ER Diagram Problem Statements

Online Bookstore Management System

An online bookstore wants to maintain a database to manage its operations efficiently. The system should store details about books, authors, customers, orders, and payments.

Requirements:
- Books: Each book has a unique ISBN, title, price, genre, and is written by one or more authors.
- Authors: Each author has a unique ID, name, and biography. An author can write multiple books.
- Customers: Each customer has a unique customer ID, name, email, and shipping address.
- Orders: A customer can place multiple orders, and each order can contain multiple books.
- Payments: Payments are associated with orders. A payment has a payment ID, amount, payment mode, and transaction status.

Entities and Attributes:
- Book (ISBN, Title, Price, Genre, Publisher, Publication_Date, Year_of_Publication, CopiesSold)
- Author (Author_ID, Name(FirstName, LastName), Biography)
- Customer (Customer_ID, Name, Email, Phone_Number, Address(Street, City, State, Zip_Code))
- Order (Order_ID, Order_Date, Status, Total_Amount)
- Payment (Payment_ID, Amount, Payment_Mode, Transaction_Status)

Relationships:
- 'Written By' (Between Book and Author)
- 'Places' (Between Customer and Order)
- 'Contains' (Between Order and Book)
- 'Made Through' (Between Order and Payment)

Hospital Management System

A hospital needs a database system to manage its patients, doctors, staff, and medical records efficiently.
The system should handle appointments, medical treatments, billing, and specialization of doctors and staff.

Requirements:
- Persons: The hospital deals with different types of people, including patients, doctors, and staff.

- Patients visit the hospital for treatments.
- Doctors specialize in different fields like Cardiology, Neurology, and Orthopedics.
- Staff members handle administrative tasks such as nurses, receptionists, and lab technicians.

Entities and Attributes:
- Person (Person_ID, Name, DOB, Age, Gender)
- Patient (Patient_ID, Medical History, Contact Number, Address)
- Doctor (Doctor_ID, Specialization, Experience)
- Staff (Staff_ID, Role, Salary)
- Appointment (Appointment_ID, Date, Time, Status)
- Medical Record (Record_ID, Diagnosis, Prescribed_Medications, TestsConducted)
- Billing (Bill_ID, Amount, Payment Status)

Relationships:
- 'Consults' (Between Patient and Doctor)
- 'Books' (Between Patient and Appointment)
- 'Assigned To' (Between Doctor and Appointment)
- 'Has' (Between Patient and Medical Record)
- 'Generates' (Between Appointment and Billing)

Specialization Concept:
- Superclass: Person
  - Subclasses: Patient (Medical History, Contact, Address), Doctor (Specialization, Experience), Staff (Role, Salary)
- Type of Specialization: Disjoint (A person can either be a patient, a doctor, or a staff member).
- Type of Inheritance: Partial (Not every person must belong to a subclass, e.g., visitors or temporary workers).