CS304 Database System Concepts

Assignment 2

Due: February 28, 2012
(Please submit hard copies to class or to Zheng on due date.)

Name: Matric No:

Q1. (2 points)Consider the employee database of Figure 1, where the primary keys are underlined. Give an expression in SQL for each of the following queries.

employee(employee_name,street,city)
works(employee_name,company_name,salary)
company(company_name,city)
manages(employee_name,manager_name)

Figure 1

a. Find the names and cities of residence of all employees who work for First Bank Corporation.
b. Find the names, street addresses, and cities of residence of all employees who work for First Bank Corporation and earn more than $10,000.
c. Find the company that has the most employees.
d. Find those companies whose employees earn a higher salary, on average, than the average salary at First Bank Corporation.

Q2. (2 points) Let R = (A, B, C), and let r_1 and r_2 both be relations on schema R. Give an expression in SQL that is equivalent to each of the following queries:

a. $r_1 \cup r_2$

b. $r_1 \cap r_2$

c. $r_1 - r_2$

d. $\prod_{AB}(r_1) \bowtie \prod_{BC}(r_2)$

Q3. (2 points)Consider the relational database of Figure 1. Using SQL, define a view consisting of manager_name and the average salary of all employees who work for that manager. Explain why the database system should not allow updates to be expressed in terms of this view.

Q4. (2 points)Consider the relational schema

student(student_id,student_nam)

registered(student_id,course_id)

Write an SQL query to list the student-id and name of each student along with the total number of courses that the student is registered for. Students who are not registered for any course must also be listed, with the number of registered courses shown as 0.

Q5. (2 points)Suppose that we have a relation *marks*(student_id,score). Write an SQL query to find the dense rank of each student. That is, all students with the top mark get a rank of 1, those with then next highest mark get a rank of 2, and so on. Hint: Split the task into parts, using the **with** clause.