

Lesson 05 Demo 07

Performing Joins on Tables

Objective: To showcase various types of join operations in MySQL, illustrating how to effectively combine data from multiple tables

Tools required: MySQL

Prerequisites: None

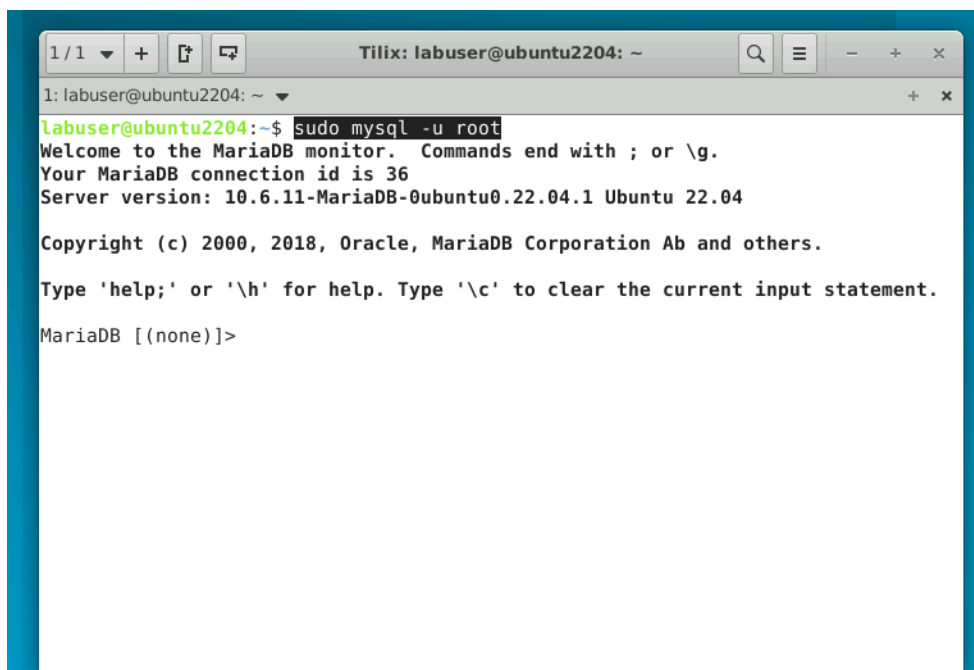
Steps to be followed:

1. Set up a database and table
2. Perform different types of joins

Step 1: Set up a database and table

1.1 Open a terminal window and access MySQL as root user:

sudo mysql -u root



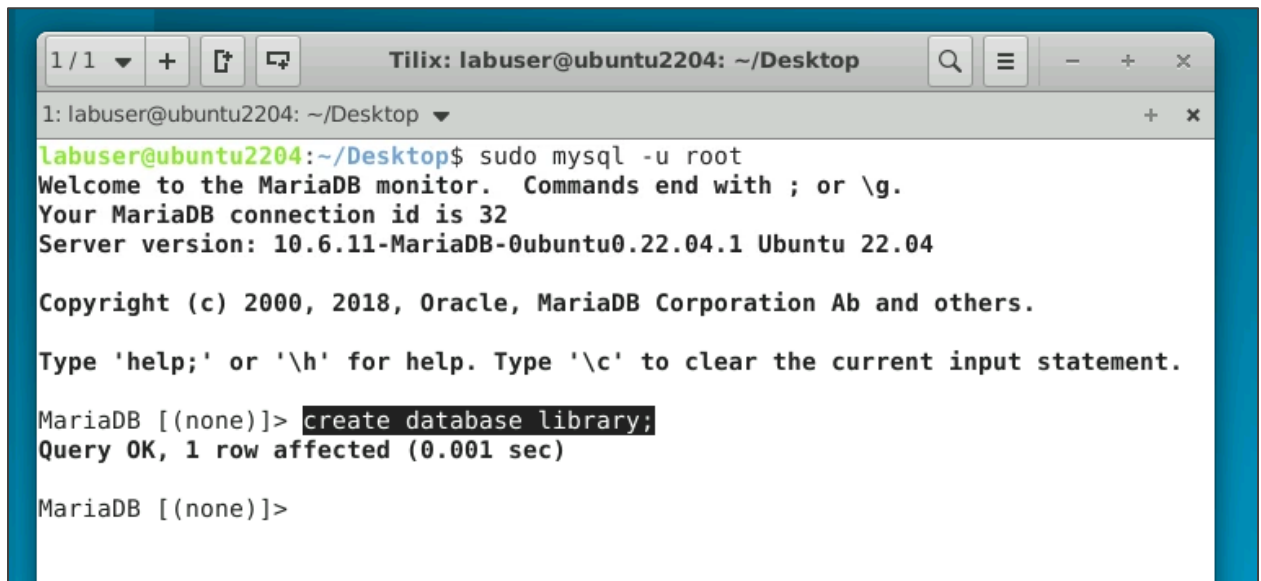
```
1 / 1 ▼ + [ ] [ ] Tilix: labuser@ubuntu2204: ~
1: labuser@ubuntu2204: ~ ▼
labuser@ubuntu2204:~$ sudo mysql -u root
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 36
Server version: 10.6.11-MariaDB-0ubuntu0.22.04.1 Ubuntu 22.04

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

- 1.2 Create a new database named **library**:
create database library;



```
1 / 1 ▼ + [T] [C] Tilix: labuser@ubuntu2204: ~/Desktop
1: labuser@ubuntu2204: ~/Desktop ▼
labuser@ubuntu2204:~/Desktop$ sudo mysql -u root
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 32
Server version: 10.6.11-MariaDB-0ubuntu0.22.04.1 Ubuntu 22.04

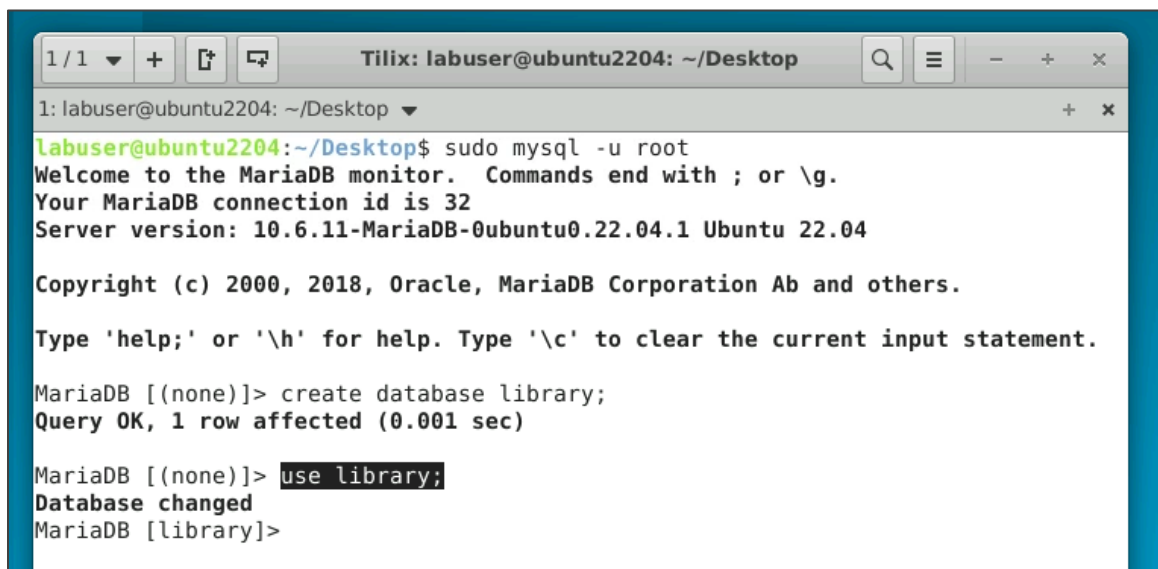
Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> create database library;
Query OK, 1 row affected (0.001 sec)

MariaDB [(none)]>
```

- 1.3 Select the **library** database:
use library;



```
1 / 1 ▼ + [T] [C] Tilix: labuser@ubuntu2204: ~/Desktop
1: labuser@ubuntu2204: ~/Desktop ▼
labuser@ubuntu2204:~/Desktop$ sudo mysql -u root
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 32
Server version: 10.6.11-MariaDB-0ubuntu0.22.04.1 Ubuntu 22.04

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

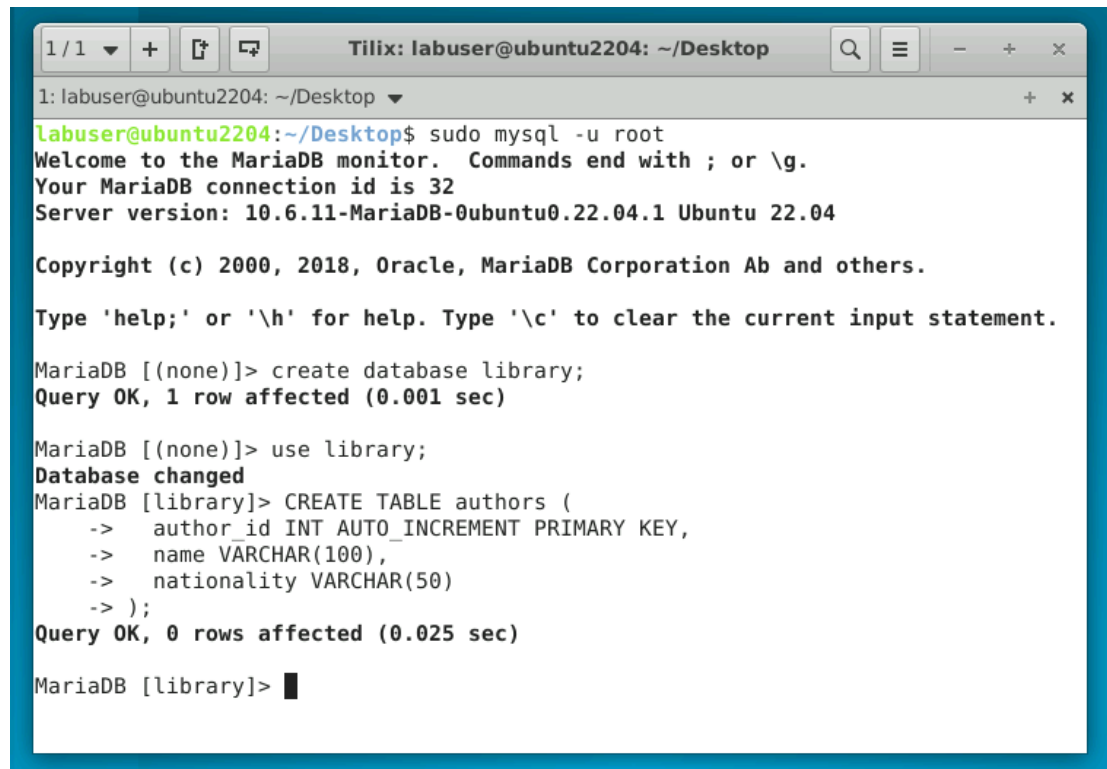
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> create database library;
Query OK, 1 row affected (0.001 sec)

MariaDB [(none)]> use library;
Database changed
MariaDB [library]>
```

1.4 Create an **authors** table with relevant fields:

```
CREATE TABLE authors (  
  author_id INT AUTO_INCREMENT PRIMARY KEY,  
  name VARCHAR(100),  
  nationality VARCHAR(50)  
);
```

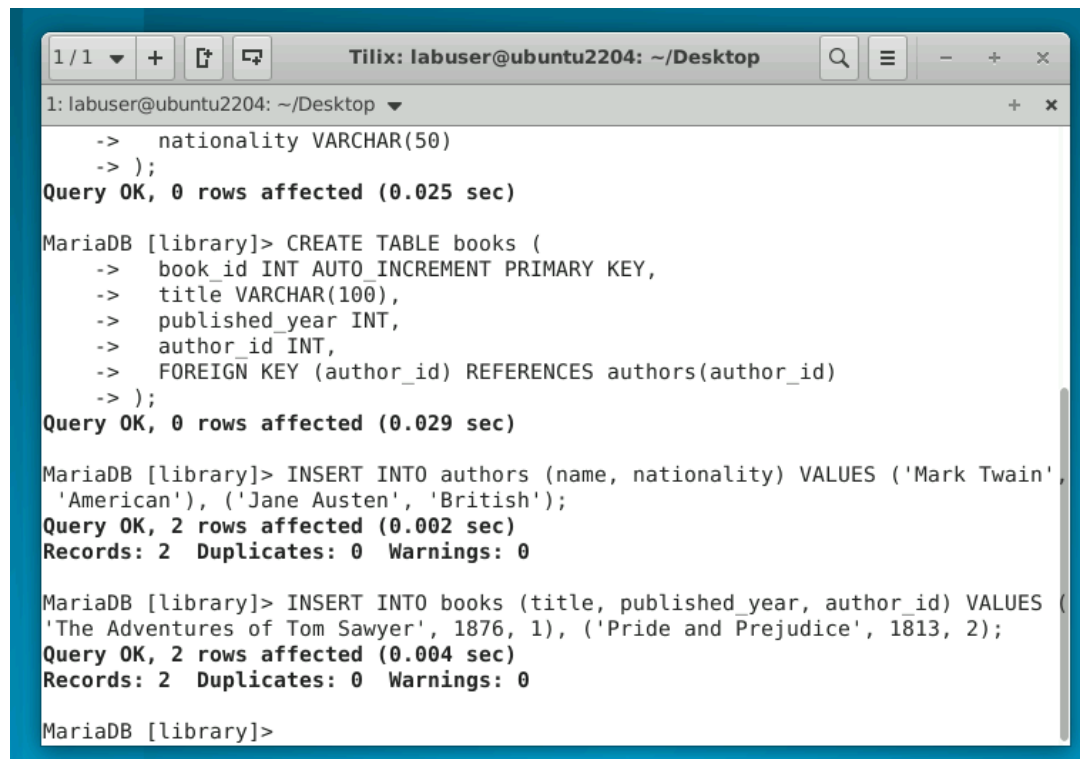
A screenshot of a terminal window titled 'Tilix: labuser@ubuntu2204: ~/Desktop'. The terminal shows a user running 'sudo mysql -u root' to access the MariaDB command-line interface. The output includes a welcome message, connection ID 32, and server version 10.6.11-MariaDB-0ubuntu0.22.04.1. The user then creates a database named 'library', switches to it, and creates a table named 'authors' with columns 'author_id' (auto-incrementing primary key), 'name' (VARCHAR(100)), and 'nationality' (VARCHAR(50)). The terminal output confirms the successful creation of the table.

```
1: labuser@ubuntu2204: ~/Desktop  
labuser@ubuntu2204:~/Desktop$ sudo mysql -u root  
Welcome to the MariaDB monitor.  Commands end with ; or \g.  
Your MariaDB connection id is 32  
Server version: 10.6.11-MariaDB-0ubuntu0.22.04.1 Ubuntu 22.04  
  
Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.  
  
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.  
  
MariaDB [(none)]> create database library;  
Query OK, 1 row affected (0.001 sec)  
  
MariaDB [(none)]> use library;  
Database changed  
MariaDB [library]> CREATE TABLE authors (  
->   author_id INT AUTO_INCREMENT PRIMARY KEY,  
->   name VARCHAR(100),  
->   nationality VARCHAR(50)  
-> );  
Query OK, 0 rows affected (0.025 sec)  
  
MariaDB [library]> █
```


1.6 Insert data into **authors** and **books** tables:

```
INSERT INTO authors (name, nationality) VALUES ('Mark Twain', 'American'), ('Jane Austen', 'British');
```

```
INSERT INTO books (title, published_year, author_id) VALUES ('The Adventures of Tom Sawyer', 1876, 1), ('Pride and Prejudice', 1813, 2);
```



```
1 / 1 + [ ] [ ] Tilix: labuser@ubuntu2204: ~/Desktop
1: labuser@ubuntu2204: ~/Desktop
-> nationality VARCHAR(50)
-> );
Query OK, 0 rows affected (0.025 sec)

MariaDB [library]> CREATE TABLE books (
-> book_id INT AUTO_INCREMENT PRIMARY KEY,
-> title VARCHAR(100),
-> published_year INT,
-> author_id INT,
-> FOREIGN KEY (author_id) REFERENCES authors(author_id)
-> );
Query OK, 0 rows affected (0.029 sec)

MariaDB [library]> INSERT INTO authors (name, nationality) VALUES ('Mark Twain',
'American'), ('Jane Austen', 'British');
Query OK, 2 rows affected (0.002 sec)
Records: 2 Duplicates: 0 Warnings: 0

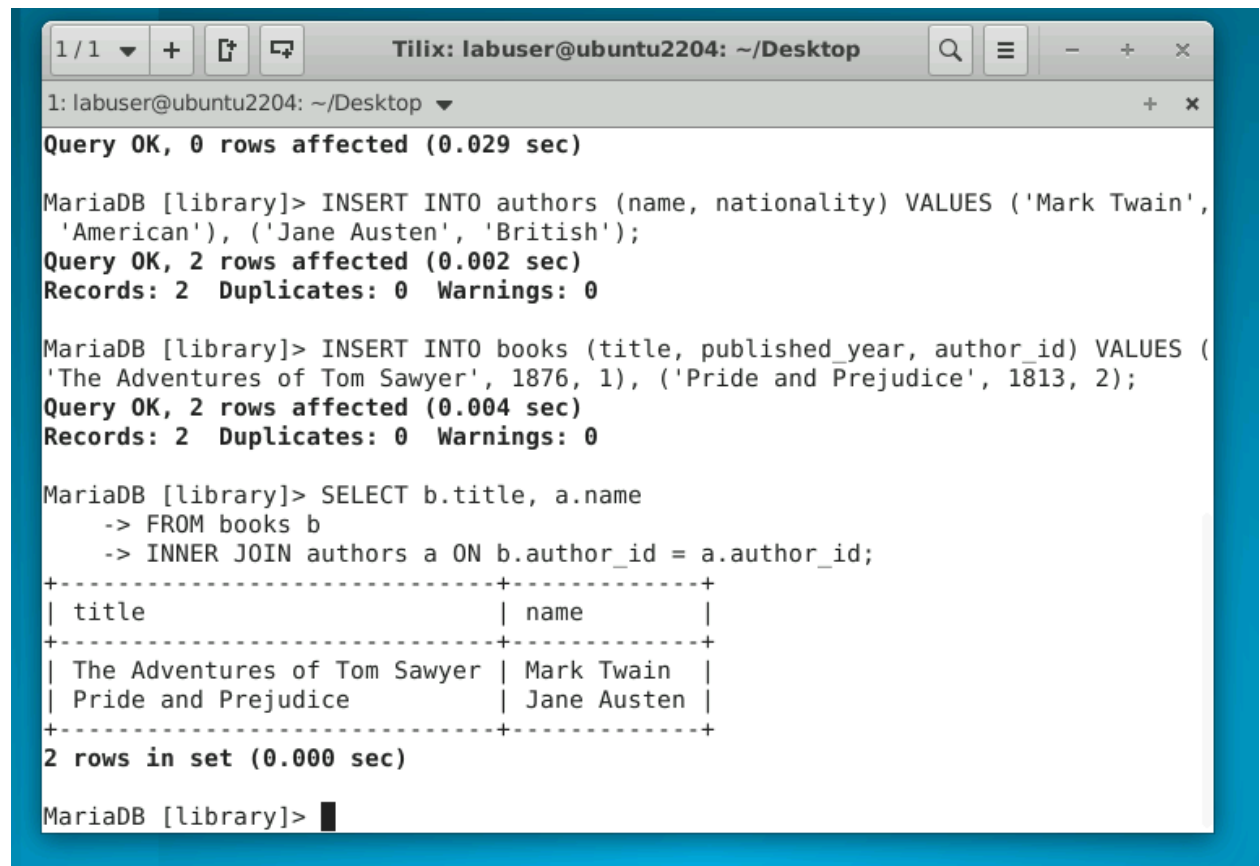
MariaDB [library]> INSERT INTO books (title, published_year, author_id) VALUES (
'The Adventures of Tom Sawyer', 1876, 1), ('Pride and Prejudice', 1813, 2);
Query OK, 2 rows affected (0.004 sec)
Records: 2 Duplicates: 0 Warnings: 0

MariaDB [library]>
```

Step 2: Perform different types of joins

2.1 Join **books** and **authors** to display book titles with their authors:

```
SELECT b.title, a.name
FROM books b
INNER JOIN authors a ON b.author_id = a.author_id;
```



The screenshot shows a terminal window titled 'Tilix: labuser@ubuntu2204: ~/Desktop'. The terminal displays the following SQL commands and their outputs:

```
1: labuser@ubuntu2204: ~/Desktop ▼
Query OK, 0 rows affected (0.029 sec)

MariaDB [library]> INSERT INTO authors (name, nationality) VALUES ('Mark Twain',
    'American'), ('Jane Austen', 'British');
Query OK, 2 rows affected (0.002 sec)
Records: 2  Duplicates: 0  Warnings: 0

MariaDB [library]> INSERT INTO books (title, published_year, author_id) VALUES (
    'The Adventures of Tom Sawyer', 1876, 1), ('Pride and Prejudice', 1813, 2);
Query OK, 2 rows affected (0.004 sec)
Records: 2  Duplicates: 0  Warnings: 0

MariaDB [library]> SELECT b.title, a.name
    -> FROM books b
    -> INNER JOIN authors a ON b.author_id = a.author_id;
+-----+-----+
| title                                | name      |
+-----+-----+
| The Adventures of Tom Sawyer         | Mark Twain |
| Pride and Prejudice                  | Jane Austen |
+-----+-----+
2 rows in set (0.000 sec)

MariaDB [library]> █
```

```

1: labuser@ubuntu2204: ~/Desktop
MariaDB [library]> SELECT b.title, a.name
-> FROM books b
-> INNER JOIN authors a ON b.author_id = a.author_id;
+-----+-----+
| title                | name        |
+-----+-----+
| The Adventures of Tom Sawyer | Mark Twain  |
| Pride and Prejudice       | Jane Austen |
+-----+-----+
2 rows in set (0.000 sec)

MariaDB [library]> SELECT a.name, b.title
-> FROM authors a
-> LEFT JOIN books b ON a.author_id = b.author_id;
+-----+-----+
| name        | title                |
+-----+-----+
| Mark Twain  | The Adventures of Tom Sawyer |
| Jane Austen | Pride and Prejudice       |
+-----+-----+
2 rows in set (0.000 sec)

MariaDB [library]> █

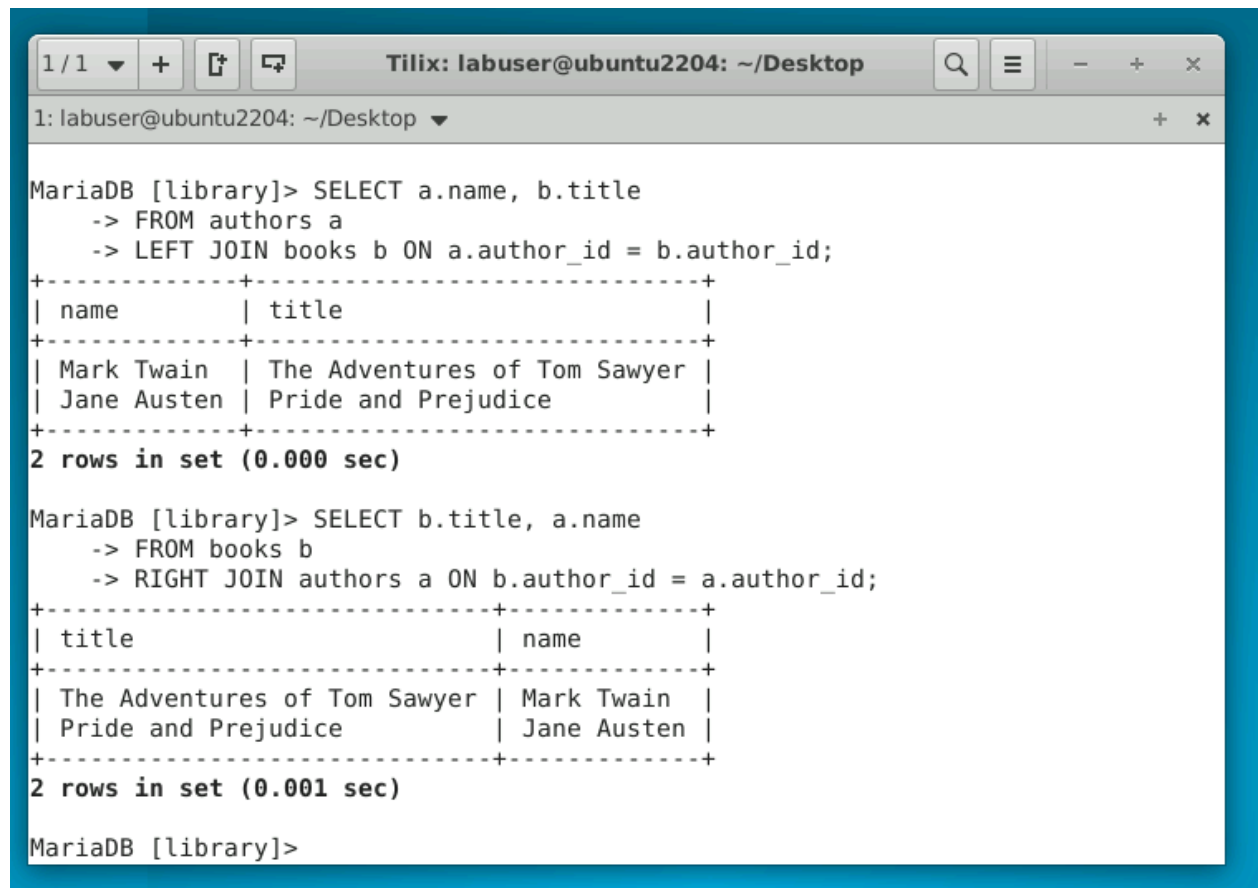
```

2.3 Perform a right join to display all the books and their authors (including books with no listed authors):

SELECT b.title, a.name

FROM books b

RIGHT JOIN authors a ON b.author_id = a.author_id;



```

1 / 1  +  [?] [x]  Tilix: labuser@ubuntu2204: ~/Desktop  🔍  ☰  -  +  x
1: labuser@ubuntu2204: ~/Desktop  +  x

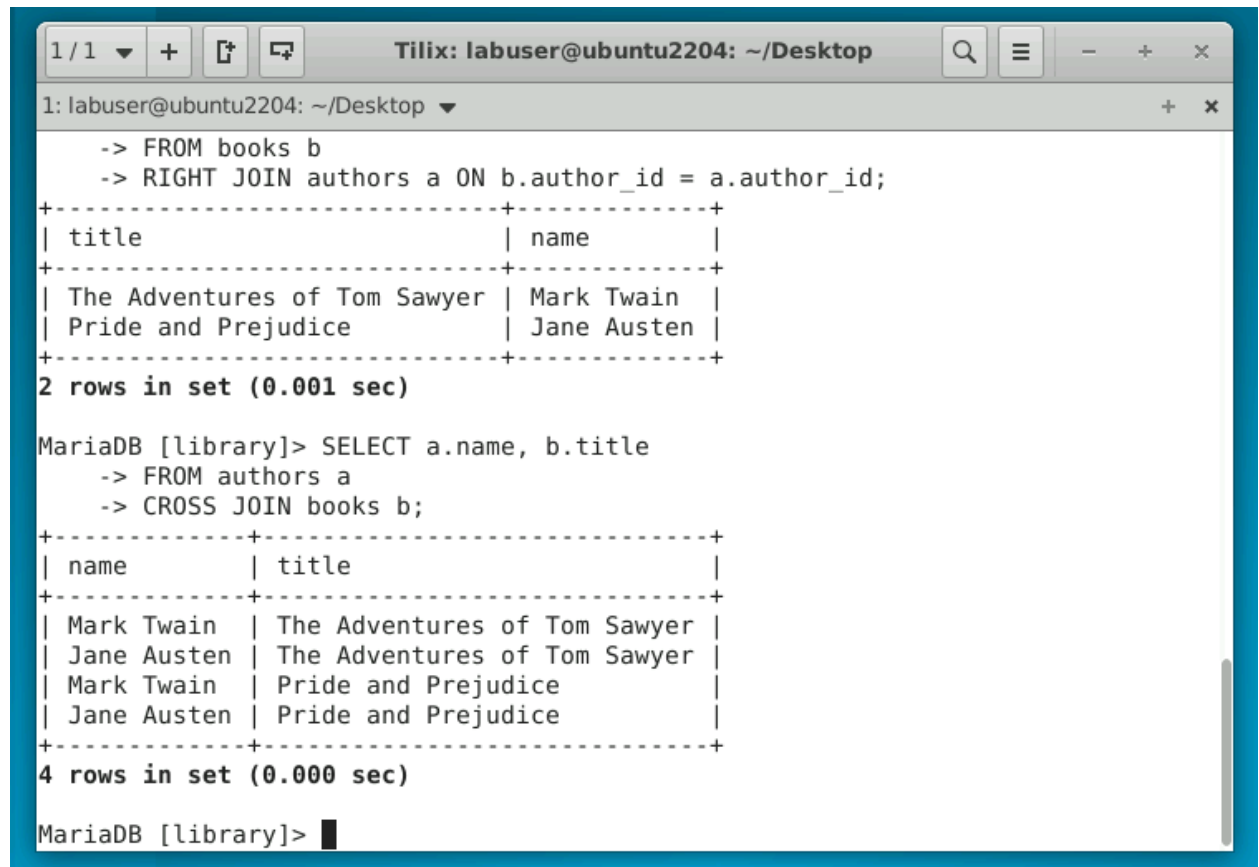
MariaDB [library]> SELECT a.name, b.title
-> FROM authors a
-> LEFT JOIN books b ON a.author_id = b.author_id;
+-----+-----+
| name      | title                                |
+-----+-----+
| Mark Twain | The Adventures of Tom Sawyer        |
| Jane Austen | Pride and Prejudice                 |
+-----+-----+
2 rows in set (0.000 sec)

MariaDB [library]> SELECT b.title, a.name
-> FROM books b
-> RIGHT JOIN authors a ON b.author_id = a.author_id;
+-----+-----+
| title                                | name      |
+-----+-----+
| The Adventures of Tom Sawyer        | Mark Twain |
| Pride and Prejudice                 | Jane Austen |
+-----+-----+
2 rows in set (0.001 sec)

MariaDB [library]>
  
```


2.4 Perform a cross-join to combine all the authors with all books (cartesian product):

```
SELECT a.name, b.title
FROM authors a
CROSS JOIN books b;
```



The screenshot shows a terminal window titled "Tilix: labuser@ubuntu2204: ~/Desktop". The terminal displays the following SQL queries and their results:

```
1: labuser@ubuntu2204: ~/Desktop
-> FROM books b
-> RIGHT JOIN authors a ON b.author_id = a.author_id;
```

title	name
The Adventures of Tom Sawyer	Mark Twain
Pride and Prejudice	Jane Austen

2 rows in set (0.001 sec)

```
MariaDB [library]> SELECT a.name, b.title
-> FROM authors a
-> CROSS JOIN books b;
```

name	title
Mark Twain	The Adventures of Tom Sawyer
Jane Austen	The Adventures of Tom Sawyer
Mark Twain	Pride and Prejudice
Jane Austen	Pride and Prejudice

4 rows in set (0.000 sec)

```
MariaDB [library]>
```

2.5 Perform a self-join on **authors** to find the authors from the same country: (Assuming additional data)

SELECT a1.name AS Author1, a2.name AS Author2

FROM authors a1

JOIN authors a2 ON a1.nationality = a2.nationality AND a1.author_id != a2.author_id;

The screenshot shows a terminal window titled 'Tilix: labuser@ubuntu2204: ~/Desktop'. It displays three SQL queries and their results in MariaDB.

```
1: labuser@ubuntu2204: ~/Desktop ▼
| Pride and Prejudice | Jane Austen |
+-----+-----+
2 rows in set (0.001 sec)

MariaDB [library]> SELECT a.name, b.title
-> FROM authors a
-> CROSS JOIN books b;
+-----+-----+
| name | title |
+-----+-----+
| Mark Twain | The Adventures of Tom Sawyer |
| Jane Austen | The Adventures of Tom Sawyer |
| Mark Twain | Pride and Prejudice |
| Jane Austen | Pride and Prejudice |
+-----+-----+
4 rows in set (0.000 sec)

MariaDB [library]> SELECT a1.name AS Author1, a2.name AS Author2
-> FROM authors a1
-> JOIN authors a2 ON a1.nationality = a2.nationality AND a1.author_id != a2
.author_id;
Empty set (0.000 sec)

MariaDB [library]>
```

By following these steps, you have successfully performed different types of joins in MySQL, demonstrating the ability to link and analyze data across multiple tables.