**CIS 717.1 Midterm Exam**

You get 1/5th of the points if you leave an answer blank. You don't get points for a totally wrong answer. You might get partial credit for a partially correct answer.

1. (10 points) List six major steps that you would take in setting up a database for a particular enterprise.

2. (10 points) Construct an E-R diagram for a car-insurance company that has a set of customers, each of whom owns one or more cars. Each car has associated with it zero more accidents. Document all assumptions that you make about the mapping constraints. Tip: Take some time to think about it.

3. (10 points) Repeat previous question only using UML.

4. (10 points) List "objects" and "events" in your design (from above questions). Write `CREATE TABLE` statements for each.

5. (20 points) For the following, use:

   ```
   employee(employee-name, street, city)
   works(employee-name, company-name, salary)
   company(company-name, city)
   manages(employee-name, manager-name)
   ```

   (a) Find 'John Doe's Manager's Name.

   (b) Find all employees in the database who live in the same cities and on the same streets as do their managers.

   (c) Find all employees who earn more than the average salary of all employees in their company.

   (d) Find the comapny that has the smallest payroll.

   (e) Find those companies whose employees earn a higher salary, on average, than the average salary at First Bank Corporation.

6. (10 points) Use the same schema as in previous question.

   (a) Using relational algebra, Find 'John Doe's Manager's Name.

   (b) Using relational algebra: Find all employees in the database who live in the same cities and on the same streets as do their managers.

7. (20 points) For the following, use:

| *branch-name* | *loan-number* | *amount* |
|---|---|---|
| Downtown | L-170 | 3000 |
| Redwood | L-230 | 4000 |
| Rerryridge | L-260 | 1700 |

loan

| *customer-name* | *loan-number* |
|---|---|
| Jones | L-170 |
| Smith | L-230 |
| Hayes | L-155 |

borrower

(a) Show result of "loan inner join borrower".

(b) Show result of "loan left outer join borrower".

(c) Show "loan natural inner join borrower".

(d) Show "loan natural right outer join".

(e) Show "loan full outer join borrower using (loan-number)".

8. (10 points) Design a database to maintain student homeworks. Basically the website where you submit homeworks has a database—how would you design such a database? Keep in mind that students can be taking many classes, and submitting many homeworks. The system should also maintain the grades, etc. As an answer to this question, draw a UML diagram of the most appropriate schema for this situation.

Good luck!