not serve any beer, then all drinkers should be in the answer.
2. Find the bars that serve every beer Joe likes at the lowest price. The answer should have a single attribute *bar*.

For queries (1) and (2) do the following:

(i) write the query in relational calculus using (at least one) universal quantification $\forall$

(ii) rewrite the query in (i) in using only existential quantification $\exists$

(iii) write the SQL query corresponding directly to the relational calculus query in (ii), that uses only NOT EXISTS tests on nested queries.

What and how to turn in

- Write or print each answer on a separate page (so you should have 6 pages total)
- Generate a pdf file with your assignment (if handwritten, scan and save in pdf).
- Upload the pdf file to Gradescope on Canvas.
- If you are tempted to typeset your homework in latex (like a real pro) you can use as a template the solutions to the practice problems on tuple calculus, posted in latex on Canvas.