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Q1. Write the SQL command to address the issue of redundant data and improve data integrity, the database should be normalized. Normalization involves dividing the database into two or more tables and defining relationships between them

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To remove data redundancy we need to apply normalization till the third degree.

Creating separate tables for each component helps in 3N normalization.

Example:

```
create table Books_info
(
  ISBN VARCHAR(100) PRIMARY KEY,
  title VARCHAR(200) NOT NULL UNIQUE,
  author VARCHAR(100) NOT NULL,
  pub_date DATE,
  price DECIMAL(10, 2) NOT NULL
);


CREATE TABLE Customer_Info
(
  cus_id INT PRIMARY KEY,
  first_name VARCHAR(100) NOT NULL,
  last_name VARCHAR(100) NOT NULL,
  email VARCHAR(100)
  );
CREATE TABLE Authors
(
  Author_id VARCHAR(50) PRIMARY KEY,
  firstname VARCHAR(100) NOT NULL,
  lastname VARCHAR(100) NOT NULL,
  birthdate date
```

```
);

CREATE TABLE Orders
(
  Order_id INT PRIMARY KEY,
  ISBN VARCHAR(100),
  Price DECIMAL(10,2),
  Quant DECIMAL(10,2),
  FOREIGN KEY (ISBN) REFERENCES Books_info(ISBN)
);
```

Creating a relations table to connect within the tables

Q2. To deal with issues of efficient inventory tracking we can put constrains

```
SELECT ISBN, title, author, price
FROM Books_info
WHERE stock_quantity > 0;
```

Q3. Write the SQL commands to address slow query performance , create indexes on columns commonly used in where clauses.

Sent by you: Write the SQL commands to address slow query performance , create indexes on columns commonly used in where clauses.

```
CREATE INDEX idx_ISBN ON Books_info (ISBN);
CREATE INDEX idx_author ON Books_info (author);
```

Q4. Define the SQL commands to implement data validation checks to ensure that only valid data is entered into the database.

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To ensure valid data we can choose the suitable datatype required for the variable

```
CREATE TABLE Employees (
  emp_id INT PRIMARY KEY,
```

```
  emp_name VARCHAR(100) NOT NULL,
  emp_email VARCHAR(100) UNIQUE,
  emp_salary DECIMAL(10, 2) CHECK (emp_salary > 0)
);
```