

Creating the Library Database and Tables

Let's create the LibraryDB database and the corresponding tables. Then, we'll use ALTER statements to modify the table structures and DROP statements to remove a redundant table.

Create Database

```
CREATE DATABASE LibraryDB;
```

```
USE LibraryDB;
```

Create Tables

➔ Publishers Table

```
CREATE TABLE Publishers (  
    PublisherID INT AUTO_INCREMENT PRIMARY KEY,  
    Name VARCHAR(255) NOT NULL UNIQUE,  
    Address VARCHAR(255),  
    Phone VARCHAR(20),  
    Email VARCHAR(100) UNIQUE  
);
```

➔ Authors Table

```
CREATE TABLE Authors (  
    AuthorID INT AUTO_INCREMENT PRIMARY KEY,  
    FirstName VARCHAR(100) NOT NULL,  
    LastName VARCHAR(100) NOT NULL,  
    DateOfBirth DATE  
);
```

➔ Books Table

```
CREATE TABLE Books (  
    BookID INT AUTO_INCREMENT PRIMARY KEY,  
    Title VARCHAR(255) NOT NULL,  
    PublisherID INT,  
    ISBN VARCHAR(13) UNIQUE NOT NULL,  
    YearPublished YEAR CHECK (YearPublished >= 1450 AND  
YearPublished <= YEAR(CURDATE())),  
    Genre VARCHAR(50),  
    CopiesAvailable INT DEFAULT 1 CHECK (CopiesAvailable >= 0),  
    FOREIGN KEY (PublisherID) REFERENCES Publishers(PublisherID)  
);
```

➔ Members Table

```
CREATE TABLE Members (  
    MemberID INT AUTO_INCREMENT PRIMARY KEY,  
    FirstName VARCHAR(100) NOT NULL,  
    LastName VARCHAR(100) NOT NULL,  
    Address VARCHAR(255) NOT NULL,  
    Phone VARCHAR(20),  
    Email VARCHAR(100) UNIQUE,  
    DateOfMembership DATE NOT NULL,  
    MembershipType ENUM('Regular', 'Premium') DEFAULT 'Regular',  
    CHECK (MembershipType IN ('Regular', 'Premium'))  
);
```

➔ Loans Table

```
CREATE TABLE Loans (  
    LoanID INT AUTO_INCREMENT PRIMARY KEY,  
    BookID INT NOT NULL,
```

```
MemberID INT NOT NULL,  
LoanDate DATE NOT NULL,  
ReturnDate DATE,  
DueDate DATE NOT NULL,  
FOREIGN KEY (BookID) REFERENCES Books(BookID),  
FOREIGN KEY (MemberID) REFERENCES Members(MemberID),  
CHECK (LoanDate <= DueDate),  
CHECK (ReturnDate IS NULL OR ReturnDate >= LoanDate)  
);
```

→ **BookAuthors Table**

```
CREATE TABLE BookAuthors (  
    BookID INT NOT NULL,  
    AuthorID INT NOT NULL,  
    PRIMARY KEY (BookID, AuthorID),  
    FOREIGN KEY (BookID) REFERENCES Books(BookID),  
    FOREIGN KEY (AuthorID) REFERENCES Authors(AuthorID)  
);
```

Using ALTER Statements:

→ **Add a new column Phone to Members Table**

```
ALTER TABLE Members ADD Phone VARCHAR(20);
```

Modify the Email column in Members Table to be NOT NULL

```
ALTER TABLE Members MODIFY Email VARCHAR(100) UNIQUE NOT  
NULL;
```

Add a new column DateOfBirth to Authors Table

ALTER TABLE Authors ADD DateOfBirth DATE;

Using DROP Statements

Drop the Phone column from the Members Table if deemed redundant

ALTER TABLE Members DROP COLUMN Phone;

Drop the BookAuthors Table if it's deemed redundant

DROP TABLE BookAuthors;

Summary

This series of SQL statements demonstrates how to create the initial database schema, modify it with ALTER statements, and remove unnecessary structures with DROP statements. This approach ensures the database design remains flexible and adaptable to changing requirements.