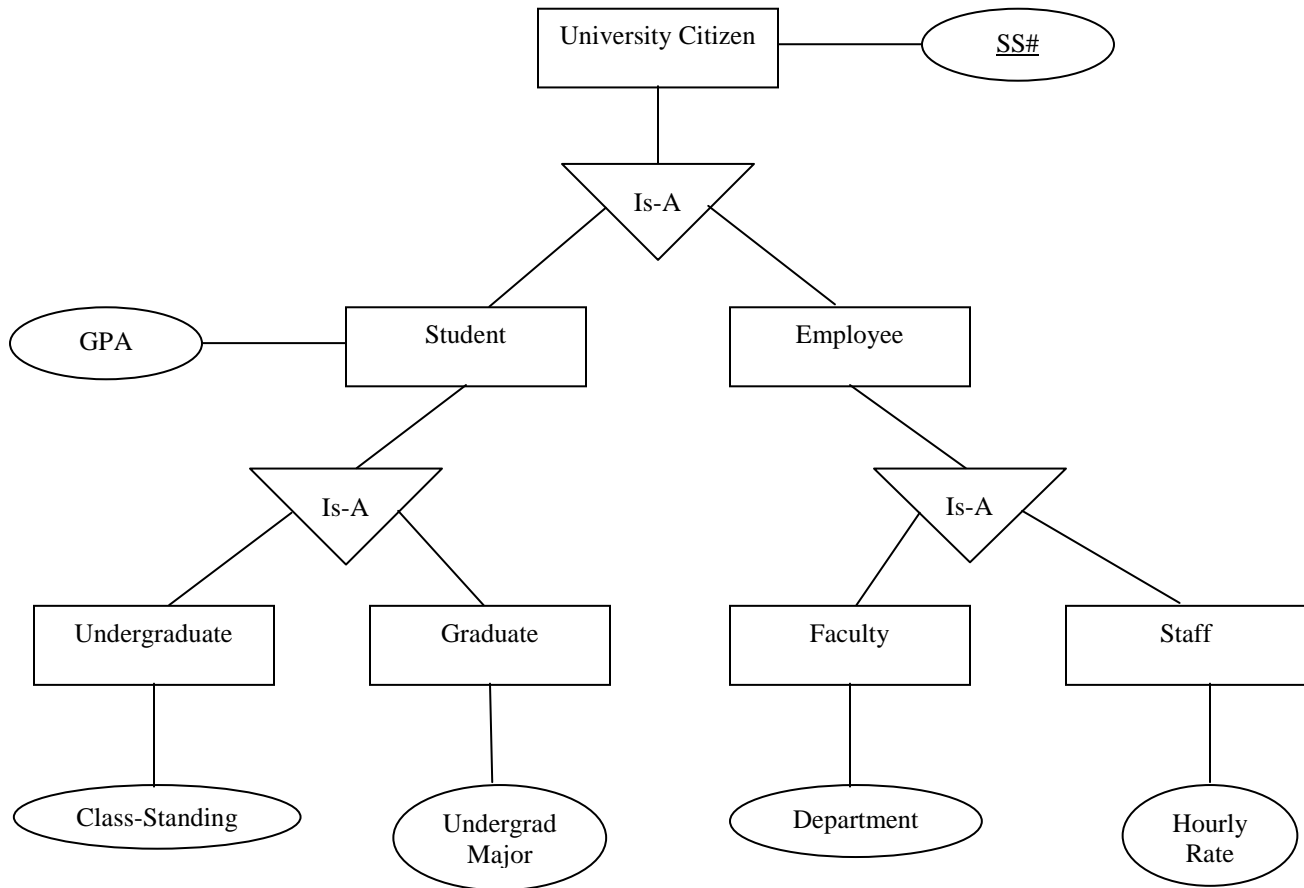


**Comprehensive Exam
Databases
Spring 2004**

1) (25 points) Consider the following ER diagram.



(a) Give a collection of one or more relational schemes, i.e., tables, for the above ER diagram. For each relational scheme be sure to specify which attributes form the primary key. Note that you may assume all attributes are strings.

(b) For each of the relational schemes given in part (a), specify the *highest* normal form satisfied by the scheme (from among 1NF, 2NF, 3NF and BCNF).

2) (25 points)

a) Define the term *transaction*.

b) Describe one example of a transaction.

c) Explain why transactions are important.

d) Is there any special SQL syntax for specifying transactions (yes or no)? If so, then describe the syntax.

3) (25 points)

a) Define first normal form (1NF).

b) Define second normal form (2NF).

c) Define third normal form (3NF).

d) Define BCNF.

4) (25 points) Consider the following collection of relation schemes.

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

Note that an employee can work for more than one company in the above scheme. Give an SQL statement for each of the following.

(a) A list of employee names and, for each employee, a count of the number of companies that they work for, and a total income (i.e., the sum of the salaries that the employee makes at all the companies they work for). Note that the list should only include employees whose total income is more than 50000.

(b) A list of employee names for those employees who live in the same city as a company for which they work. Note that no name should appear more than once in the result.

(c) A list of employee names for those employees who either live in Orlando, work for Oracle, or have Mary Brown as a manager.