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CS 465

January 31st, 2020

Homework #3

1. a) This will produce a relation of hotel ID numbers (hotelNo) where the price for a room from the Room table is greater than 50 pounds. Essentially this produce a relation of hotelNo’s with a room price greater than 50 pounds.

c) This will produce a natural join of Hotel and Room with a price of a room being greater than 50 pounds. This will produce a relation containing all hotel names with a room price greater than 50 pounds.

f) This will produce a join of Booking and Guest and will essentially produce a relation containing the names of guests and hotel ID’s for all tuples of guests with hotels booked in London.

1. b. Relational Algebra:

Tuple Relational Calculus:

c. Relational Algebra:

Tuple Relational Calculus:

d. Relational Algebra:

Tuple Relational Calculus:

e. Relational Algebra:

Tuple Relational Calculus:

f. Relational Algebra:

Note to TA: ⟕ was the closest symbol to the textbooks LEFT OUTER JOIN as I could find.

Tuple Relational Calculus:

1. a. This would produce a relation containing all hotel names in the city of London.

b. This would produce a relation containing all hotel names with room prices greater than

50 pounds.

c. This would produce a relation containing all of the hotel names where guest John

Smith has stayed. This would essentially return all hotel names where guest John

Smith has had bookings.

d. This would produce a relation containing the hotel name and guest name where there

exist two bookings for the guest at the same hotel.

* 1. Main Entity Types:
     1. Instructor
     2. Trainee
     3. Advanced Technology Course
     4. Training Session
     5. Course Development
     6. Teaching Team

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Relationship Types and Multiplicity** | | | | |
| **LHS Multiplicity** | **LHS Entity** | **Relationship** | **RHS Entity** | **RHS Multiplicity** |
| 1..\* | Trainee | Attends | Training Session | 1..\* |
| 1..1 | Instructor | Put On | Teaching Team | 0..2 |
| 1..1 | Instructor | Assigned | Course Development | 0..\* |
| 1..1 | Advanced Course | Offers | Training Session | 1..\* |
| 1..1 | Teaching Team | Teaches | Advanced Course | 1..\* |

* 1. (Made on draw.io)

A picture containing screenshot

Description automatically generated

* 1. (Made on draw.io)

A screenshot of a cell phone

Description automatically generated

* 1. **Red denotes primary keys**
     1. Branch (branchNo, address, phoneNumber, manager)
     2. Staff (staffNo, name, position, salary)
        + Name contains first name and last name
     3. VideoTitle (catalogNo, title, category, dailyRentFee, purchaseCost, actorNames, directorName)
     4. VideoRental (videoNum, category, rentalStatus, catalogNo, title, dailyRentFee, purhcaseCost, actorNames, directorName)
     5. Member (memberNo, firstName, lastName, address, registrationDate, branchRegistered)
     6. Registration (memberNo, branchNo)
     7. RentalAgreement(rentalNo, firstName, lastName, memberNo, videoTitle, dailyRental, dateFrom, dateTo)
  2. Primary Keys:
     1. Branch Entity
        + Primary Key: branchNo
        + Candidate Key: branchNo, address
     2. Staff Entity
        + Primary Key: staffNo
        + Candidate Key: staffNo, name
     3. VideoTitle
        + Primary Key: catalogNo
        + Candidate Key: catalogNo, {title, category}
     4. VideoRental
        + Primary Key: videoNum
        + Candidate Key: videoNum, {catalogNo, title}
     5. Member
        + Primary Key: memberNo
        + Candidate Key: memberNo, {firstName, lastName}
     6. Registration
        + Primary Key: None, this is a weak entity type.
        + Candidate Key {memberNo, branchNo}
     7. RentalAgreement
        + Primary Key: rentalNo
        + Candidate Key: rentalNo, {firstName, lastName, memberNo}