Practical 1(Question 1)

Aim

To design and implement a relational database schema for a basic book management system using Data Definition Language (DDL) commands, enforcing a one-to-many relationship between authors and books.

Objective

- To create a table named Authors with author_id as the primary key.
- To create a table named Books with book_id as the primary key.
- To establish a foreign key constraint in the Books table that references the Authors table.
- To use appropriate data types and constraints (INT, VARCHAR, PRIMARY KEY, FOREIGN KEY) for all columns.

Theory

Data Definition Language (DDL) commands are used to define and manage database structures. The CREATE TABLE command is fundamental for creating new tables. A **Primary Key** is a unique identifier for each record in a table, ensuring data integrity. A **Foreign Key** is a column or set of columns in one table that refers to the primary key of another table, establishing a link between the two. This link enforces a **one-to-many relationship**, where one record in the parent table (Authors) can be associated with multiple records in the child table (Books), but each child record must be linked to a single parent record.

Procedure

1. **Open** a SQL command-line tool or a database management software.
2. **Execute** the following DDL command to create the Authors table:
```
CREATE TABLE Authors (
author_id INT PRIMARY KEY,     name VARCHAR(50),
   country VARCHAR(50)
);
```

3. **Execute** the following DDL command to create the Books table with a foreign key constraint:
```
CREATE TABLE Books (
   book_id INT PRIMARY KEY,     title
VARCHAR(100),
   author_id INT,
   FOREIGN KEY (author_id) REFERENCES Authors(author_id)
```

);

4. **Verify** the table structures using a DESCRIBE or SHOW COLUMNS command, depending on the database system.

Result

```
-- Write your Query here
CREATE TABLE Authors(author_id INT PRIMARY KEY, name VARCHAR(50), country VARCHAR(50));
CREATE TABLE Books(book_id INT PRIMARY KEY, title VARCHAR(100), author_id INT, FOREIGN KEY(author_id) REFERENCES Authors(author_id));
desc Authors;
desc Books;
```

Learning Outcomes

1. **Schema Design:** The ability to design a simple relational database schema based on given requirements.
2. **DDL Commands:** Proficiency in using DDL commands like CREATE TABLE with various constraints.
3. **Key Constraints:** A clear understanding of the purpose and implementation of PRIMARY KEY and FOREIGN KEY for maintaining data integrity.