

# Hands-on Lab: Working with Joins 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:

## SAMPLE HR DATABASE TABLES

EMP_ID	F_NAME	L_NAME	SSN	B_DATE	SEX	ADDRESS	JOB_ID	SALARY	MANAGER_ID	DEP_ID
E1001	John	Thomas	123456	1976-01-09	М	5631 Rice, OakPark,IL	100	100000	30001	2
E1002	Alice	James	123457	1972-07-31	F	980 Berry In, Elgin,IL	200	80000	30002	5
E1003	Steve	Wells	123458	1980-08-10	М	291 Springs, Gary,IL	300	50000	30002	5

JOB_HISTORY				JOBS			
START_DATE	JOBS_ID	DEPT_ID	JOB_IDENT	JOB_TITLE	MIN_SALARY	MAX_SALAR	
2000-01-30	100	2	100	Sr. Architect	60000	100000	
2010-08-16	200	5	200	Sr.SoftwareDeveloper	60000	80000	
2016-08-10	300	5	300	Jr.SoftwareDeveloper	40000	60000	
	START_DATE 2000-01-30 2010-08-16	START_DATE         JOBS_ID           2000-01-30         100           2010-08-16         200	START_DATE         JOBS_ID         DEPT_ID           2000-01-30         100         2           2010-08-16         200         5	START_DATE         JOBS_ID         DEPT_ID         JOB_IDENT           2000-01-30         100         2         100           2010-08-16         200         5         200	START_DATE         JOBS_ID         DEPT_ID         JOB_IDENT         JOB_TITLE           2000-01-30         100         2         100         Sr. Architect           2010-08-16         200         5         200         Sr.SoftwareDeveloper	START_DATE         JOBS_ID         DEPT_ID         JOB_IDENT         JOB_TITLE         MIN_SALARY           2000-01-30         100         2         100         Sr. Architect         60000           2010-08-16         200         5         200         Sr.SoftwareDeveloper         60000	

21003	2010 00 10	-		300	JI.SUITWATEDEVEL
DEPARTMEN	TS			LOCATI	ONS
DEPT_ID_DEP	DEP_NAME	MANAGER_ID	LOC_ID	LOCT_ID	DEP
2	Architect Group	30001	L0001	L0001	2
5	Software Development	30002	L0002	L0002	5
7	Design Team	30003	L0003	L0003	7
5	Software	30004	L0004		

In this lab, you will run through some SQL practice problems that will provide hands-on experience with the different kinds of join operations.

## How does a CROSS JOIN (also known as Cartesian Join) statement syntax look?

SELECT column\_name(s)
FROM table1
CROSS JOIN table2;

#### How does an INNER JOIN statement syntax look?

```
SELECT column_name(s)
FROM table1
INNER JOIN table2
ON table1.column_name = table2.column_name;
WHERE condition;
```

## How does a LEFT OUTER JOIN statement syntax look?

```
SELECT column_name(s)
FROM table1
LEFT OUTER JOIN table2
ON table1.column_name = table2.column_name
WHERE condition;
```

## How does a RIGHT OUTER JOIN statement syntax look?

```
SELECT column_name(s)
FROM table1
RIGHT OUTER JOIN table2
ON table1.column_name = table2.column_name
WHERE condition;
```

## How does a FULL OUTER JOIN statement syntax look?

```
SELECT column_name(s)
FROM table1
LEFT OUTER JOIN table2
ON table1.column_name = table2.column_name
WHERE condition

UNION

SELECT column_name(s)
FROM table1
RIGHT OUTER JOIN table2
ON table1.column_name = table2.column_name
WHERE condition
```

## **Union operator**

The UNION operator is used to combine the result-set of two or more SELECT statements.

Every SELECT statement within UNION must have the same number of columns The columns must also have similar data types The columns in every SELECT statement must also be in the same order

```
SELECT column_name(s) FROM table1
UNION
SELECT column_name(s) FROM table2;
```

## How does a SELF JOIN statement syntax look?

```
SELECT column_name(s)
FROM table1 T1, table1 T2
WHERE condition;
```

# **Exercise**

1. Problem:

Select the names and job start dates of all employees who work for the department number 5.

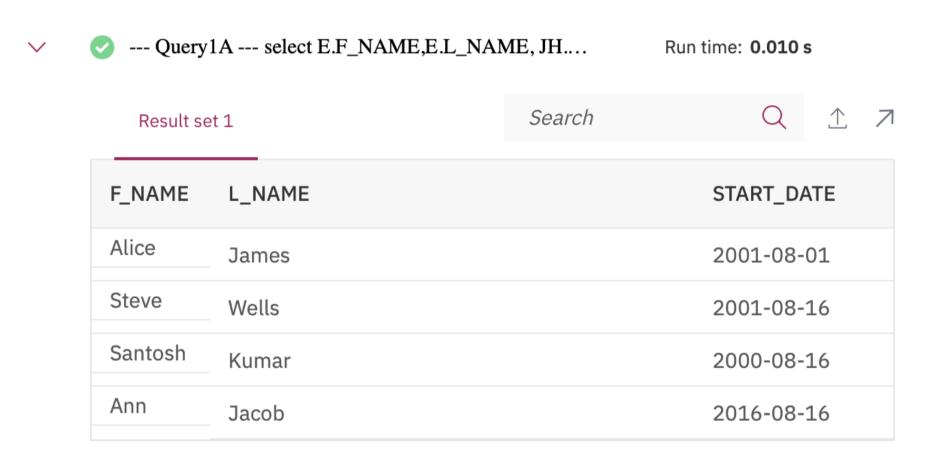
#### **▼** Hint

Use the Inner join operation with the EMPLOYEES table as the left table and the JOB\_HISTORY table as the right table.

#### **▼** Solution

```
select E.F_NAME, E.L_NAME, JH.START_DATE
from EMPLOYEES as E
INNER JOIN JOB_HISTORY as JH on E.EMP_ID=JH.EMPL_ID
where E.DEP_ID = '5';
```

#### **▼** Output



## 2. Problem:

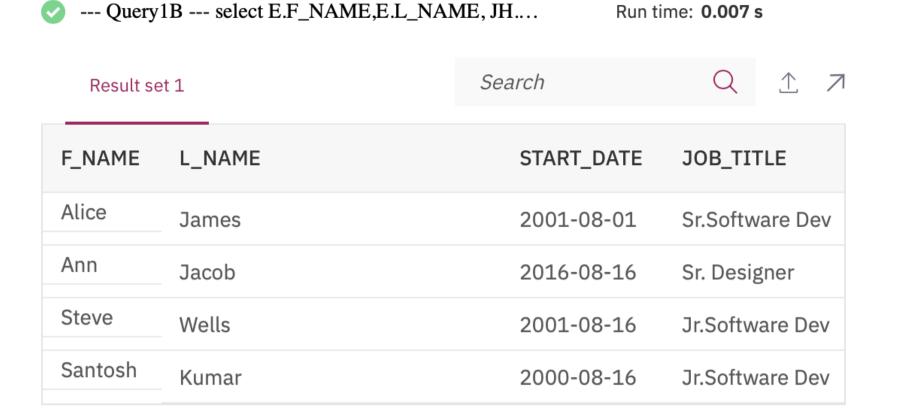
Select the names, job start dates, and job titles of all employees who work for the department number 5.

## **▼** Hint

Perform an INNER JOIN with 3 tables â€" EMPLOYEES, JOB\_HISTORY, JOBS.

## ▼ Solution

```
select E.F_NAME, E.L_NAME, JH.START_DATE, J.JOB_TITLE
from EMPLOYEES as E
INNER JOIN JOB_HISTORY as JH on E.EMP_ID=JH.EMPL_ID
INNER JOIN JOBS as J on E.JOB_ID=J.JOB_IDENT
where E.DEP_ID = '5';
```



## 3. Problem:

\*Perform a Left Outer Join on the EMPLOYEES and DEPARTMENT tables and select employee id, last name, department id and department name for

all employees.\*

**▼** Hint

Use the Left Outer Join operation with the EMPLOYEES table as the left table and the DEPARTMENTS table as the right table.

## **▼** Solution

```
select E.EMP_ID,E.L_NAME,E.DEP_ID,D.DEP_NAME
from EMPLOYEES AS E
LEFT OUTER JOIN DEPARTMENTS AS D ON E.DEP_ID=D.DEPT_ID_DEP;
```



--- Query 2A --- select E.EMP\_ID,E.L\_NAME,E.D...

Run time: 0.004 s



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EMP_ID	L_NAME	DEP_ID	DEP_NAME
E1001	Thomas	2	Architect Group
E1006	Allen	2	Architect Group
E1005	Hussain	2	Architect Group
E1002	James	5	Software Group
E1010	Jacob	5	Software Group
E1004	Kumar	5	Software Group
E1003	Wells	5	Software Group
E1007	Thomas	7	Design Team
E1009	Jones	7	Design Team
E1008	Gupta	7	Design Team

## 4. Problem:

Re-write the previous query but limit the result set to include only the rows for employees born before 1980.

## **▼** Hint

Use a WHERE clause and Left Outer Join operation. Alternatively, you could also use an INNER JOIN.

## **▼** Solution

```
select E.EMP_ID,E.L_NAME,E.DEP_ID,D.DEP_NAME
from EMPLOYEES AS E
LEFT OUTER JOIN DEPARTMENTS AS D ON E.DEP_ID=D.DEPT_ID_DEP
where YEAR(E.B_DATE) < 1980;</pre>
```



## 5. Problem:

Re-write the previous query but have the result set include all the employees but department names for only the employees who were born before 1980.

#### **▼** Hint

Use an AND in the LEFT OUTER JOIN clause.

## **▼** Solution

```
select E.EMP_ID,E.L_NAME,E.DEP_ID,D.DEP_NAME
from EMPLOYEES AS E
LEFT OUTER JOIN DEPARTMENTS AS D ON E.DEP_ID=D.DEPT_ID_DEP
AND YEAR(E.B_DATE) < 1980;</pre>
```



## --- Query 2C --- select E.EMP\_ID,E.L\_NAME,E.D...

Run time: 0.002 s



Search







EMP_ID	L_NAME	DEP_ID	DEP_NAME
E1001	Thomas	2	Architect Group
E1002	James	5	Software Group
E1003	Wells	5	
E1004	Kumar	5	
E1005	Hussain	2	
E1006	Allen	2	Architect Group
E1007	Thomas	7	Design Team
E1008	Gupta	7	
E1009	Jones	7	
E1010	Jacob	5	

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## 6. Problem:

Perform a Full Join on the EMPLOYEES and DEPARTMENT tables and select the First name, Last name and Department name of all employees.

## **▼** Hint

Use the Full Outer Join operation with the EMPLOYEES table as the left table and the DEPARTMENTS table as the right table.

## **▼** Solution

```
select E.F_NAME,E.L_NAME,D.DEP_NAME
from EMPLOYEES AS E
LEFT OUTER JOIN DEPARTMENTS AS D ON E.DEP_ID=D.DEPT_ID_DEP

UNION

select E.F_NAME,E.L_NAME,D.DEP_NAME
from EMPLOYEES AS E
RIGHT OUTER JOIN DEPARTMENTS AS D ON E.DEP_ID=D.DEPT_ID_DEP
```



F_NAME	L_NAME	DEP_NAME
John	Thomas	Architect Group
Alice	James	Software Group
Steve	Wells	Software Group
Santosh	Kumar	Software Group
Ahmed	Hussain	Architect Group
Nancy	Allen	Architect Group
Mary	Thomas	Design Team
Bharath	Gupta	Design Team
Andrea	Jones	Design Team
Ann	Jacob	Software Group

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## 7. Problem:

Re-write the previous query but have the result set include all employee names but department id and department names only for male employees.

## **▼** Hint

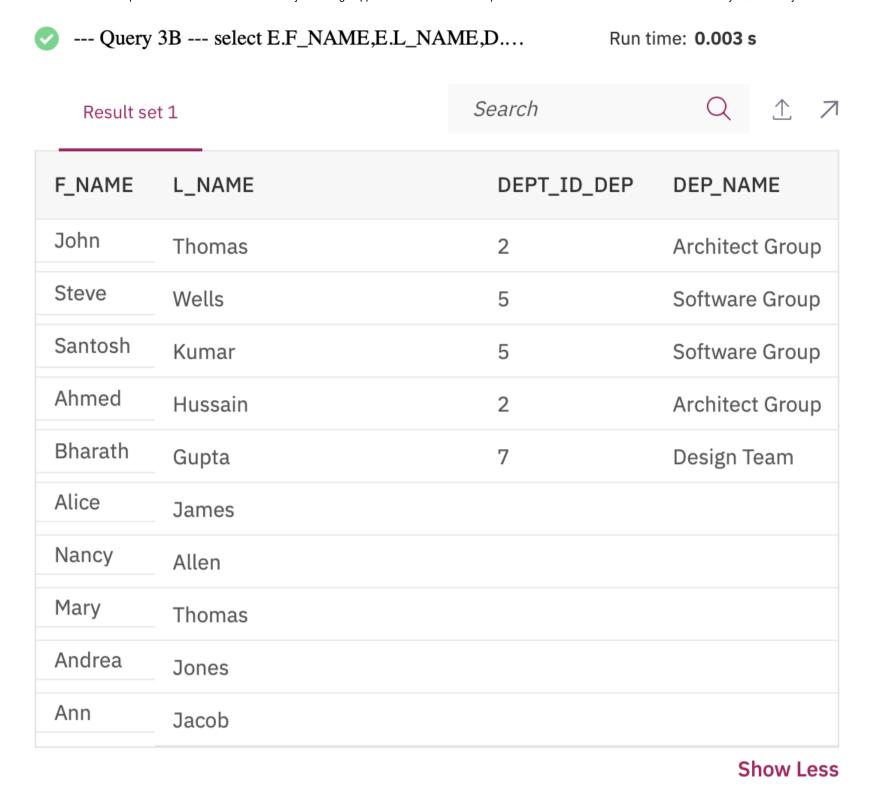
Add an AND in Query 3A to filter on male employees in the ON clause. Alternatively, you can also use Left Outer Join.

## **▼** Solution

```
select E.F_NAME,E.L_NAME,D.DEPT_ID_DEP, D.DEP_NAME
from EMPLOYEES AS E
LEFT OUTER JOIN DEPARTMENTS AS D ON E.DEP_ID=D.DEPT_ID_DEP AND E.SEX = 'M'

UNION

select E.F_NAME,E.L_NAME,D.DEPT_ID_DEP, D.DEP_NAME
from EMPLOYEES AS E
RIGHT OUTER JOIN DEPARTMENTS AS D ON E.DEP_ID=D.DEPT_ID_DEP AND E.SEX = 'M';
```



# **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 mysql phpadmin interface. Follow <u>Hands-on Lab</u>: <u>Create tables using SQL scripts and Load data into tables</u> on how to import a script to mysql phpadmin interface.

• JOIN Solution Script.sql

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

# Author(s)

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## Changelog

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Date	Version	Changed by	Change Description
2022-10-28	0.3	Appalabhaktula Hema	Updated image links
2021-08-09	0.2	Sathya Priya	Updated SQL link
2021-11-01	0.1	Lakshmi Holla, Malika Singla	Initial Version

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