## Assignment 2: Design a database schema for a library system, including tables, fields, and constraints like NOT NULL, UNIQUE, and CHECK. Include primary and foreign keys to establish relationships between tables.

CREATE TABLE Authors (

author\_id INT PRIMARY KEY AUTO\_INCREMENT,

first\_name VARCHAR(100) NOT NULL,

last\_name VARCHAR(100) NOT NULL

);

CREATE TABLE Publishers (

publisher\_id INT PRIMARY KEY AUTO\_INCREMENT,

name VARCHAR(255) NOT NULL

);

CREATE TABLE Categories (

category\_id INT PRIMARY KEY AUTO\_INCREMENT,

category\_name VARCHAR(100) NOT NULL UNIQUE

);

CREATE TABLE Books (

book\_id INT PRIMARY KEY AUTO\_INCREMENT,

title VARCHAR(255) NOT NULL,

author\_id INT NOT NULL,

publisher\_id INT NOT NULL,

publication\_year YEAR NOT NULL CHECK (publication\_year > 0),

isbn VARCHAR(13) UNIQUE NOT NULL,

category\_id INT NOT NULL,

copies\_available INT NOT NULL CHECK (copies\_available >= 0),

FOREIGN KEY (author\_id) REFERENCES Authors(author\_id),

FOREIGN KEY (publisher\_id) REFERENCES Publishers(publisher\_id),

FOREIGN KEY (category\_id) REFERENCES Categories(category\_id)

);

CREATE TABLE Members (

member\_id INT PRIMARY KEY AUTO\_INCREMENT,

first\_name VARCHAR(100) NOT NULL,

last\_name VARCHAR(100) NOT NULL,

email VARCHAR(255) UNIQUE NOT NULL,

phone\_number VARCHAR(15),

membership\_start\_date DATE NOT NULL,

membership\_end\_date DATE

);

CREATE TABLE Loans (

loan\_id INT PRIMARY KEY AUTO\_INCREMENT,

book\_id INT NOT NULL,

member\_id INT NOT NULL,

loan\_date DATE NOT NULL,

return\_date DATE CHECK (return\_date > loan\_date),

FOREIGN KEY (book\_id) REFERENCES Books(book\_id),

FOREIGN KEY (member\_id) REFERENCES Members(member\_id)

);

### Explanation

* The Books table contains foreign keys to Authors, Publishers, and Categories to establish relationships with these tables.
* The Loans table references Books and Members to track which member has borrowed which book and when.
* Constraints like NOT NULL, UNIQUE, and CHECK are used to ensure data integrity and validity.

This schema provides a robust framework for managing a library system, including tracking books, authors, publishers, categories, members, and loan transactions.