

Question

You are tasked with designing a database for a library management system. The system must store information about books, authors, members, and book loans. Each book has a title, ISBN, and publication year. Each author has a name and date of birth. Members have a name, membership number, and membership type. Each loan involves a book, a member, and a loan date. A book can be written by multiple authors, and an author can write multiple books. A member can borrow many books, but each book can only be borrowed by one member at a time.

Task:

Design an ER diagram for this library management system. Be sure to define all the entities, relationships, and any necessary attributes. Identify primary keys, foreign keys, and cardinality constraints.

Question

Given the following unnormalized relation:

StudentID	StudentName	CourseName	InstructorName	InstructorEmail	InstructorPhone
1	Nahim	Django-1	Nahid	a@xyz.com	123-456-789
2	Araf	Django-2	Salman	b@xyz.com	890-456-432
3	Moin	Django-1	Nahid	a@xyz.com	123-456-789

Task:

- Normalize the relation to 3rd Normal Form (3NF).
- Identify any functional dependencies in the given table and explain why normalization is necessary.

Question

You are designing a database for an e-commerce platform. The system needs to store information about products, customers, orders, and payments. A product has a name, description, price, and category. A customer has a name, email, and shipping address. An order includes a customer and a list of products with their quantities. A payment is linked to an order and contains information about the payment method, amount, and payment status.

Task:

- Identify the relations (tables) for this e-commerce database and design the relational schema.
- Define primary keys, foreign keys, and any relevant constraints.