Task 1: Database Setup and Schema Design

Domain: Library Management System

Objective

Learn to create a well-structured relational database schema using SQL and visualize it with an ER diagram.

Entities & Relationships

Entities:

1. **Author**
2. **Book**
3. **Member**
4. **Borrowing_Record**

Relationships:

- One **Author** can write many **Books**.
- One **Member** can borrow many **Books** (tracked using Borrowing_Record).
- One **Book** can be borrowed many times.

ER Diagram (Text Format)

```
Author
-------
author_id (PK)
name

Book
-------
book_id (PK)
title
genre
author_id (FK) → Author(author_id)

Member
--------
member_id (PK)
```

```
name
phone

Borrowing_Record
------------------
record_id (PK)
book_id (FK) → Book(book_id)
member_id (FK) → Member(member_id)
borrow_date
return_date
```

SQL Script to Create Schema

```sql
-- Author Table
CREATE TABLE Author (
    author_id INT PRIMARY KEY,
    name VARCHAR(100) NOT NULL
);

-- Book Table
CREATE TABLE Book (
    book_id INT PRIMARY KEY,
    title VARCHAR(200) NOT NULL,
    genre VARCHAR(50),
    author_id INT,
    FOREIGN KEY (author_id) REFERENCES Author(author_id)
);

-- Member Table
CREATE TABLE Member (
    member_id INT PRIMARY KEY,
    name VARCHAR(100) NOT NULL,
    phone VARCHAR(15)
);

-- Borrowing_Record Table
CREATE TABLE Borrowing_Record (
    record_id INT PRIMARY KEY,
    book_id INT,
    member_id INT,
    borrow_date DATE,
    return_date DATE,
    FOREIGN KEY (book_id) REFERENCES Book(book_id),
```

```
    FOREIGN KEY (member_id) REFERENCES Member(member_id)
);
```

Deliverables

- **Domain:** Library Management System
- **ER Diagram:** Provided above
- **SQL Script:** Provided above
- **Tools:** MySQL Workbench / pgAdmin / SQLiteStudio

Outcome

- Successfully identified entities and relationships for a Library Management System.
- Designed a normalized relational schema.
- Created tables with proper primary and foreign keys.
- Provided a working SQL script for schema creation.