

CS 351 DATA ORGANIZATION AND MANAGEMENT HOMEWORK V

Date Given : December 18, 2009

Date Due : December 29, 2009

Important Notes: 1. Please submit the Homework to Room EA 231 on the due date by 5:00 pm (no late submission will be accepted). 2. Answer the following 4 question in the order they are given using a standard size paper. 3. Handwritten submissions are accepted, a word document is preferred. 4. Staple all papers and write your name on them.

1. Consider the Entity Sets representing Climbers and Mountains

CLIMBERS (SSN, CNAME, NATIONALITY)

MOUNTAINS (MNAME, ALTITUDE, COUNTRY)

Climbers climb Mountains and Mountains are climbed by climbers.

Model the following situations by E/R (ER) Diagrams. Introduce a Relationship Set called CLIMBED and additional Relationship Set(s) as needed in answering the following:

- a. A CLIMBER may climb any number of mountains (but at most once each) at a particular date and a MOUNTAIN maybe climbed by zero or more climbers.
- b. A CLIMBER may climb any number of mountains any number of times (on different dates) and a MOUNTAIN may be climbed by zero or more climbers.
- c. Same as in Part (a), but there can be no mountains not climbed by a climber.
- d. As in Part (a), but we also wish to record the number of times a climber climbed to each mountain.
- e. As in part (a), but we also wish to record not just one NATIONALITY, but more than one nationality for climbers.

Show all details in your diagrams: Entity Sets, Attitibutes, Keys, Relationship Sets, Key Constraints, Participation Constraints, etc.

2. Question 2.6 in the textbook.

3. Consider the database below:
Employee (employee-name, street, city)
Works (employee-name, company-name, salary)
Company (company-name, city)
Manages (employee-name, manager-name)

Construct a complete E/R Diagram where all details are specified.
State any assumptions you make.

4. Write Relational Algebra Expressions for the following queries using the database in Q3. above:
- a. Find the names of all employees who work for Microsoft.
 - b. Find the names and cities of residence of all employees who work for Microsoft.
 - c. Find the names, street address and cities of residence of all employees who work for Microsoft and earn more than \$10000.
 - d. Find the pairs of employees (their names) who work for the same company.
 - e. Find the names of all employees in this database who live in the same city as the company for which they work.
 - f. Find the names of all employees who live in the same city and on the same street as do their managers. (There are some more items on p. 2.)

- g. Find the names of all employees in this database who do not work for First Bank Corporation.
- h. Find the names of all employees in this database who earn more than every employee of Small Bank Corporation.
- i. Assume the companies may be located in several cities. Find all companies located in every city in which Small Bank Corporation is located.
- j. Find the employees who are managers in Microsoft.