CS3431
C-Term, 2013
Homework 1: Entity-Relationship Model

Post Date: Jan. 14, 2013 (11:00AM).
Due Date: Jan. 21, 2013 (11:00 AM).

General Instructions

- The homework is to be done individually.
- In your ERD design, clearly indicate the keys and the cardinalities of the relationships.
- Any assumptions you make, which are not stated in the problem definition, need to written explicitly. The assumptions you add must be "***in addition***" to the specified requirements in the problem definition without deleting any of these requirements.
- Indicate if there is any information (constraints or other concepts) listed in the description that cannot be modeled by the ER model.

Problem 1 (Book publisher Database) [30 Points]

Design an ER diagram for a ***book publisher company*** that represents books, authors, publishers, and their relationships. Your design should reflect the following requirements:

- Each publisher can publish multiple books, but each book is associated with only one publisher.
- Each author can write multiple books, and each book can be written by at least one author.
- An author can sign contracts with multiple publishers, and each publisher is dealing with many authors. The contract between an author and a publisher contains some terms such as the number of books the author needs to provide, and the total payment from the publisher to the author. Moreover, the contract has many lines, each line states for each book to be written, the due date for this book, the book type, and the payment to be paid by the publisher to the author for this book.
- Books are further classified into two categories: novels and textbooks. Each novel has sequel number, and each textbook has an edition number. Books of other types are also allowed but no additional information is kept for them.
- The minimum properties for authors are: ID (unique for all authors), name, address, DoB, multiple phone numbers. The minimum properties for publishers are: name (unique for all publishers), address, start year, phone number. The minimum properties for a book are: ISBN (unique for all books), title, publishing date, number of pages, price, and language.

Problem 2 (Bank Database) [30 Points]

Design an ER diagram for ***Bank database*** that should reflect the following requirements:

- Each bank has a unique ID, name, and headquarter address. Each bank has many branches, and for each branch we need to keep the branch ID (unique within the bank but not unique across different banks), location, and telephone number.
- Customers can have many accounts at the same branch or at different branches. An account has a unique account ID, type (E.g., saving, or checking), currency (E.g., dollar, euro), and balance.
- A customer can take many loans from different branches, however there are a restriction that a customer cannot take more than one loan from a given branch in the same year. For each loan we need to keep the loan amount and the year.
- Each customer has a SSN (unique ID), name, address, and DoB properties.
- We need to capture the transactions done by each customer over each account. We capture whether the transaction is *withdrawal* or *deposit*, the transaction time, and the amount.

- If we want to add the requirement that a customer cannot open more than one account with the same currency and type in a single branch. Can this requirement by captured by ERD? If so, show how.

Grading:
The maximum grade is 60 Points. Late submissions follow the rules stated on the website.

Deliverables:
Each student should deliver a report containing the required solution. You may use tools like (MS word, or power point) to draw the ERD.

Submission:
Submit a hardcopy in the beginning of the class (11:00AM), or submit electronically via blackboard.wpi.edu website.