

HOMework 3

Relational algebra is used to let us see what operations in the relational model look like and how we can navigate through data between different relations. It can also be used to identify different kinds of constraints that are useful for restricting database content.

Important notes:

- Only use operators from the course book (chapter 2.4 and 5.1-5.2).
- Splitting a long expression into several smaller using assignments is valid.

REQUIRED TASKS (P)

1. If you received feedback to change regarding homework 2, or if you simply want to make adjustments of your own accord, implement these changes, clearly state what has been modified, and explain the reason behind each change.
2. List all your normalised schemas from the previous homework so it is clear what the relational algebra is based on.
3. Write a relational algebra expression for each of the following statements using your own schemas. For each expression, write an explanation for what is happening in the expression.
 - a) A list of UserIDs of all the users who do not currently have a subscription.
 - b) A list of User IDs of all the users that have not attended an event.
 - c) A list of names of all users that have liked more than 5 posts.
 - d) A list of unique Codecs of all video posts that have been taken at the same place as the event with eventID = 1368.
 - e) A list of PostIDs of all the posts that have **both** Crypto **and** Studying as tags posted after the year 2023.

Grading Criteria:

- Is the feedback for homework 2, if such was given, implemented?
- Are all changes in task 1, if such were made, implemented correctly and explained?
- Are all the final schemas from homework 2 included in the list in task 2?
- Are all relational algebra expressions correct?
- Are the relational algebra expressions clear and readable, with detailed explanations?

NOTE: 1) Homework **MUST** be handed in via Canvas **only** and in the correct assignment folder, in one file representing the entire homework. 2) Your names, group number must be included in the document. 3) Take into consideration this **exercise is accumulative** and builds upon your solutions. 4) **All homeworks are based solely on the course case study.**

HOMework 3 P+ (Constraints)

Important requirement: To be able to pass the P+ assignment, the P assignment has to pass.

TASKS (P+):

1. Write a relational algebra expression for each of the following statements using your own schemas.

For each expression, write an explanation for what is happening in the expression.

- a. A list of UserIDs of all the users who have made at least 5 posts with 10 or more likes.
- b. A list containing the average number of likes on a post made by users with more than 50 friends compared to users with 50 friends or less.
- c. A list of PostIDs along with the percentage of likes originating from users who were subscribed when they liked the post.

2. Explain each of the following constraints and give at least 1 example for each from your database design.

- a. Referential integrity constraint
- b. Domain constraint
- c. Key constraint

Each example must be presented as a relational algebra expression which you must also explain and clarify.

Important notes:

For the example regarding domain constraints, you cannot use that attributes must be atomic or that each attribute only has one data type, since neither of these can be expressed as a relational algebra expression.

Grading Criteria:

- Are the explanations correct and thorough?
- Is at least 1 correct example given per constraint?
- Is each example correctly expressed as a relational algebra expression?
- Is each relational algebra expression explained with words?
- Is the relational algebra expression correct?

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