

# 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.

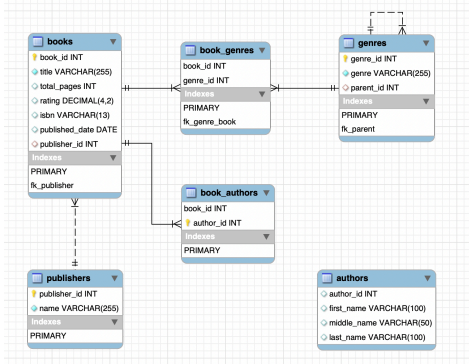


To complete this lab, you will utilize the MySQL relational database service available as part of IBM Skills Network Labs' (SN Labs) Cloud IDE. SN Labs is a virtual lab environment used in this course.

## 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

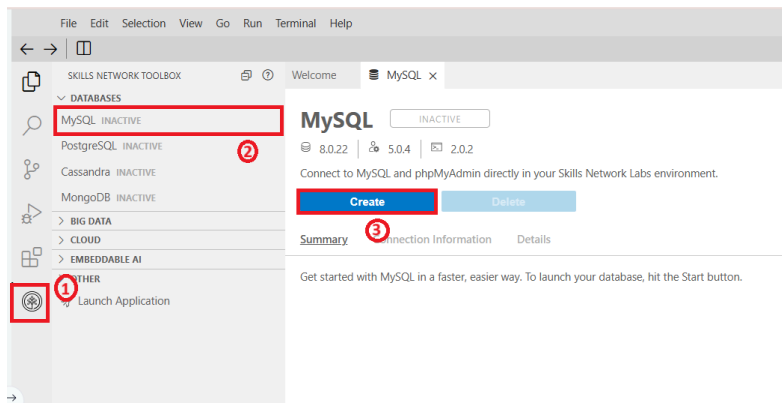
After completing this lab, you will be able to use the MySQL phpMyAdmin to:

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

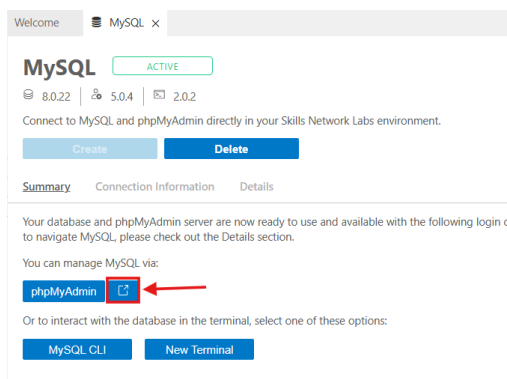
## Exercise

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. Click the Skills Network extension button on the left side of the window.
2. Open the DATABASES menu and click MySQL.
3. Click Create. MySQL may take a few moments to start.












4. Open the phpMyAdmin tool in a new tab in your browser.





























































5. You will see the phpMyAdmin GUI tool.

← → ↻ 🏠 🔒 sandipsahajo-8080.theiadocker-27.proxy.cognitiveclass.ai





Recent Favorites



← Server: mysql:3306

DatabasesSQLStatusUser accountsExportImportSettingsBinary logReplication

# 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`

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 timeout limit. *(This might be a good way to import large files, however it i*

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

## Other options:

☐ Enable foreign key checks

## Format:

SQL

## Format-specific options:

SQL compatibility mode: NONE

☒ Do not use `AUTO_INCREMENT` for zero values

8. 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.

phpMyAdmin

Recent Favorites

New

+

 eBooks

information\_schema

mysql

performance\_schema

sys

← Server: mysql:3306

DatabasesSQLStatusUser accountsExportImport

Import has been successfully finished, 81 queries executed. (eBooks\_mysql\_dump.sql)

9. **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.

Server: mysql:3306 » Database: eBooks » Table: authors

Structure SQL Search Insert Export Import Privi

Table structure Relation view

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input checked="" type="checkbox"/>	1	author_id	int		Yes	NULL			Char
<input type="checkbox"/>	2	first_name	varchar(100)	utf8mb4_0900_ai_ci	Yes	NULL			Char
<input type="checkbox"/>	3	middle_name	varchar(50)	utf8mb4_0900_ai_ci	Yes	NULL			Char
<input type="checkbox"/>	4	last_name	varchar(100)	utf8mb4_0900_ai_ci	Yes	NULL			Char

Check all With selected: Browse Change Drop Primary Unique

Print Move columns Normalize

Add 1 column(s) after last\_name Go

Indexes

No index defined!

10. **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**.

Server: mysql:3306 » Database: eBooks » Table: authors

Structure SQL Search Insert Export Import Privi

Table structure Relation view

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
<input checked="" type="checkbox"/>	1	author_id	int		No	None		
<input type="checkbox"/>	2	first_name	varchar(100)	utf8mb4_0900_ai_ci	Yes	NULL		
<input type="checkbox"/>	3	middle_name	varchar(50)	utf8mb4_0900_ai_ci	Yes	NULL		
<input type="checkbox"/>	4	last_name	varchar(100)	utf8mb4_0900_ai_ci	Yes	NULL		

Check all With selected: Browse Change Drop Primary Unique

Print Move columns Normalize

Add 1 column(s) after last\_name Go

Indexes

Action	Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
Edit Drop	PRIMARY	BTREE	Yes	No	author_id	1378	A	No	

Server: mysql:3306 » Database: eBooks » Table: authors

Structure SQL Search Insert Export Import Privileges Operations Trigger

Name	Type	Length/Values	Default	Collation	Attributes	Null
author_id	INT		None			<input type="checkbox"/>

Structure

11. **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

Recent Favorites

- New
- eBooks
  - New
  - authors
  - books
  - book\_authors
  - book\_genres
  - genres
  - publishers
- information\_schema
- mysql
- performance\_schema
- sys

Server: mysql:3306 » Database: eBooks » Table: authors

Browse Structure SQL Search Insert Export Import Privileges

Table structure Relation view

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
<input type="checkbox"/> 1	author_id	int			No	None		AUTO_INCREMENT
<input checked="" type="checkbox"/> 2	first_name	varchar(100)	utf8mb4_0900_ai_ci		Yes	NULL		
<input type="checkbox"/> 3	middle_name	varchar(50)	utf8mb4_0900_ai_ci		Yes	NULL		
<input type="checkbox"/> 4	last_name	varchar(100)	utf8mb4_0900_ai_ci		Yes	NULL		

Check all With selected: Browse Change Drop Primary Unique

Print Move columns Normalize

Add 1 column(s) after last\_name Go

Indexes

Action	Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
Edit Drop	PRIMARY	BTREE	Yes	No	author_id	1378	A	No	

Server: mysql:3306 » Database: eBooks » Table: authors

Browse Structure SQL Search Insert Export Import Privileges Operations Trigger

Name	Type	Length/Values	Default	Collation	Attributes	Null
first_name	VARCHAR	100	None	utf8mb4_0900_ai_ci		

Structure

12. **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 Favorites

- New
- eBooks
  - New
  - authors
  - books
  - book\_authors
  - book\_genres
  - genres
  - publishers
- information\_schema
- mysql
- performance\_schema
- sys

Server: mysql:3306 » Database: eBooks » Table: book\_authors

Browse Structure SQL Search Insert Export Import Privileges

Table structure Relation view

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/> 1	book_id	int			No	None			Change Drop
<input type="checkbox"/> 2	author_id	int			No	None			Change Drop

Check all With selected: Browse Change Drop Primary Unique

Print Move columns Normalize

Add 1 column(s) after author\_id Go

Indexes

Action	Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
Edit Drop	PRIMARY	BTREE	Yes	No	book_id	1091	A	No	
					author_id	1717	A	No	

Recent

Favorites

New

eBooks

New

authors

books

book\_authors

book\_genres

genres

publishers

information\_schema

mysql

performance\_schema

sys

Server: mysql:3306 » Database: eBooks » Table: book\_authors

Browse

Structure

SQL

Search

Insert

Export

Import

Privileges

Table structure

Relation view

Foreign key constraints

Actions

Constraint properties

Drop

fk\_book

ON DELETE

CASCADE

ON UPDATE

RESTRICT

fk\_author

ON DELETE

CASCADE

ON UPDATE

RESTRICT

+ Add constraint

Your SQL query has been executed successfully.

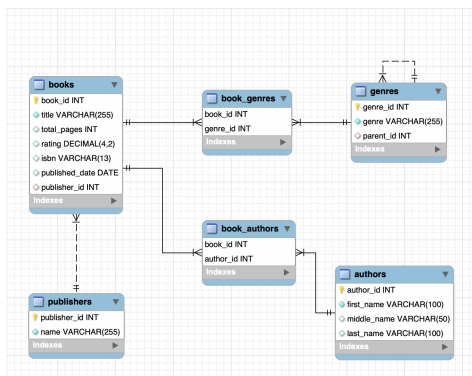
```
ALTER TABLE `book_authors` ADD CONSTRAINT `fk_author` FOREIGN KEY (`author_id`) REFERENCES `authors` (`author_id`) ON DELETE CASCADE ON UPDATE RESTRICT
```

**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.

13. 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.

Author: [Sandip Saha Joy](#).



# Skills Network

Other Contributor(s)

- Kathy An

© IBM Corporation. All rights reserved.