CS 122A: Introduction to Data Management – Fall 2021

Homework 4: Relational Algebra (100 points)

Due Date: **Friday, October 29 (6:00 PM)**

Submission

All HW assignments should be submitted online, as a PDF file, through the associated homework (HW4 in this case) in **Gradescope**. See the table below for HW 4 submission opportunities. Note that after the last deadline, Saturday, October 30, no further HW 4 submissions will be accepted at all. We will not be able to accept assignments after that time because we will be publishing the solution at that time. Please turn in all of your work on time! If possible, save your one dropped assignment for the end of the term when you are most likely to want/need it.

Date / Time	**Grade Implications**
Friday, October 29 (6:00 PM)	Full credit will be possible
Saturday, October 30 (6:00PM)	10 points will be deducted

Submission note: please use the provided template to answer each question. In any case, please always start each new question at the beginning of a new page. Also, in Gradescope, mark your answer for each question so that grading will be easier.

Relational Algebra [100 pts]

Congratulations! SWOOSH has officially launched its business; the web site is up and running and starting to attract usage. As expected, your database design is working well so far! Now it's time to search and analyze the data using the Relational Algebra.

Schema, Data, and Tools

SWOOSH is currently using the relations from HW 2. You can refer to the provided solution to remind yourself of their schemas. You will also be able to see the relations' schemas in your browser when you're using the online relational algebra executor for this assignment. A small sample data set will be provided for you to use in testing your queries. More information about how to load the schema and associated sample data – and how to enter and run queries – can be found in the RelaX instructions linked from HW 4's entry on the course wiki page. You are required to use this online tool for this assignment.

For this HW, write the following queries in the relational algebra against the SWOOSH relations. Show both the parse tree and the actual result of each query that you wrote where requested to do so. We suggest that you write your relational algebra expressions on paper first before attempting to run them on the Relational Algebra Calculator site. Please note that you will not get ***any*** points for giving the result of a query on this assignment if your relational algebra expression is not syntactically correct. Since you have a "live" algebra interpreter at your disposal, this should not be an issue – you will be testing all of your queries that way.

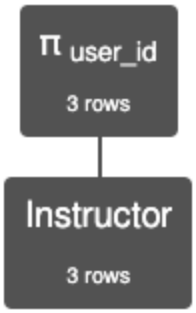
As an example, we have included a sample question and its answer below. Please note that we expect you to use the parse tree generated from the Relational Algebra Calculator site.

Sample Questions: Print the user_id of all instructors.

a) [6pts] Relational algebra

π user_id (Instructor)

b) [1pt] Parse Tree



c) [3pts] Result

Instructor.user_id
'1'
'8'
'9'

1. Find the course id of the course with the name ‘Programming’.
2. List the topics of the posts made by users whose last name was ‘Atkins’.
3. List the recording ids for recordings of meetings about the course ‘Advanced Math’.
4. Select the first and last name of students who attended a meeting with the meeting name ‘Programming17 ’.
5. List the user emails for users who made a post of type ‘note’ that received at least one thumbs up.
6. List the email of all students who attended a meeting about the course ‘Programming’ AND a meeting about the course ‘Advanced Math’.
7. List the user_id of students enrolled in courses that are taught by ***all*** instructors with title=’Professor’ or ‘Assistant Professor’.
8. List the post_id of all the posts about meetings hosted by an ‘Assistant Professor’.