Hands-on Lab: String Patterns, Sorting and Grouping in MySQL using phpMyAdmin

Estimated time needed: 20 minutes

In this lab, you will learn how to create tables and load data in the MySQL database service using the phpMyAdmin graphical user interface (GUI) tool.

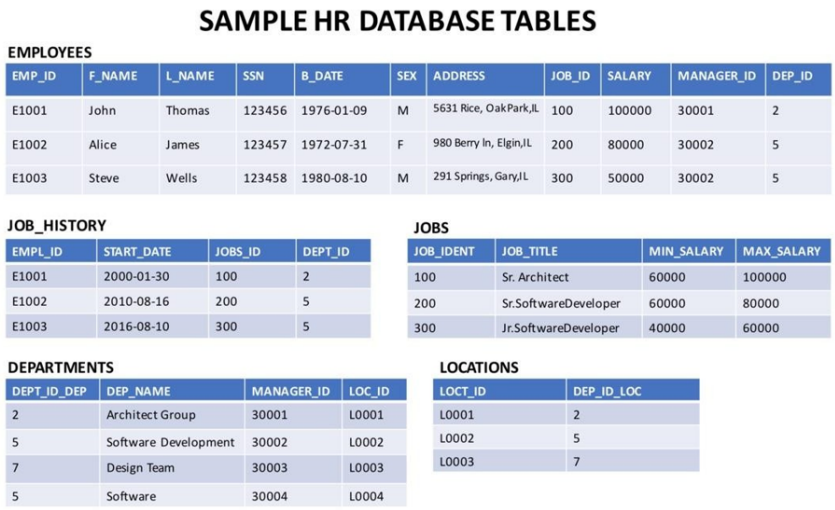
Software Used in this Lab

In this lab, you will use MySQL. MySQL is a Relational Database Management System (RDBMS) designed to efficiently store, manipulate, and retrieve data.

To complete this lab you will utilize 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

The database used in this lab is an internal database. You will be working on a sample HR database. This HR database schema consists of 5 tables called **EMPLOYEES**, **JOB_HISTORY**, **JOBS**, **DEPARTMENTS** and **LOCATIONS**. Each table has a few rows of sample data. The following diagram shows the tables for the HR database:

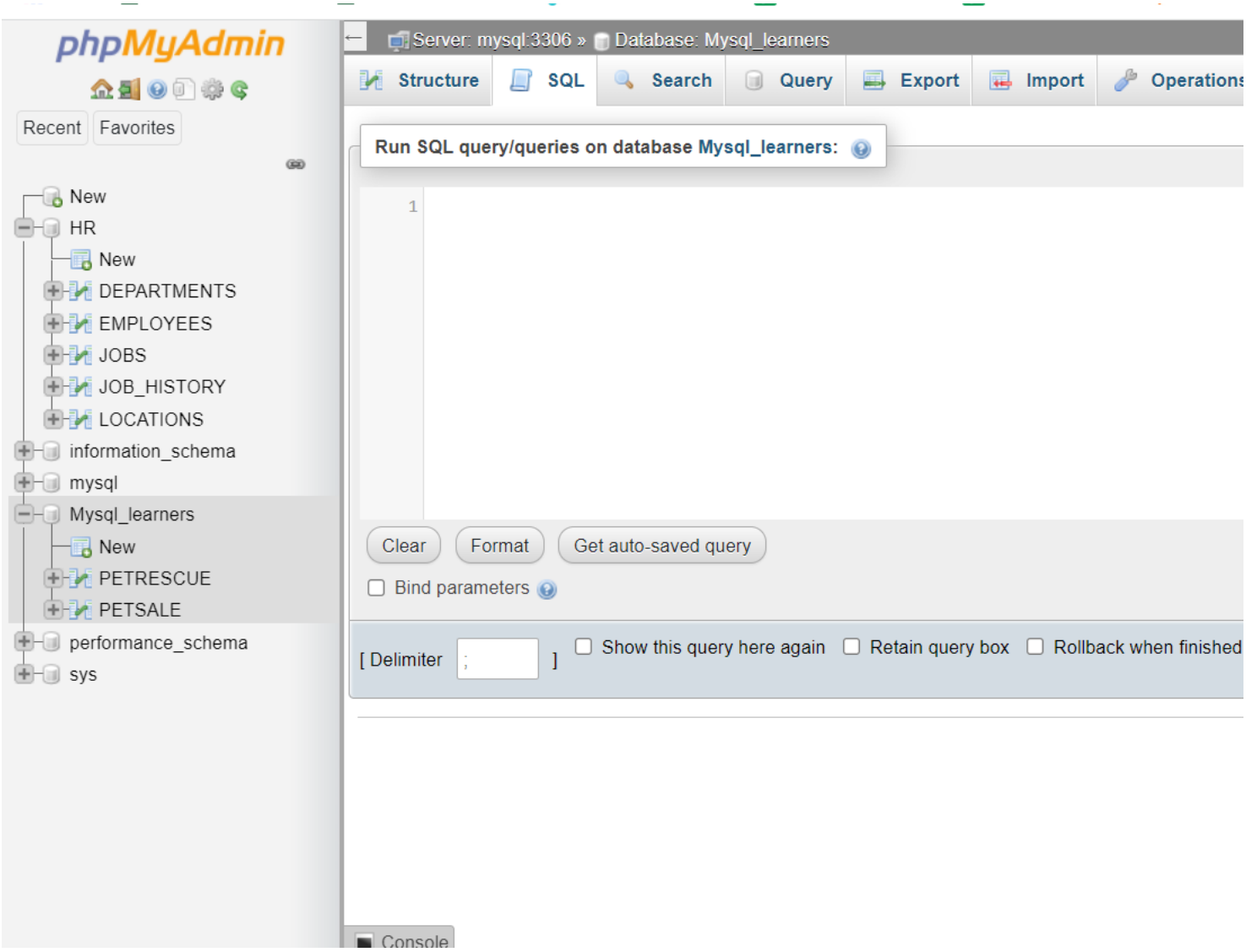


Objectives

After completing this lab, you will be able to:

- Simplify a SELECT statement by using string patterns, ranges, or sets of values
- Sort the result set in either ascending or descending order and identify which column to use for the sorting order
- Eliminate duplicates from a result set and further restrict a result set

Once the tables are loaded open the sql editor to start executing the functions.



Exercise 1: String Patterns

In this exercise, you will go through some SQL problems on String Patterns.

1. Problem:

   Retrieve all employees whose address is in Elgin,IL.

▶ Hint
▼ Solution

```
1. 1
2. 2
3. 3
1. SELECT F_NAME , L_NAME
2. FROM EMPLOYEES
3. WHERE ADDRESS LIKE '%Elgin,IL%';
```

Copied!

▶ Output

2. Problem:

   Retrieve all employees who were born during the 1970's.

▶ Hint
▼ Solution

```
1. 1
2. 2
3. 3
1. SELECT F_NAME , L_NAME
2. FROM EMPLOYEES
3. WHERE B_DATE LIKE '197%';
```

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▶ Output

3. Problem:

   Retrieve all employees in department 5 whose salary is between 60000 and 70000.

▶ Hint
▼ Solution

```
1. 1
2. 2
3. 3
1. SELECT *
2. FROM EMPLOYEES
3. WHERE (SALARY BETWEEN 60000 AND 70000) AND DEP_ID = 5;
```

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▶ Output

Exercise 2: Sorting

In this exercise, you will go through some SQL problems on Sorting.

1. Problem:

   Retrieve a list of employees ordered by department ID.

▶ Hint
▼ Solution

```
1. 1
2. 2
3. 3
1. SELECT F_NAME, L_NAME, DEP_ID
2. FROM EMPLOYEES
3. ORDER BY DEP_ID;
```

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▶ Output

2. Problem:

   Retrieve a list of employees ordered in descending order by department ID and within each department ordered alphabetically in descending order by last name.

▶ Hint
▼ Solution

```
1. 1
2. 2
3. 3
1. SELECT F_NAME, L_NAME, DEP_ID
2. FROM EMPLOYEES
3. ORDER BY DEP_ID DESC, L_NAME DESC;
```

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▶ Output

3. (Optional) Problem:

   In SQL problem 2 (Exercise 2 Problem 2), use department name instead of department ID. Retrieve a list of employees ordered by department name, and within each department ordered alphabetically in descending order by last name.

▶ Hint
▼ Solution

```
1. 1
2. 2
3. 3
4. 4
1. SELECT D.DEP_NAME , E.F_NAME, E.L_NAME
2. FROM EMPLOYEES as E, DEPARTMENTS as D
3. WHERE E.DEP_ID = D.DEPT_ID_DEP
4. ORDER BY D.DEP_NAME, E.L_NAME DESC;
```

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   In the SQL Query above, `D` and `E` are aliases for the table names. Once you define an alias like `D` in your query, you can simply write `D.COLUMN_NAME` rather than the full form `DEPARTMENTS.COLUMN_NAME`.

▶ Output

Exercise 3: Grouping

In this exercise, you will go through some SQL problems on Grouping.

NOTE: The SQL problems in this exercise involve usage of SQL Aggregate functions AVG and COUNT. COUNT has been covered earlier. AVG is a function that can be used to calculate the Average or Mean of all values of a specified column in the result set. For example, to retrieve the average salary for all employees in the EMPLOYEES table, issue the query: `SELECT AVG(SALARY) FROM EMPLOYEES;`. You will learn more about AVG and other aggregate functions later in the lecture **Built-in Database Functions**.

1. Problem:

   For each department ID retrieve the number of employees in the department.

▶ Hint
▼ Solution

```
1. 1
2. 2
3. 3
1. SELECT DEP_ID, COUNT(*)
2. FROM EMPLOYEES
3. GROUP BY DEP_ID;
```

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▶ Output

2. Problem:

   For each department retrieve the number of employees in the department, and the average employee salary in the department..

▶ Hint
▼ Solution

```
1. 1
2. 2
3. 3
1. SELECT DEP_ID, COUNT(*), AVG(SALARY)
2. FROM EMPLOYEES
3. GROUP BY DEP_ID;
```

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▶ Output

3. Problem:

   Label the computed columns in the result set of SQL problem 2 (Exercise 3 Problem 2) as NUM_EMPLOYEES and AVG_SALARY.

▶ Hint
▼ Solution

```
1. 1
2. 2
3. 3
1. SELECT DEP_ID, COUNT(*) AS "NUM_EMPLOYEES", AVG(SALARY) AS "AVG_SALARY"
2. FROM EMPLOYEES
3. GROUP BY DEP_ID;
```

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▶ Output

4. Problem:

   In SQL problem 3 (Exercise 3 Problem 3), order the result set by Average Salary..

▶ Hint
▼ Solution

```
1. 1
2. 2
3. 3
4. 4
1. SELECT DEP_ID, COUNT(*) AS "NUM_EMPLOYEES", AVG(SALARY) AS "AVG_SALARY"
2. FROM EMPLOYEES
3. GROUP BY DEP_ID
4. ORDER BY AVG_SALARY;
```

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▶ Output

5. Problem:

   In SQL problem 4 (Exercise 3 Problem 4), limit the result to departments with fewer than 4 employees.

▶ Hint
▼ Solution

```
1. 1
2. 2
3. 3
4. 4
5. 5
1. SELECT DEP_ID, COUNT(*) AS "NUM_EMPLOYEES", AVG(SALARY) AS "AVG_SALARY"
2. FROM EMPLOYEES
3. GROUP BY DEP_ID
4. HAVING count(*) < 4
```

```
5. ORDER BY AVG_SALARY;
```

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▶ Output

Solution Script

If you would like to run all the solution queries of the SQL problems of this lab with a script, download the script below.Import the script to phpadmin mysql interface and run. Follow Hands-on Lab : Create tables using SQL scripts and Load data into tables on how to upload a script to phpmyadmin console and run it.

- StringPattern-Sorting-Grouping_Solution_Script.sql

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

Author(s)

Lakshmi Holla

Malika Singla

Changelog

Date	Version	Changed by	Change Description
2023-05-10	0.3	Eric Hao & Vladislav Boyko	Updated Page Frames
2023-05-04	0.2	Rahul Jaideep	Updated Markdown file
2021-11-01	0.1	Lakshmi Holla, Malika Singla	Initial Version