CSCI 6333/6315 Database Systems

Spring 2020

ASSIGNMENT 2: Formal Relational Query Languages

All answers shall be typed using a word processor and some drawing utilities. A cover page shall be prepared with course title, homework number, submitted date and time, and contact info including your email address.

Due: Midnight, Tuesday, February 25, 2020

1. (120) Consider the employee database of Fig. 1, where the primary keys are underlined. For each of the following questions, give (1) a relational algebra expression, (2) a tuple relational calculus expression, and (3) a domain relational calculus expression. Note that each problem has 15 points with 5 points for each of the three required expressions.

    a. Find the names of all employees who work for First Bank Corporation.
    b. Find the names and cities of residence of all employees who work for First Bank Corporation.
    c. Find the names, street addresses, and cities of residence of all employees who work for First Bank Corporation and earn more than $10,000.
    d. Find all employees in the database who live in the same cities as the companies for which they work.
    e. Find all employees in the database who live in the same cities and on the same streets as do their managers.
    f. Find all employees in the database who do not work for the First Bank Corporation.
    g. Find all employees in the database who earn more than each employee of Small Bank Corporation.
    h. Assume that the companies may be located in several cities. Find all companies located in every city in which Small Bank Corporation is located.

employee(<u>employee-id</u>, employee-name, street, city)
works(<u>employee-id</u>, company-id, salary)
company(<u>company-id</u>, company-name, city)
manages(<u>employee-id</u>, manager-id)

Figure 1. Employee database

Note: For each tuple of the *manages* relation, the manager-id is the manager's employee id.