Additional Colloquium Problems

Problem 1: Inventory Management

A small grocery store is starting its operations and needs a system to manage its inventory. The store sells various items such as fruits, vegetables, dairy products, meats, and beverages. Design a data model to track the inventory of these items, including their names, quantities in stock, and prices. You will eventually write applications to add items that have arrived, and to remove items that have been taken to the store's shelves.   You will also write an application to conduct an inventory of all items that are in storage and their value.

Problem 2: Customer Management

The grocery store wants to keep track of its customers and their purchases. Customers should be identified by their names, contact information, and loyalty program IDs if applicable. Design a data model to store customer information and their purchase history, including the items purchased, quantities, and dates of purchase. You will write an application that sends an email to each customer asking if they'd like to reorder something they have purchased previously.

Problem 3: Supplier Management

Problem Statement: To maintain a steady supply of goods, the grocery store needs to manage its relationships with suppliers. Each supplier provides different types of products, and the store needs to keep track of supplier names, contact information, and the products they supply. Design a data model to represent the relationship between suppliers and the products they supply to the store. You will write applications to order from suppliers and to maintain the supplier table.

Problem 4: Sales and Transactions

Problem Statement: The grocery store needs a system to process sales transactions and generate receipts for customers. Each transaction consists of multiple items purchased by a customer. Design a data model to capture sales transactions, including the items sold, quantities, prices, and payment methods. Your application will produce the check the customer receives at checkout. You will also write a customer-facing application that tells them the status of their frequent customer account.

Problem 5: Employee Management

Problem Statement: As the business grows, the grocery store plans to hire employees to handle various tasks such as cashiering, stocking shelves, and cleaning. Each employee has a unique employee ID, name, contact information, and role within the store. Design a data model to manage employee information and their roles within the organization. You will write an application to be used by a manager who is interviewing applicants that will allow her to enter comments and a recommendation to hire or not hire. You will write another application to handle annual raises, that will receive raise recommendations from each employee's supervisor, consider them according to some company criteria, and then decide the raise amount.