Hands-on Lab: Keys and Constraints in MySQL using phpMyAdmin

Estimated time needed: 20 minutes

Introduction

In this lab, you will learn how to add keys to create relationships between the tables and use constraints to enforce rules on the data entry in the MySQL database service using the phpMyAdmin graphical user interface (GUI) tool.

Software used in this lab

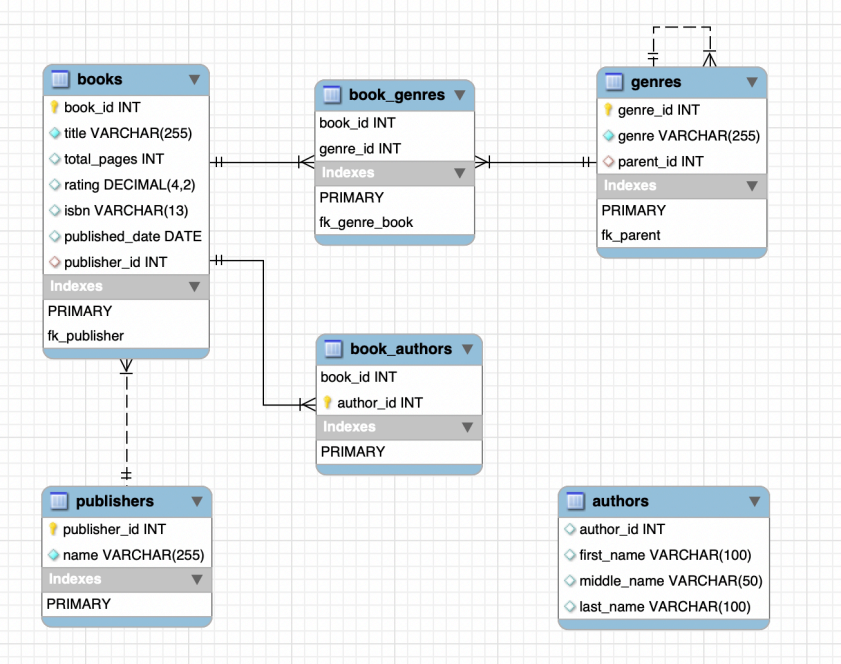
In this lab, you will use MySQL. MySQL is a relational database management system (RDBMS) designed to store, manipulate, and retrieve data efficiently.

To complete this lab, you will utilize the MySQL relational database service available as part of IBM Skills Network Labs' (SN Labs) Cloud IDE. SN Labs is a virtual lab environment used in this course.

Database used in this lab

For this lab, you will use the eBooks database.

The following entity relationship diagram (ERD) shows the current status of the schema of the eBooks database used in this lab:



Objectives

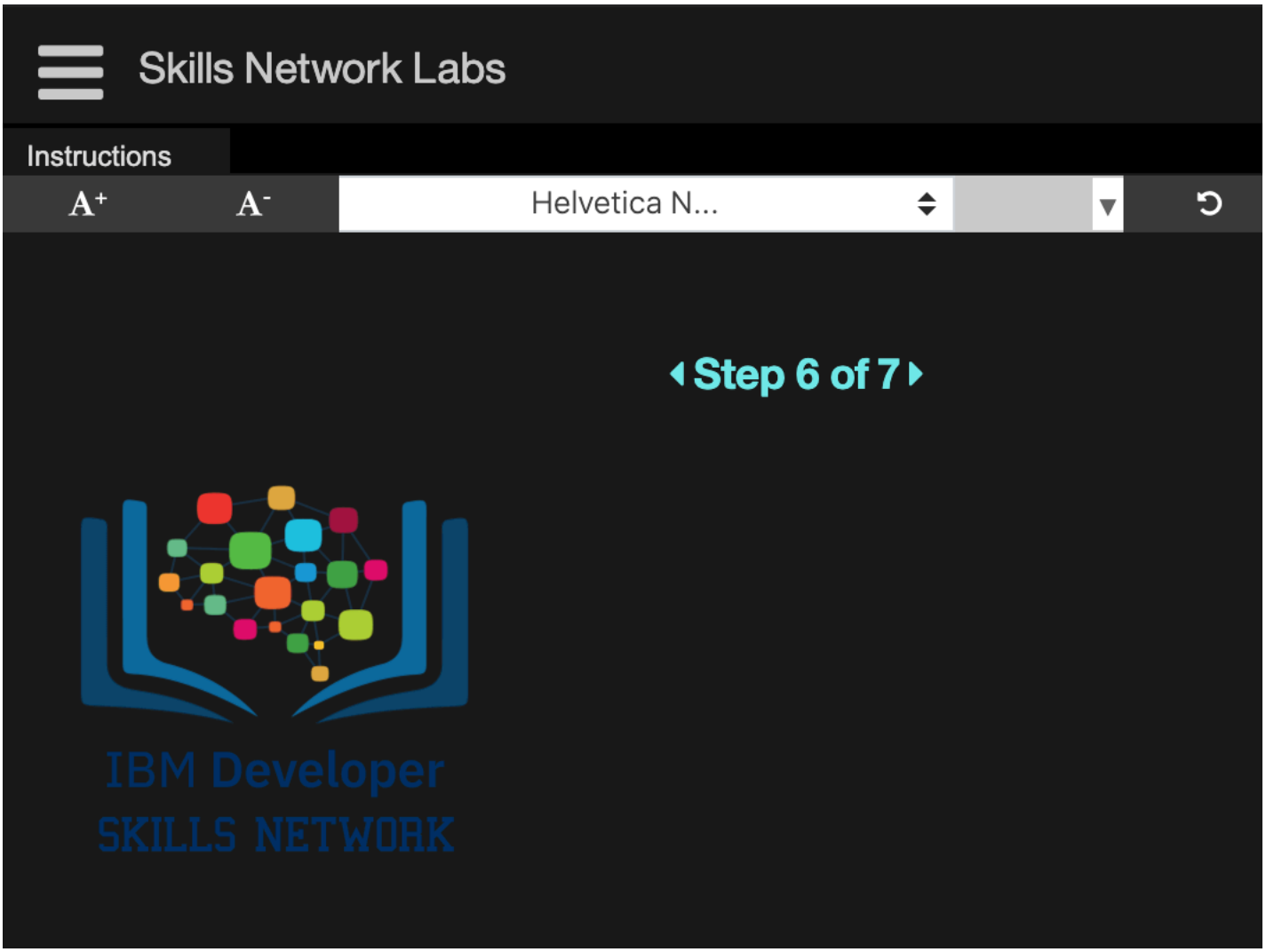
After completing this lab, you will be able to use the MySQL phpMyAdmin to:

- Create primary and foreign keys
- Add constraints to data columns

Exercise

In this exercise, you will learn how to add keys to create relationships between the tables. You will use constraints to enforce rules on the data entry in the MySQL database service using the phpMyAdmin graphical user interface (GUI) tool.

1. First, download the **eBooks** MySQL dump file (containing the eBooks database table, definitions, and data) to your local computer storage.
    - eBooks_mysql_dump.sql
2. Go to **Terminal > New Terminal** to open a terminal from the side-by-side launched Cloud IDE.



3. Start the MySQL service session in the Cloud IDE using the following command in the terminal. Find your MySQL service session password in the following image from the highlighted terminal location. Note your MySQL service session password because you may need to use it later in the lab.

```
1. 1
1. start_mysql
```

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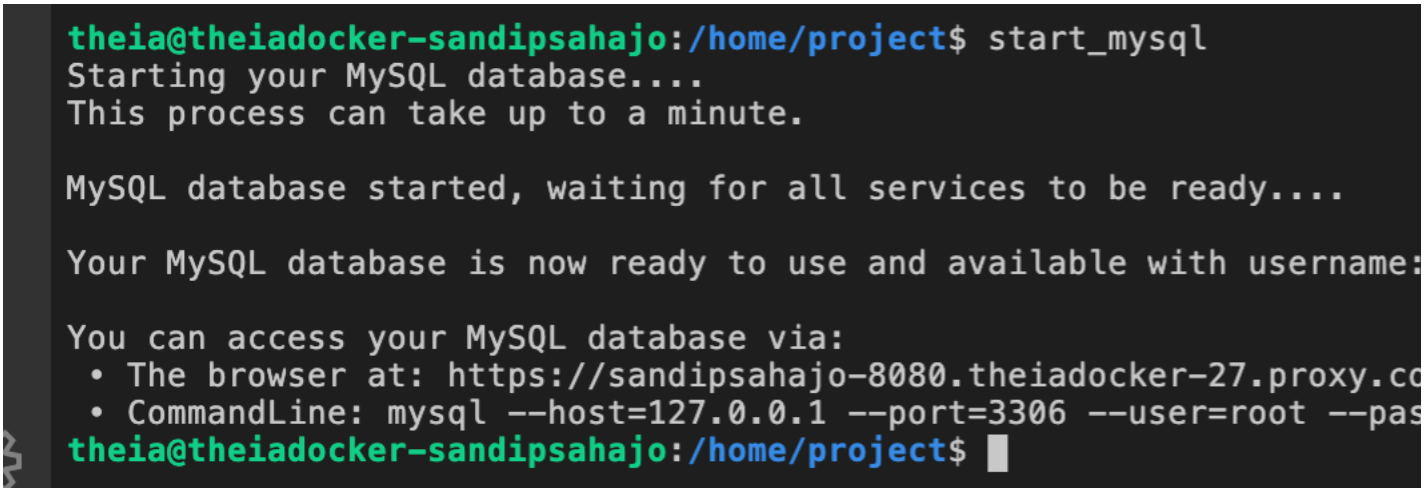
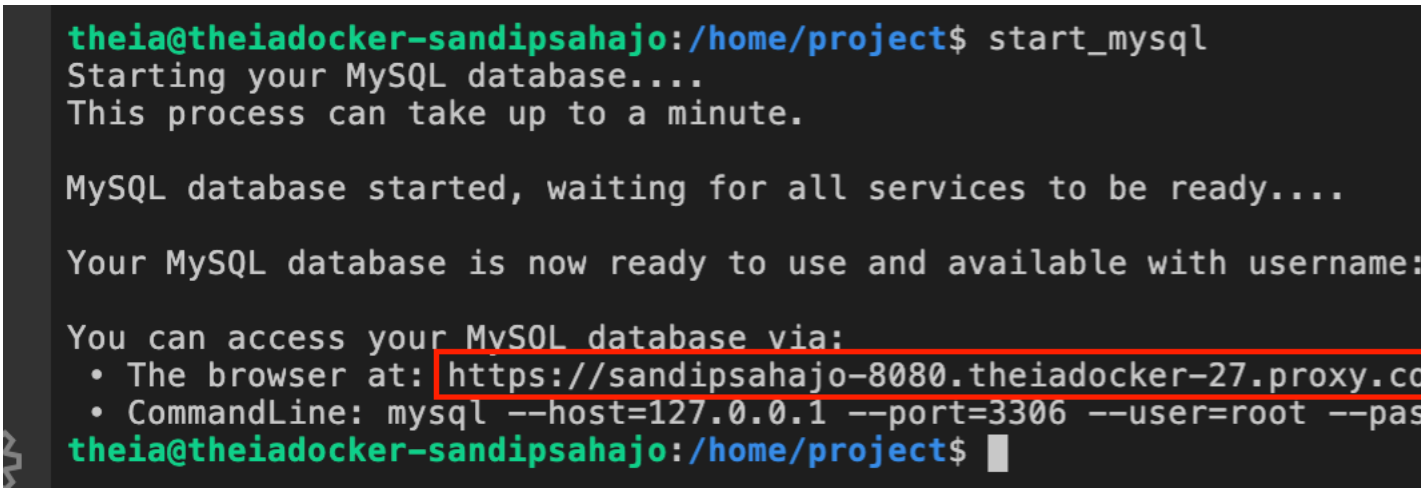
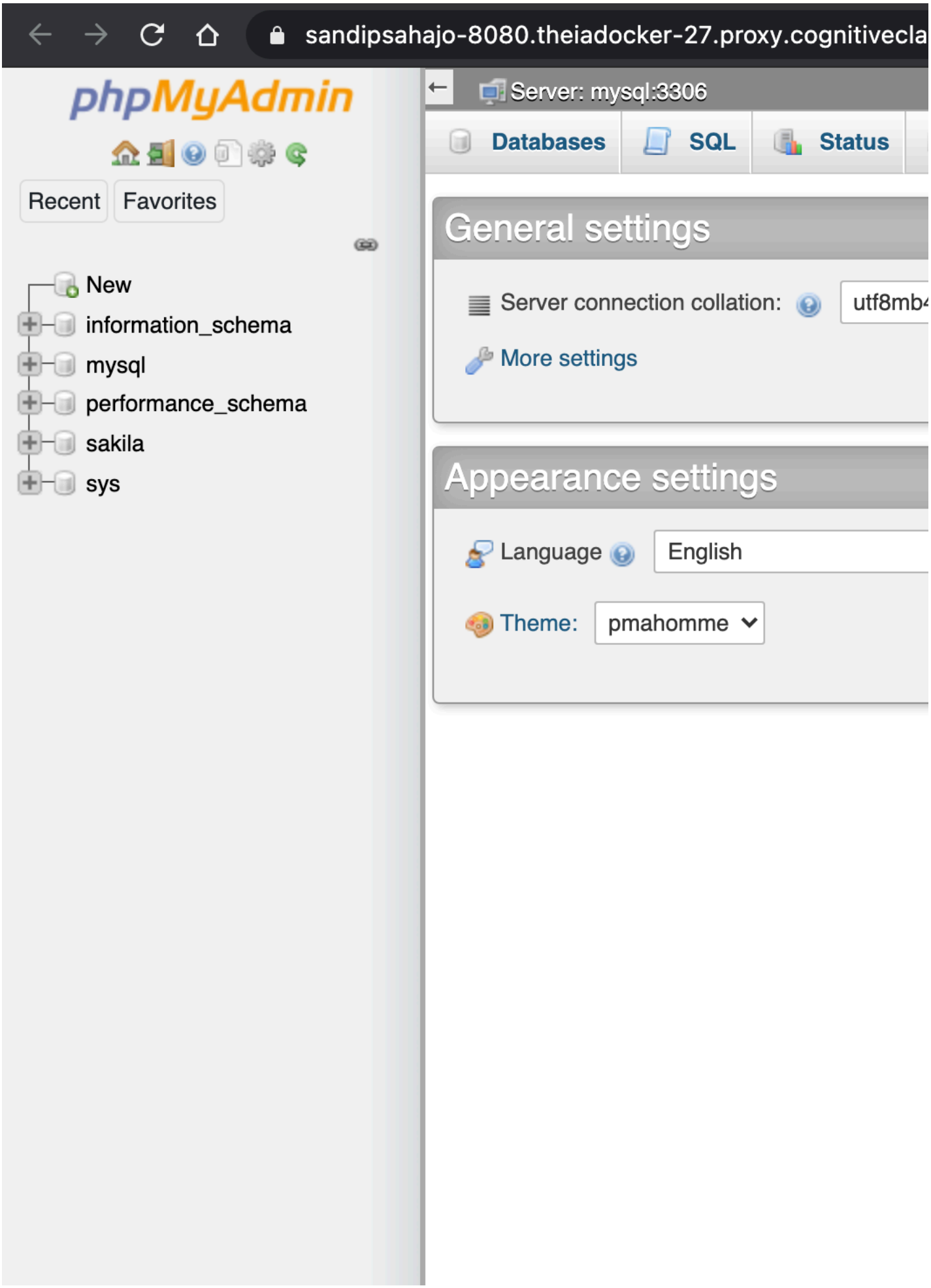


4. Copy your phpMyAdmin weblink from the highlighted location of the terminal shown in the following image and paste it to a new tab of your web browser.



5. You will see the phpMyAdmin GUI tool.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More settings
Appearance settings
Language
English
Theme:
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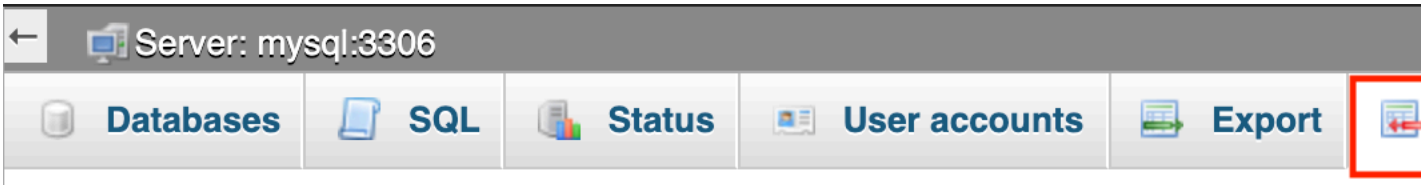
6. Go to the **Import** tab. Click **Choose File** and load the **eBooks_mysql_dump.sql** file. Next, uncheck **Enable foreign key checks** and select SQL as the **Format**. Then click **Go**.



Importing into the current server

File to import:

File may be compressed (gzip, bzip2, zip) or uncompressed.
A compressed file's name must end in **.[format].[compression]**. Example: **.sql.zip**

2

Browse your computer: Choose File eBooks_mysql_dump.sql (Max: 2,048KiB)

You may also drag and drop a file on any page.

Character set of the file: utf-8

Partial import:

Allow the interruption of an import in case the script detects it is close to the PHP tin

Skip this number of queries (for SQL) starting from the first one: 0

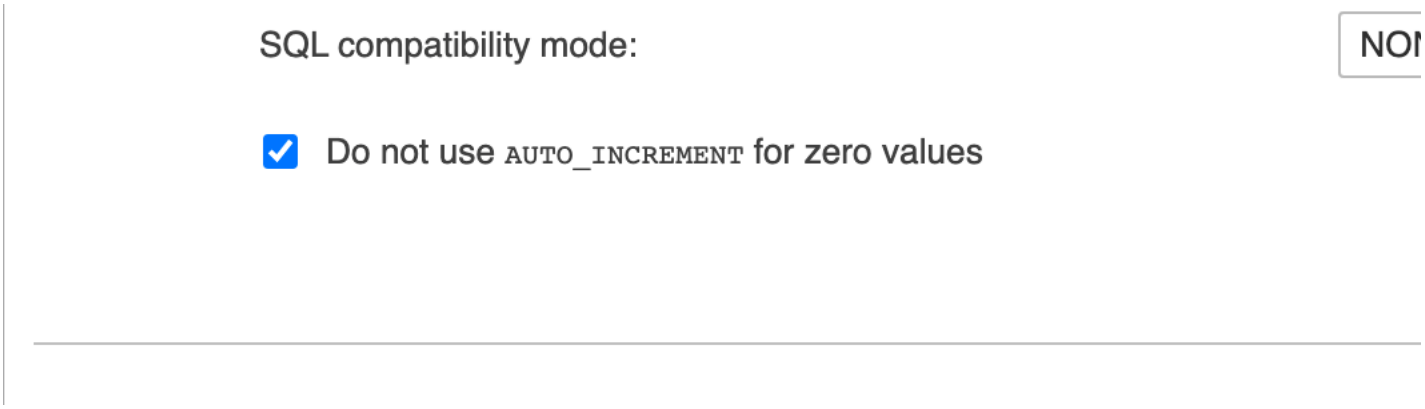
Other options:

Enable foreign key checks 3

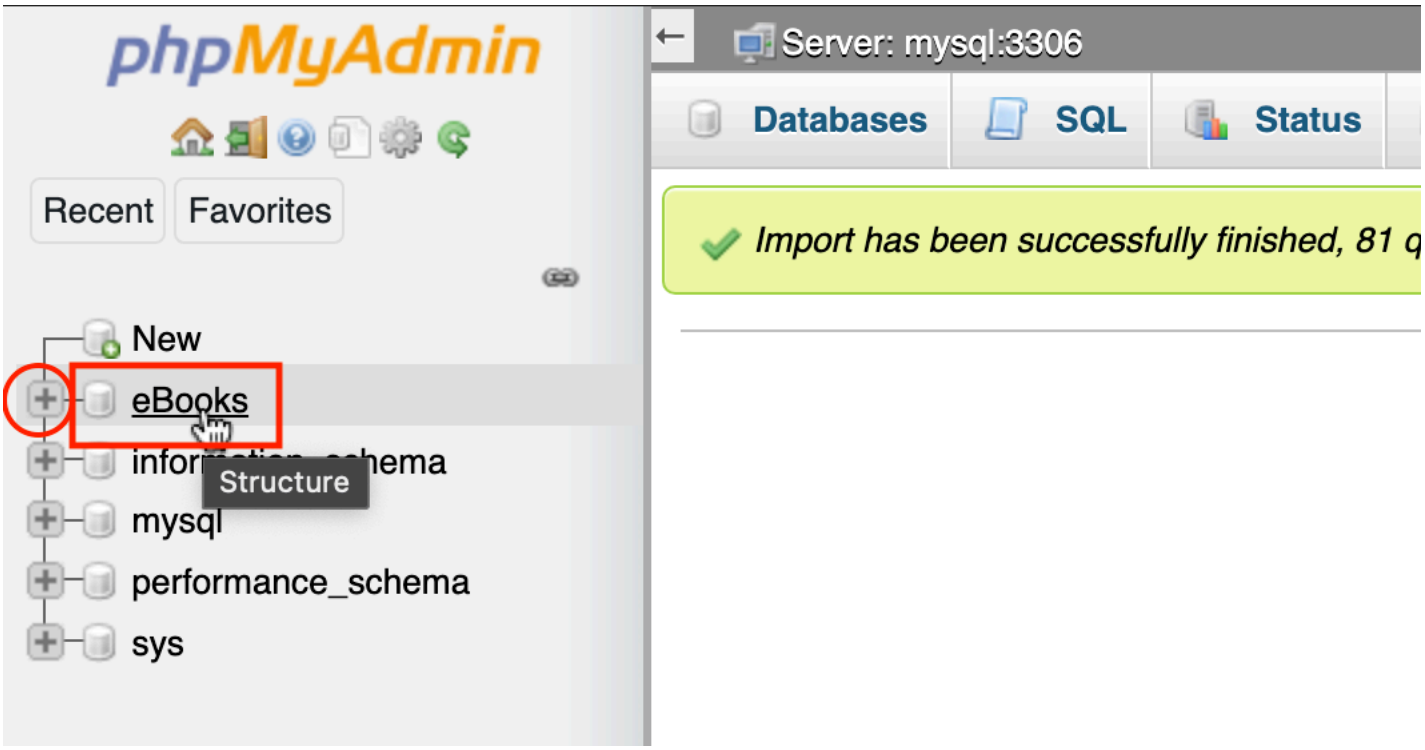
Format:

SQL 4

Format-specific options:

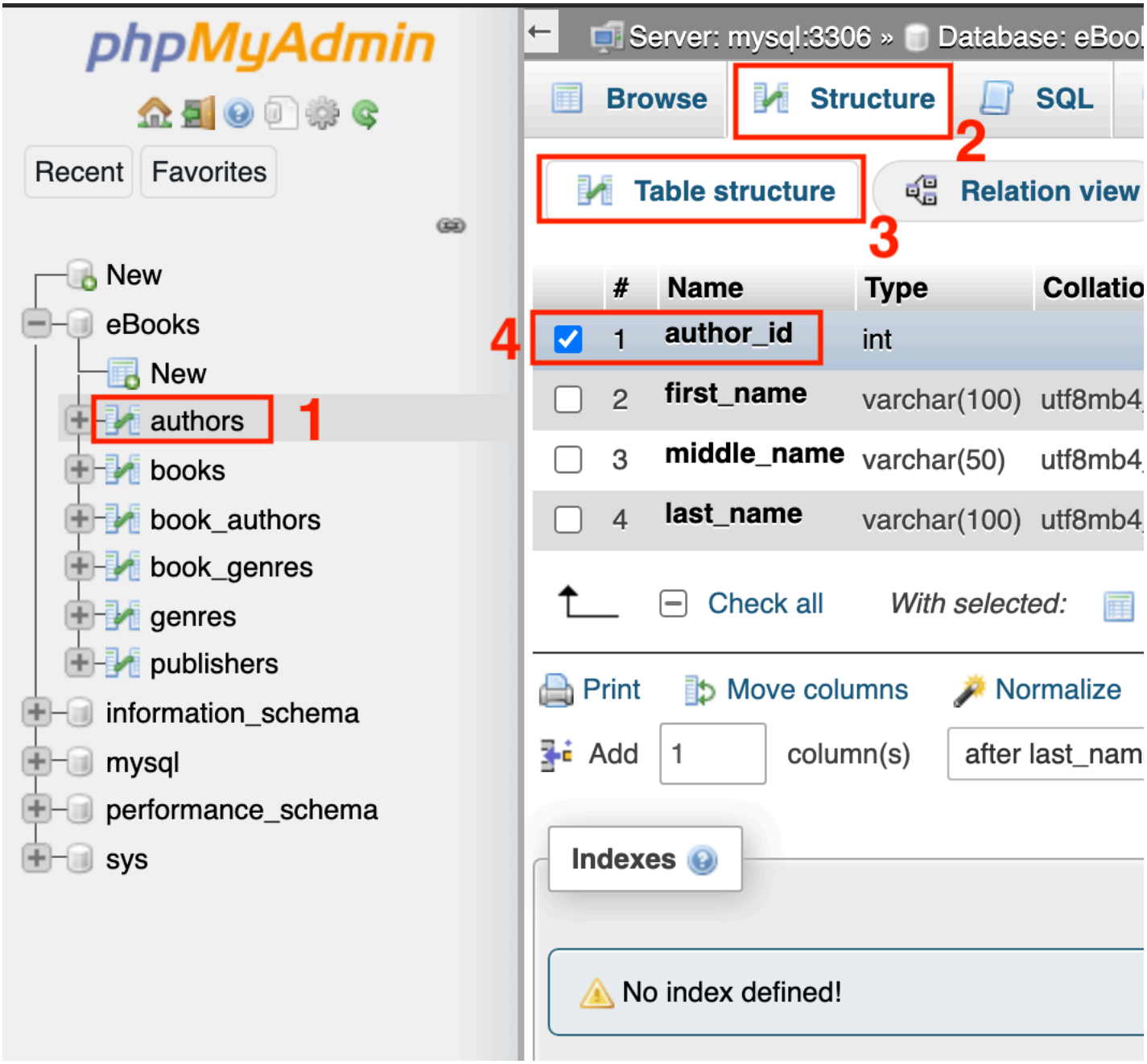


7. The system will notify you that the import has successfully finished. Select the database **eBooks** to expand the image (if necessary, click the + icon beside **eBooks**). You will see the list of tables from the eBooks database.



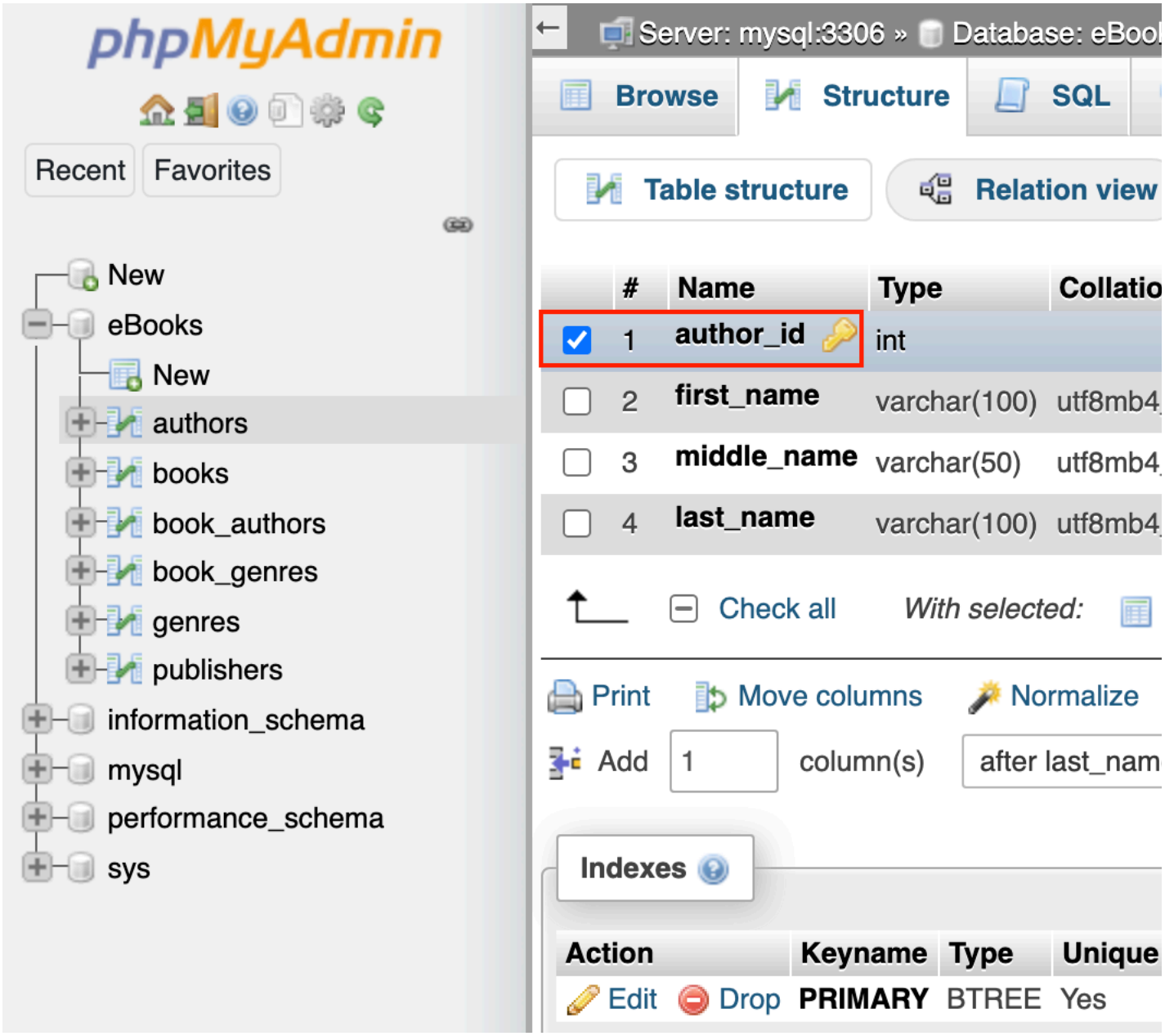
8. **Primary Keys**: Creating a primary key on a table automatically creates an index on the key. You will create a primary key for the **author** table to identify every row in the table uniquely. You will set the **author_id** column of the **author** table as a primary key.

- In the tree view, click the **authors** table.
- Switch to the **Structure** tab and make sure you are inside the **Table structure** subtab.
- Check the **author_id** column.
- Click the **Primary** option.



9. **Auto-increment**: You will set the auto-increment feature for the primary key of the **author** table.

   - In the tree view, click the **authors** table. Switch to the **Structure** tab and make sure you are inside the **Table structure** subtab.
   - Check the **author_id** column.
   - Click the **Change** option.
   - Check **A_I** option (A_I = Auto_Increment).
   - Click **Save**.


phpMyAdmin
Recent
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performance_schema
sys
Server: mysql:3306 » Database: eBook
Browse
Structure
SQL
Table structure
Relation view
Name Type Collatio
1 author_id int
2 first_name varchar(100) utf8mb4
3 middle_name varchar(50) utf8mb4
4 last_name varchar(100) utf8mb4
Check all
With selected:
Print
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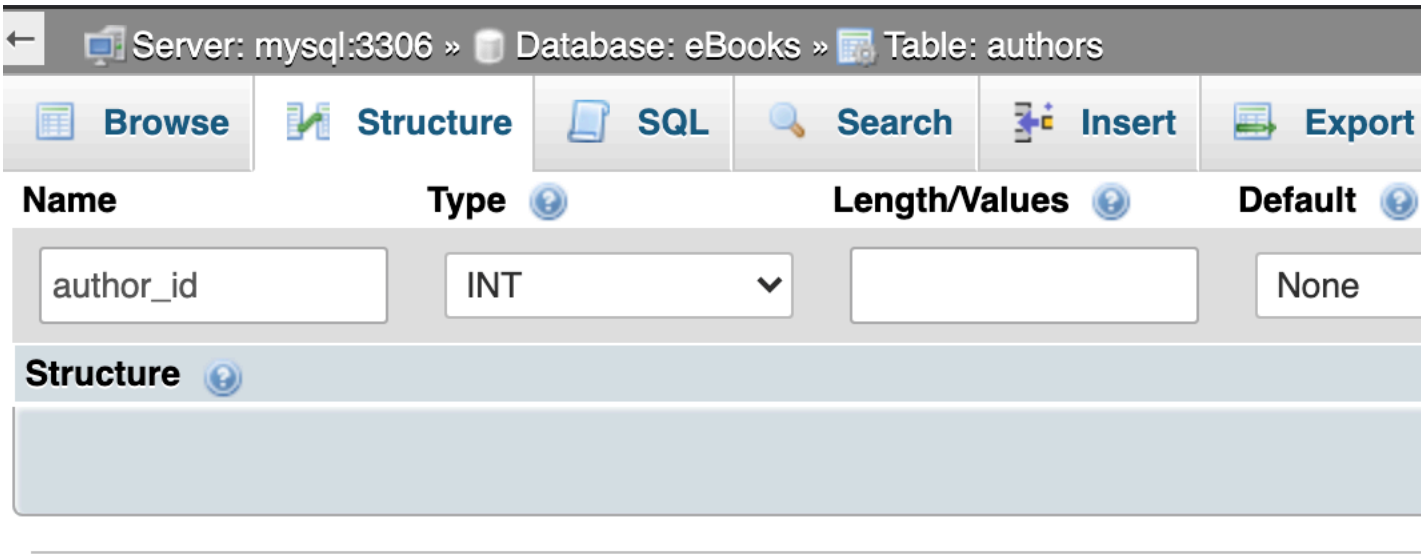
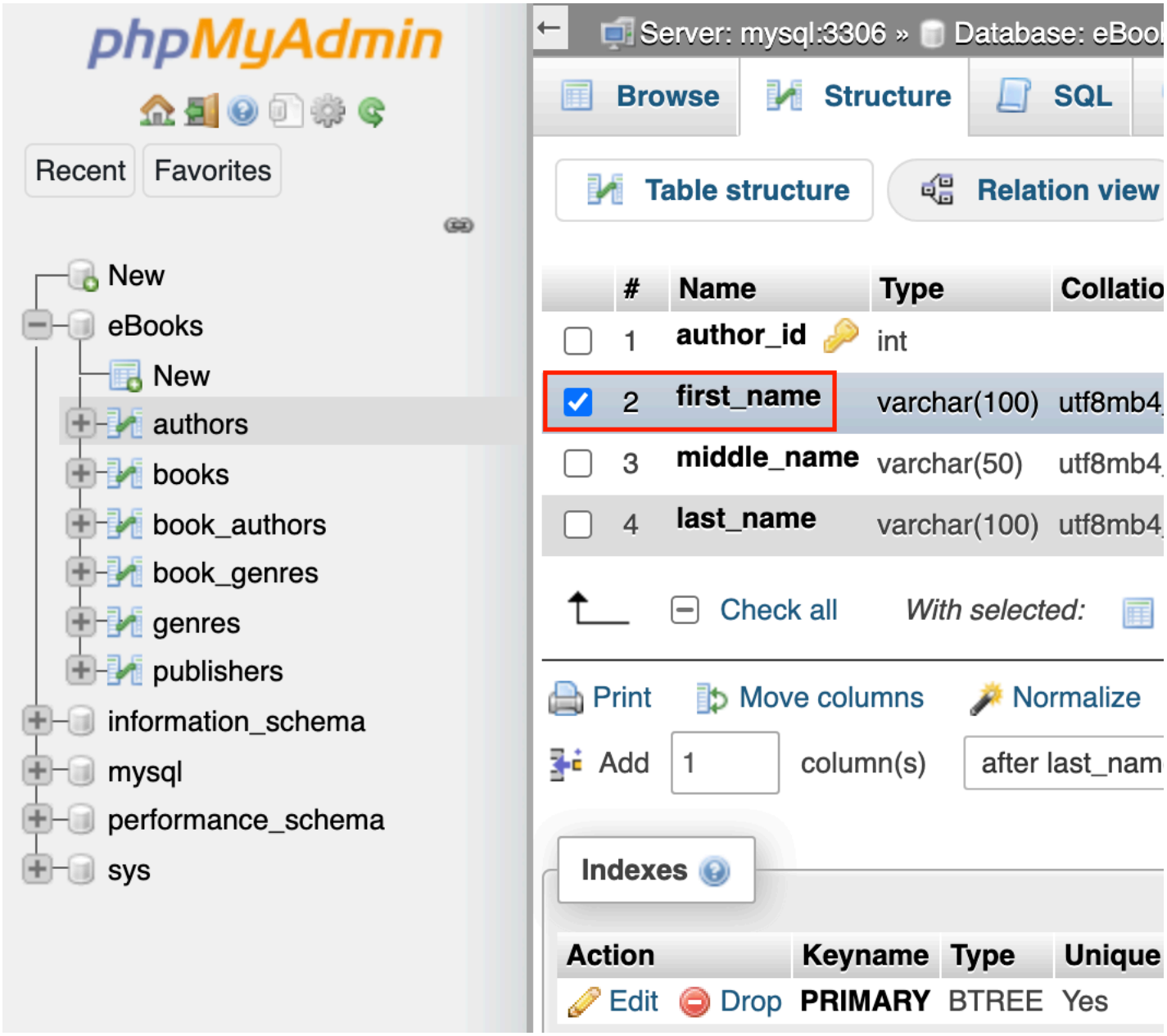
Normalize
Add 1 column(s)
after last_nam
Indexes
Action Keyname Type Unique
Edit Drop PRIMARY BTREE Yes



10. **Null constraints**: You will restrict the **first_name** column of the **authors** table from having a NULL value.
    - In the tree view, click the **authors** table. Switch to the **Structure** tab and make sure you are inside the **Table structure** subtab.
    - Check the **first_name** column.
    - Click the **Change** option.
    - Uncheck the **Null** option.
    - Click **Save**.


phpMyAdmin
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Structure
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Table structure
Relation view
Name Type Collatio
1 author_id int
2 first_name varchar(100) utf8mb4
3 middle_name varchar(50) utf8mb4
4 last_name varchar(100) utf8mb4
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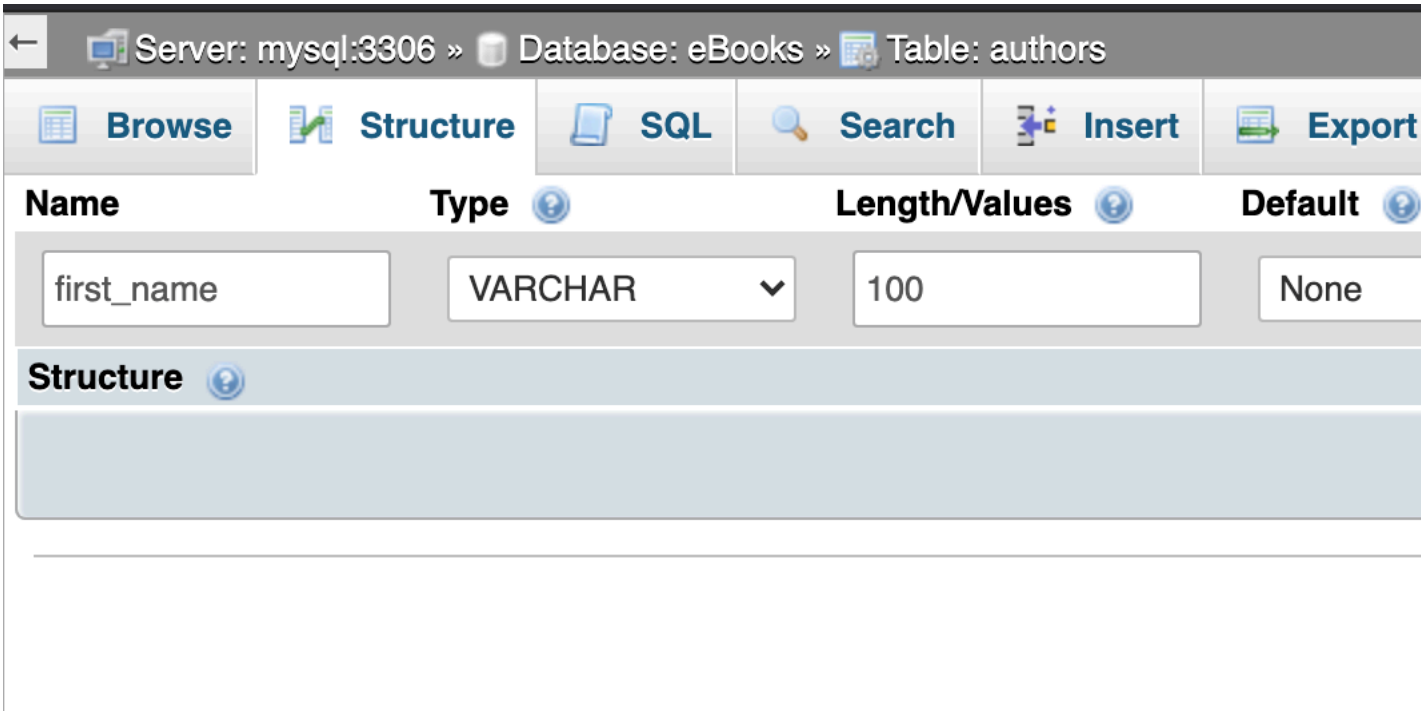
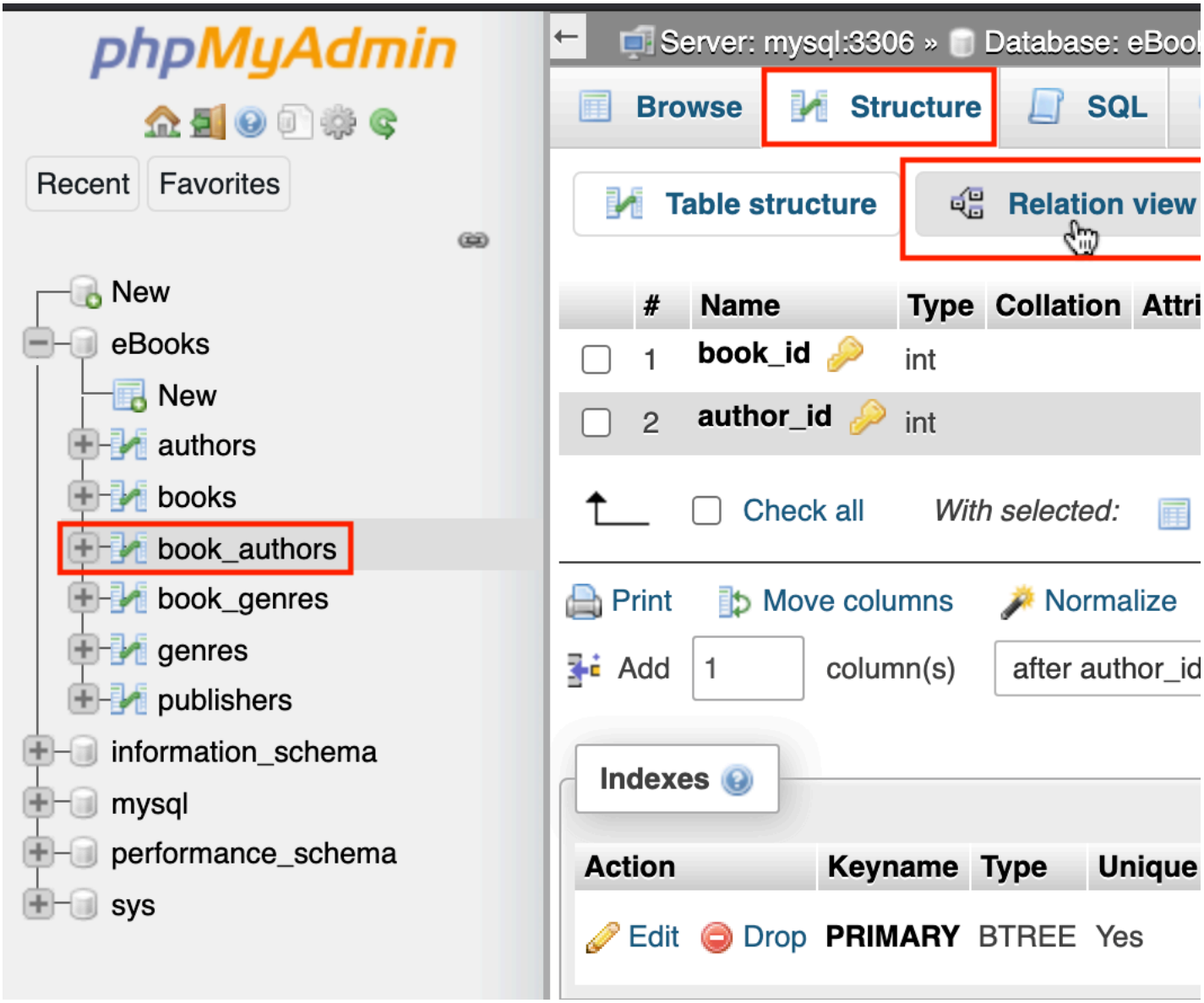


11. **Foreign keys**: You will create a foreign key for the **book_authors** table by setting its **author_id** column as a foreign key to establish a relationship between the **book_authors** and **authors** tables.

    - In the tree view, click the **book_authors** table. Switch to the **Structure** tab and make sure you are inside the **Relation view** subtab.
    - If necessary, click **Add constraint** to create a new foreign key constraint placeholder.
    - Fill in the placeholders as shown in the following image.
    - Click **Save**.


phpMyAdmin
Recent
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With selected:
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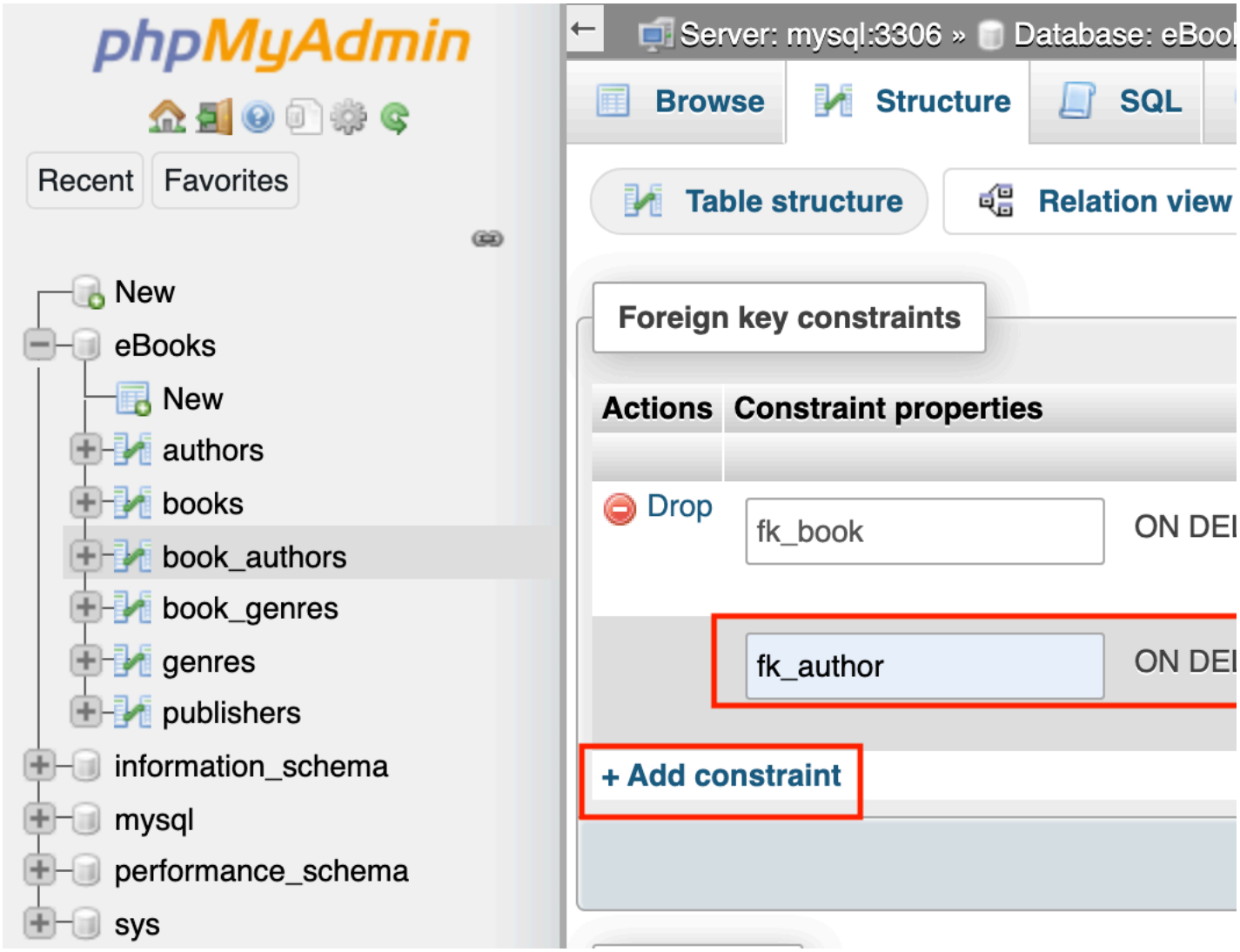
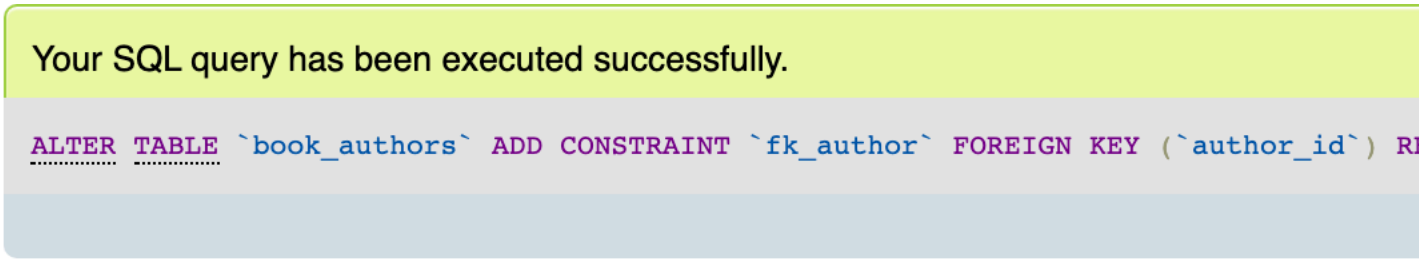
Add 1 column(s)
after author_id
Indexes
Action Keyname Type Unique
Edit Drop PRIMARY BTREE Yes



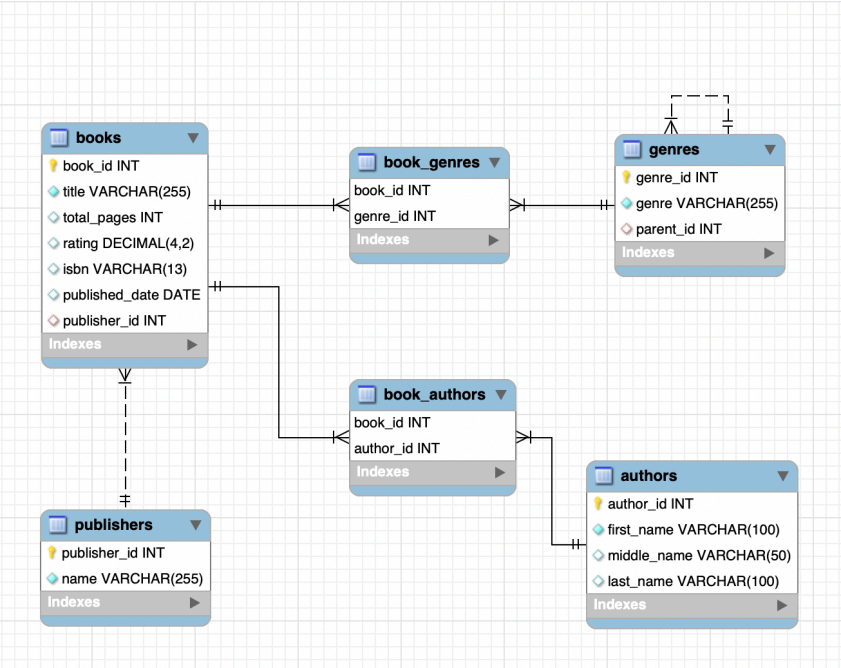


CASCADE means that when rows are deleted or updated in the parent table, the corresponding rows in the child table will also be deleted or updated.

RESTRICT means that rows cannot be deleted or updated in the parent table if there are corresponding rows in the child table.

12. After creating/adding all the above necessary primary keys, foreign keys, and constraints, the schema of the complete eBooks database will look like the following ERD diagram:

    Note: You don't need to generate any ERD diagram like below for this lab. By comparing the earlier eBooks schema ERD (shown in the section "Database Used in this Lab") and this complete eBooks schema ERD, just try to understand how all the operations you did above made the eBooks database complete.



Congratulations! You have completed this lab, and you are ready for the next topic.

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