CPSC 471: Data Base Management Systems

Winter 2020

Assignment 02 (5%)

Due: March 13th (11:59 PM)

This assignment is to be completed individually

Objective

This assignment will help you strengthen your knowledge on relational algebra and tuple relational calculus languages.

Question 1 (8 marks)

Consider the following relations that contain information a conference management system. An author my submit a manuscript to a conference. Each manuscript is assigned a reviewer who submit a detailed review along with a score and recommendation to the conference board. A publication is accepted if it received an average score higher the 7 out of 10. The Contact attribute indicates who submitted the manuscript to the conference. The city columns indicate the city of residence of authors and reviewers.

AUTHOR(aEmail,fName,lName,bDate,city) **REVIEWER**(rEmail,phoneNumber,lName,fName,city)
PAPER(paperId,title,abstract,submissionDate) **AUTHOR_PAPER**(authorId,paperId,isContact)
PAPER_REVIEW(paperId,reviewerId,score ,reviewSubmissionDate,reviewInvitationDate)

Code the following queries using Relational Algebra:

1. Retrieve the names of reviewers who reviewed a paper with at least one of the authors do not live Calgary.
2. Retrieve publications with an average score of at least 7 and has the average review date less than 30 days.
3. Retrieve the names of authors who are older than 30 years and has more than three publications.
4. Retrieve the names of reviewers who never gave a score below 6 for any paper.
5. Retrieve the title and number of reviewers for each paper with more than 3 authors.
6. Retrieve the name of authors who acted as contact author for more than one paper between 30/2/2018 and 30/3/2019 inclusive.
7. Retrieve all reviewers with a phoneNumber starting with 403.
8. Retrieve papers reviewed by at least one reviewer from the same city as one of its authors.

Question 2 (7 marks)

Consider the following MAILORDER relational schema describing the data for a mail order company.

PARTS(pNo, pName, qOh, price, oLevel) **CUSTOMERS**(cNo, cName, street, zip, phone)

EMPLOYEES(eNo, eName, zip, hDate) **ZIP_CODES**(zip, city)

ORDERS(oNo, cNo, eNo, received, shipped) **ODETAILS**(oNo, pNo, qty)

qOh stands for quantity on hand: the other attribute names are self explanatory.

Code the following queries using Relational Algebra:

1. Retrieve the names of parts that cost at least $20.00.
2. Retrieve the names and cities of employees who have taken orders for parts costing at most $50.00.
3. Retrieve the pairs of customer number values of customers who live in the same ZIP Code.
4. Retrieve the names of customers who have ordered parts from employees living in Wichita.
5. Retrieve the names of customers who have ordered parts costing less than $20.00.
6. Retrieve the names of customers who have not placed an order.
7. Retrieve the names of customers who have placed exactly two orders and not yet received.

Question 3 (5 marks)

Consider the following relations that contain information about countries, cities, streets and houses. For each country, name, area and population are kept; and its neighbor countries are stored in Border. Note that if (Canada, USA) is in Border then that does not mean (USA, Canada) is in Border. You still have to check separately if (USA, Canada) is in Border or not. For each city, we keep city name, country name, area and population of the city. For each street, we keep street number, city name and length of the street. For each house we keep house number, number of rooms, owner name and street number.

Country (name, area, population) **Border** (countryName1, countryName2)

City (cityName, countryName, area, population) **Street** (stNo, cityName, length)

House (hNo, #rooms, stNo, ownerName)

Code the following queries using Tuple Relational Calculus:

1. Retrieve street number of the shortest street in each city in Canada?
2. Retrieve the names of people who own at least one house in each city in Canada?

3. Retrieve the names of people who has at most three houses outside USA and at least one inside the USA?
4. Retrieve the names of countries with at least one border with Germany?
5. Retrieve the names of people who own at most one house in each of the countries that border Spain?

Rubric

Relational algebra:

Relational algebra operations from the following categories must be used at least once:

- Unary Relational Operations
- Relational Algebra Operations from Set Theory
- Binary Relational Operations

Tuple relational calculus:

- An existential quantifier must be used in at least one query.
- A universal quantifier must be used in at least one query.

Submission:

Submit your assignment in PDF format to the drop box on D2L.

Late Submission Policy:

- 12.5% for each late day or portion of a day.
- Hence no submissions are accepted 8 days after the deadline.

Collaboration Policy:

- Assignment is to be done individually.
- Sharing of solutions is prohibited.
- Sharing includes looking at others' solution on paper and on the computer screen.
- Discussions with others can only be carried out at the concept level.
- Your submission must be your own original work. If unsure, always check with your instructor or TA.

Academic Misconduct:

- Violation of the collaboration policy may be considered academic misconduct.
- Any similarities between assignment submissions will be further investigated for potential academic misconduct.

D2L Marks:

Any marks posted on D2L or made available using any other mean are tentative and are subject to change (after posting). They can go UP or DOWN due to necessary corrections.