**CSCI 4333 Database Design and Implementation**

**Project Stage 1: Database Design**

Instructor: Dr. Xiang Lian

Due Date: See the course Web page

**Description**

The first stage of the Project consists of the following tasks:

1. Collect and analyze data management requirements of an organization of your choice (make sure you have sufficient domain knowledge). You cannot select a university, car dealership, or banking enterprise, since they are covered in the textbook and in class. Sample organizations include an airport, grocery store, car dealership, restaurant business, hotel business, software development company, health care organization, etc. Provide the description of your organization and its operations. Below is a sample description for a typical banking enterprise.

*A bank normally has many branches, and customers can open accounts at any of these branches. It is normal for more than one customer to have the same account and for one customer to have multiple accounts. Each customer must have at least one account and each account must have at least one holder. The bank offers four types of accounts: (1) checking, (2) savings, (3) credit, and (4) retirement. The bank issues a debit/credit card for each customer with a checking/credit account. Each retirement account has a financial advisor who can manage multiple retirement accounts. The bank records all the transactions for each account, including deposits, withdrawals, payments, balance transfers, late fee and financial charges, etc. Some additional requirements and information may include primary and secondary holders for an account, online banking, mutual funds for retirement accounts, interest rates, etc.*

You should provide similar description of your organization based on your analysis.

2. Design an ER diagram that captures the information about your organization and its operations. The diagram should contain at least 10 entity/relationship types. Show attributes (and non-trivial roles, when appropriate) for each entity/relationship type. Make sure that your ER model captures the requirements described in the previous task.

3. Indicate any key, participation, and cardinality constraints on the diagram.

4. Document all the data integrity constraints and non-trivial decisions you make while modeling your organization.

*For example, for the banking enterprise, one can choose a SSN to be a primary key of entity type CUSTOMER. Such a decision, although seems simple and natural, has some serious consequences: the bank will not be able to serve clients who have no SSNs, which may not always be true in real life. You should be able to recognize and document this and similar decisions for your design and state appropriate assumptions. An example integrity constraint may state that a customer cannot open a credit account if she/he does not have a savings account with the bank. This constraint will not appear on the diagram and will require a trigger to be implemented later in the project.*

5. Translate your final ER diagram to the relational model.

*For example, for the banking enterprise, the design may result in the following relations:*

CUSTOMER(SSN, Name, DOB, Address, Phone, …)

TRANSACTION(…)

etc.

**Submission**

Please form a team of at most 3 students, and write the report of this project (Part 1) about the roles of different students in designing the databases.

Please submit an electronic copy of your project solution (including student IDs and names in your team) to the teaching assistant.

**Grading**

Tasks 1, 2, 3, 4, and 5 receive 20 points each (100 total, if solved correctly).

If all tasks are accomplished without major errors or the design report is impressive, you can get **20 extra points**.