

Homework 3

Instructions

1. For question 1, please prepare your answers in a word processor.
2. For question 2, it would be preferable if you could use a word processor with an equation editor, but if that is too difficult, you may hand write your answers and scan them in. However, you must write **neatly** or you may receive a 0 if the TA cannot read your handwriting.
3. For questions 3-5 prepare your answers using either a word processor or by neatly sketching diagrams and then scanning them into a single digital document (e.g., scan them into a word processing document and then create a pdf file of the word processing document).
4. Please submit your answers as a single file. You should insert scanned pages into your word processing document.

Problems

1. 5.8 parts a, c, and f. As an illustration of the type of answer I want, here is an example answer for 5.8d:
This will produce a (left outer) join of Guest and those tuples of Booking with an end date (dateTo) greater than or equal to 1-Jan-2002. All guests who don't have a booking with such a date will still be included in the join. Essentially this will produce a relation containing all guests and show the details of any bookings they have beyond 1-Jan-2002.
2. 5.12, b-f.
 - a. Only generate the relational algebra and tuple relational calculus expressions.
 - b. Do not generate the domain relational calculus expressions.
 - c. You can use mysql's CURDATE() function and its between syntax for finding currently occupied rooms, although if you do so, subtract 1 from dateTo.
 - d. 5.12c should read "list the names and addresses of all guests" rather than the cities of all guests.
 - e. For the relational algebra query for 5.12.f you will need an outer join.
 - f. For the relational calculus query for 5.12.f, you will need two subqueries that are combined using the or operator. One of the subqueries will return all the rooms at the Grosvenor Hotel and the second subquery will return all the occupied rooms at the Grosvenor Hotel with the guest name. When the union occurs, the rooms with no guest from the first query will get their guest field filled in while the rooms with no current guest will continue to have an empty field. The first subquery will not involve guests and the second subquery will involve guests.
3. Provide the equivalent tuple relational calculus expressions for parts a, c, and f from exercise 5.8
4. 5.10. Question 5.10d should read:

- d) $\{H.\text{hotelName}, G.\text{guestName} \mid \text{Hotel}(H) \wedge \text{Guest}(G) \wedge (\exists B1)((\exists B2)(\text{Booking}(B1) \wedge \text{Booking}(B2) \wedge H.\text{hotelNo} = B1.\text{hotelNo} \wedge G.\text{guestNo} = B1.\text{guestNo} \wedge B2.\text{hotelNo} = B1.\text{hotelNo} \wedge B2.\text{guestNo} = B1.\text{guestNo} \wedge B2.\text{dateFrom} \neq B1.\text{dateFrom}))\}$
5. Provide the equivalent relational algebra expressions for each of the tuple relational calculus expressions given in exercise 5.10a and 5.10c