

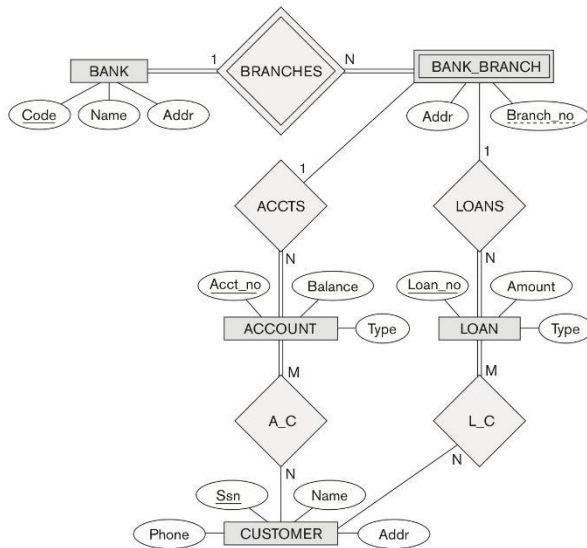
Project 2
CMP 420 & CMP 758 - Database Systems
Fall 2022
Total points: 110

Due Date: **Wednesday November 02 2022 by 11:59 pm**

Submission Details and Instructions

- No late submission will be accepted and **no emailed work will be accepted.**
- All work must be submitted on Blackboard in a PDF or Microsoft Word Document.
- You must do this work on your own.
- This work contains 10 points of extra credit.
- **Undergraduate (U) students, please answer questions 1 through 4. Graduate (G) students, please answer all questions.**

1. **(U: 20 points) (G: 15 points)** Map the following ER diagram for a Bank database into a relational database schema.



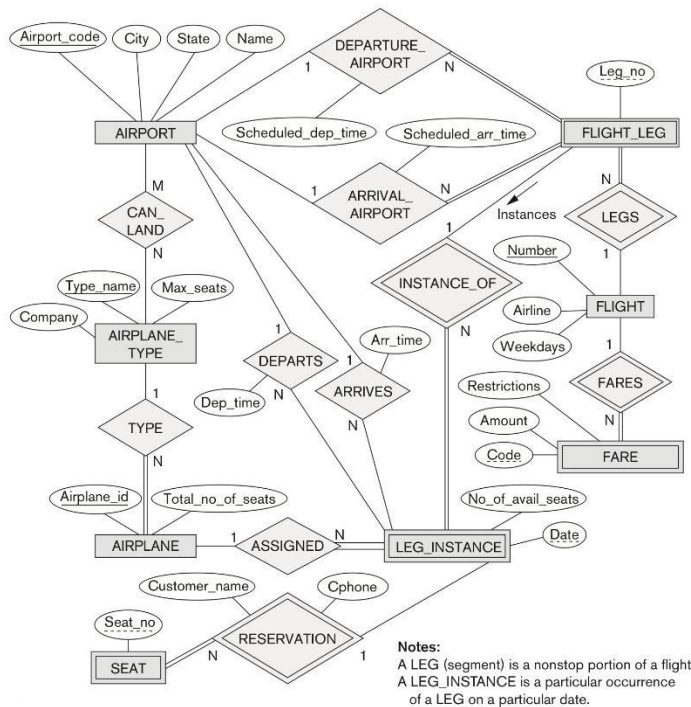
Project 2

CMP 420 & CMP 758 - Database Systems

Fall 2022

Total points: 110

2. (U: 20 points) (G: 15 points) Map the following ER diagram for a Bank database into a relational database schema.



3. (U: 30 points) (G: 25 points) Consider a MAIL_ORDER database in which employees take orders for parts from customers. The data requirements are summarized as follows:
- The mail order company has employees, each identified by a unique employee number, first and last name, and Zip Code.
 - Each customer of the company is identified by a unique customer number, first and last name, and Zip Code.
 - Each part sold by the company is identified by a unique part number, a part name, price, and quantity in stock.
 - Each order placed by a customer is taken by an employee and is given a unique order number. Each order contains specified quantities of one or more parts. Each order has a date of receipt as well as an expected ship date. The actual ship date is also recorded.
- a). Design an entity-relationship diagram for the mail order database and build the design using a data modeling tool such as ERwin or Rational Rose or a tool of your choice. (You already did this activity as homework 1 but feel free to improve it for this homework)
- b). Map the following ER diagram from the above step into a relational database.

Project 2
CMP 420 & CMP 758 - Database Systems
Fall 2022
Total points: 110

4. (U: 40 points) (G: 35 points) Design a database to keep track of information for an art museum. Assume that the following requirements were collected:
- The museum has a collection of ART_OBJECTS. Each ART_OBJECT has a unique Id_no, an Artist (if known), a Year (when it was created, if known), a Title, and a Description. The art objects are categorized in several ways, as discussed below.
 - ART_OBJECTS are categorized based on their type. There are three main types: PAINTING, SCULPTURE, and STATUE, plus another type called OTHER to accommodate objects that do not fall into one of the three main types.
 - A PAINTING has a Paint_type (oil, watercolor, etc.), material on which it is Drawn_on (paper, canvas, wood, etc.), and Style (modern, abstract, etc.).
 - A SCULPTURE or a statue has a Material from which it was created (wood, stone, etc.), Height, Weight, and Style.
 - ART_OBJECTs are categorized as either PERMANENT_COLLECTION (objects that are owned by the museum) and BORROWED. Information captured about objects in the PERMANENT_COLLECTION includes Date_acquired, Status (on display, on loan, or stored), and Cost.
 - Information captured about BORROWED objects includes the Collection from which it was borrowed, Date_borrowed, and Date_returned.
 - Information describing the country or culture of Origin (Italian, Egyptian, American, Indian, and so forth) and Epoch (Renaissance, Modern, Ancient, and so forth) is captured for each ART_OBJECT.
 - The museum keeps track of ARTIST information, if known: Name, DateBorn (if known), Date_died (if not living), Country_of_origin, Epoch, Main_style, and Description. The Name is assumed to be unique.
 - Different EXHIBITIONS occur, each having a Name, Start_date, and End_date. EXHIBITIONS are related to all the art objects that were on display during the exhibition.
 - Information is kept on other COLLECTIONS with which the museum interacts, including Name (unique), Type (museum, personal, etc.), Description, Address, Phone, and current Contact_person.

Draw an EER schema diagram for this application. Discuss any assumptions you make, and that justify your EER design choices.

Map the following EER diagram from the above step into a relational database

5. (U: 0 points) (G: 20 points) Consider a MOVIE database in which data is recorded about the movie industry. The data requirements are summarized as follows:
- Each movie is identified by title and year of release. Each movie has a length in minutes. Each has a production company, and each is classified under one or more genres (such as horror, action, drama, and so forth). Each movie has one or more

Project 2
CMP 420 & CMP 758 - Database Systems
Fall 2022
Total points: 110

- directors and one or more actors appear in it. Each movie also has a plot outline. Finally, each movie has zero or more quotable quotes, each of which is spoken by a particular actor appearing in the movie.
- Actors are identified by name and date of birth and appear in one or more movies. Each actor has a role in the movie.
 - Directors are also identified by name and date of birth and direct one or more movies. It is possible for a director to act in a movie (including one that he or she may also direct).
 - Production companies are identified by name and each has an address. A production company produces one or more movies.
- a). Design an Entity-Relationship diagram for the movie database and enter the design using a data modeling tool such as ERwin or Rational Rose.
- b). Map the following ER diagram from the above step into a relational database