# Database (MySQL)

Create a database named **Library Management System (lms)** with the following tables and **insert data** in each table. A schema diagram (Figure 1) of this database is given below for understanding the relationships among tables.

**authors(author_id, author_name, author_address)**
**publisher(publisher_id, name, address)**
**books(book_id, book_title, *author_id*, *publisher_id*, no_of_copies)**
**borrowers(borrower_id, firstname, lastname, address,email, phone, department)**
**booking(booking_id, *book_id*, *borrower_id*, booking date,available_date)**
**borrow_book(id, *book_id*, *borrower_id*, borrowing_date, duedate)**
**fine(fine_id, *borrow_id*, fine_amount, fine_date)**

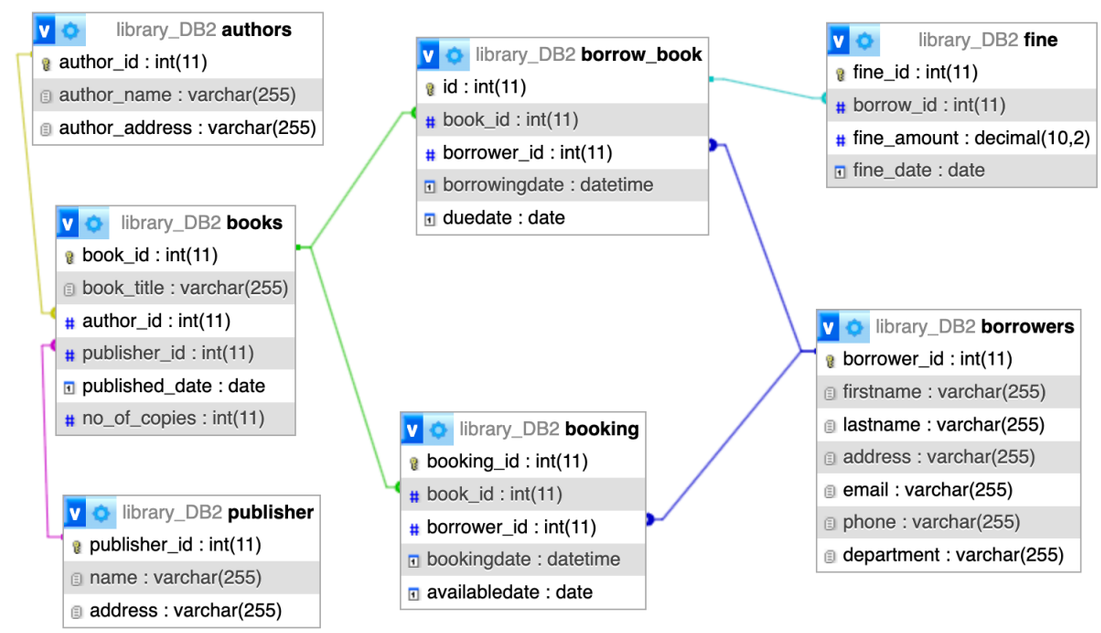


**Figure 1: Schema diagram of *lms* database**

Q1: Create a database name ***lms*** with above tables.
Q2: Insert data in each table. Sample data are given in below.

**Table 1: authors**

| author_id | author_name | author_address |
|---|---|---|
| 1 | Alexandar | UK |
| 2 | PB Shelly | UK |
| 3 | Neheru | India |
| 4 | Nazrul | Bangladesh |
| 5 | Humayun Ahmed | Dhaka |
| 6 | Zafar Iqbal | Dhaka |
| 7 | Balagurusamy | Dhaka |
| 8 | Herbert Schidlt | Dhaka |

**Table 2: Publisher**

| publisher_id | name | address |
|---|---|---|
| 1 | Binary Pub | Dhaka |
| 2 | McGrawhill | Newyork |
| 3 | Sobuj | Dhaka |
| 4 | Panjeree | Dhaka |
| 5 | Pearson | UK |
| 6 | Wiley | US |

**Table 3: books**

| book_id | book_title | author_id | publisher_id | published_date | no_of_copies |
|---|---|---|---|---|---|
| 1 | Agnibina | 4 | 1 | 2020-08-17 | 5 |
| 2 | FReedom of india | 3 | 2 | 2021-11-09 | 4 |
| 3 | Himu | 5 | 3 | 2022-11-09 | 10 |
| 4 | Fundamentals | 7 | 2 | 2020-11-01 | 11 |
| 5 | Bear Story | 1 | 2 | 2019-11-02 | 5 |

**Table 4: borrowers**

| borrower_id | firstname | lastname | address | email | phone | department |
|---|---|---|---|---|---|---|
| 1 | Kabir | Khan | barishal | kabir@gmail.com | 01899968590 | CSE |
| 2 | sabir | Ahmed | Dhaka | sabir@gmail.com | 01899969590 | CSE |
| 3 | abir | hossain | barishal | abir@gmail.com | 01839768590 | Bangla |
| 4 | Sadat | Ahmed | Dhaka | sadat@gmail.com | 01899969590 | English |
| 5 | Amant | Nayeb | Khulna | sadatt@gmail.com | 01837069590 | English |

**Table 5: booking**

| booking_id | book_id | borrower_id | bookingdate | availabledate |
|---|---|---|---|---|
| 1 | 4 | 2 | 2019-11-11 21:11:45 | 2019-11-30 |
| 2 | 4 | 4 | 2019-11-11 21:11:45 | 2019-12-13 |

**Table 6: borrow_book**

| id | book_id | borrower_id | borrowingdate | duedate |
|---|---|---|---|---|
| 1 | 1 | 3 | 2019-11-11 21:10:51 | 2019-11-29 |
| 2 | 2 | 5 | 2019-11-11 21:10:51 | 2019-11-20 |
| 3 | 5 | 3 | 2023-11-20 13:47:20 | 2023-11-22 |
| 4 | 4 | 3 | 2023-11-20 13:47:20 | 2023-11-29 |
| 5 | 2 | 4 | 2023-11-20 13:54:57 | 2023-11-30 |

**Table 7: fine**

| fine_id | borrow_id | fine_amount | fine_date |
|---|---|---|---|
| 1 | 2 | 100.00 | 2023-11-01 |
| 2 | 3 | 300.00 | 2023-11-03 |
| 3 | 1 | 150.00 | 2023-11-02 |
| 4 | 3 | 500.00 | 2023-11-08 |
| 5 | 4 | 100.00 | 2023-11-01 |
| 6 | 5 | 100.00 | 2023-11-02 |

**Q3: Now write SQL for the following questions:**

| | |
|---|---|
| **1.** | List all books along with the names of their respective authors and publishers. |
| **2.** | Find the number of books available by each author. |
| **3.** | Count the number of distinct borrowers in each department. |
| **4.** | Find the average number of copies available for each publisher's books. |
| **5.** | List the details of borrowers who have been fined more than once. |
| **6.** | Retrieve a list of all borrowers who have borrowed books authored by 'J.K. Rowling'. |
| **7.** | Calculate the total fine collected by date. |
| **8.** | Find the details of borrowers who have overdue books (i.e., duedate has passed). |
| **9.** | Create a view that shows the title, author, and publisher for all books. |
| **10.** | Find the names of authors and their books where both the author's name and the book title start with the same letter. |
| **11.** | Find the details of each borrower who has borrowed book at least two times. |
| **12.** | Find the name of each borrower with how much amount was fined. |