Group Project 1

Due Date: Wednesday, March 5, 2025 at 11:59 p.m.

Homework Instructions:

Homework 1 is worth 100 points, and partial credit may be awarded for incomplete or incorrect answers. Homework is due on Wednesday, March 5, by 11:59 p.m., and should be uploaded to Canvas. Ensure your submission includes your teammates' name and x500 username.

Late submissions will be accepted until Friday, March 7, 2025, at 11:59 p.m., with a 10-point deduction.

In this homework, you will map a conceptual schema design in the Entity-Relationship (ER) model to a relational database schema. You will apply the ER-to-Relational Mapping algorithm to create a relational schema that accurately represents the given conceptual schema. Additionally, you will extend your understanding by incorporating Enhanced ER (EER) model constructs and mapping them into the relational schema. Detail each step, explain your process, and demonstrate how you derive the final schema. I recommend reviewing Chapter 9 in the textbook, along with the lectures from Week 5 and Week 6, for a deeper understanding.

Homework Problem:

You and your team are tasked with designing a database for a Bookstore Management System. The bookstore sells a wide range of books, tracks inventory, manages customer orders, and handles payments. Your goal is to create an ER/EER diagram and convert it into a relational schema using the ER-to-Relational Mapping algorithm. Below are the details for the system. Be sure to make any assumptions clear in your diagram.

The Bookstore Management System tracks information about customers, books, authors, orders, payments, and employees.

Entities and Descriptions:

1. Customers:
    - Each customer is identified by a unique CustomerID.
    - Customers have a first name, last name, and contact information (phone number and email address).
    - Customers have a billing address (street, city, state, zip code).
    - Customers can place orders for books, and each order is associated with a shipping address.
2. Books:
    - Each book is assigned a unique BookID.
    - Books have a title, genre, publication year, price, and stock quantity.

    - Each book can have one or more authors.
    - Each book is associated with a publisher (name and contact information).
3. Authors:
    - Each author is identified by a unique AuthorID.
    - Authors have a first name, last name, and biography (optional).
    - An author can write multiple books, and a book can have multiple authors.
4. Orders:
    - Each order is identified by a unique OrderID.
    - Orders are placed by customers and have an associated order date and shipping date.
    - An order can include multiple books, and for each book in the order, the quantity and price are specified at the time the order is placed.
    - Orders also have a payment status (paid, pending, etc.) and are associated with a payment record.
5. Payments:
    - Each payment is identified by a unique PaymentID.
    - Payments are made for orders and include the payment amount, payment method (credit card, PayPal, etc.), and payment date.
    - A payment can cover multiple orders, but each order is associated with one payment.
6. Employees:
    - Each employee is identified by a unique EmployeeID.
    - Employees have a first name, last name, position (e.g., cashier, manager), and hire date.
    - Employees process orders, manage inventory, and assist customers.
7. Inventory:
    - The system tracks the inventory for each book in the bookstore.
    - Each book has an inventory quantity and a restock threshold (if stock falls below this threshold, the system will notify the manager).