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.

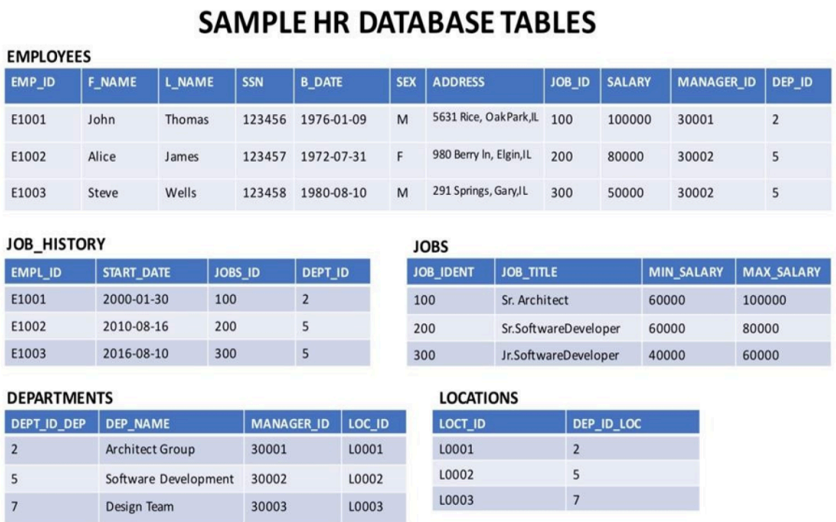
Software Used in this Lab

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:



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

NOTE: This lab requires you to have all 5 of these tables of the HR database populated with sample data on MySQL. If you don't have the tables above populated with sample data on MySQL, please go through the lab below first:

Hands-on Lab: Create and Load Tables using SQL Scripts

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.

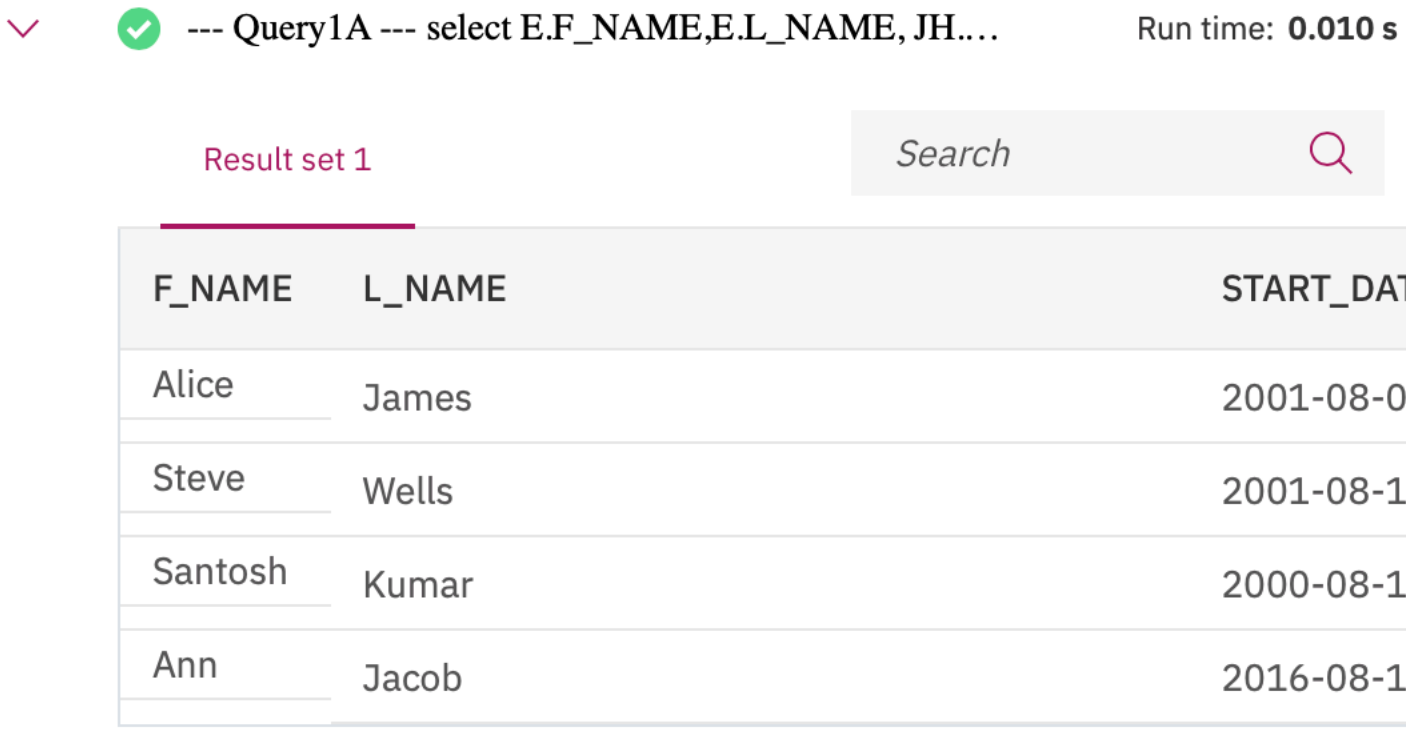
   ▼ Hint

   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.

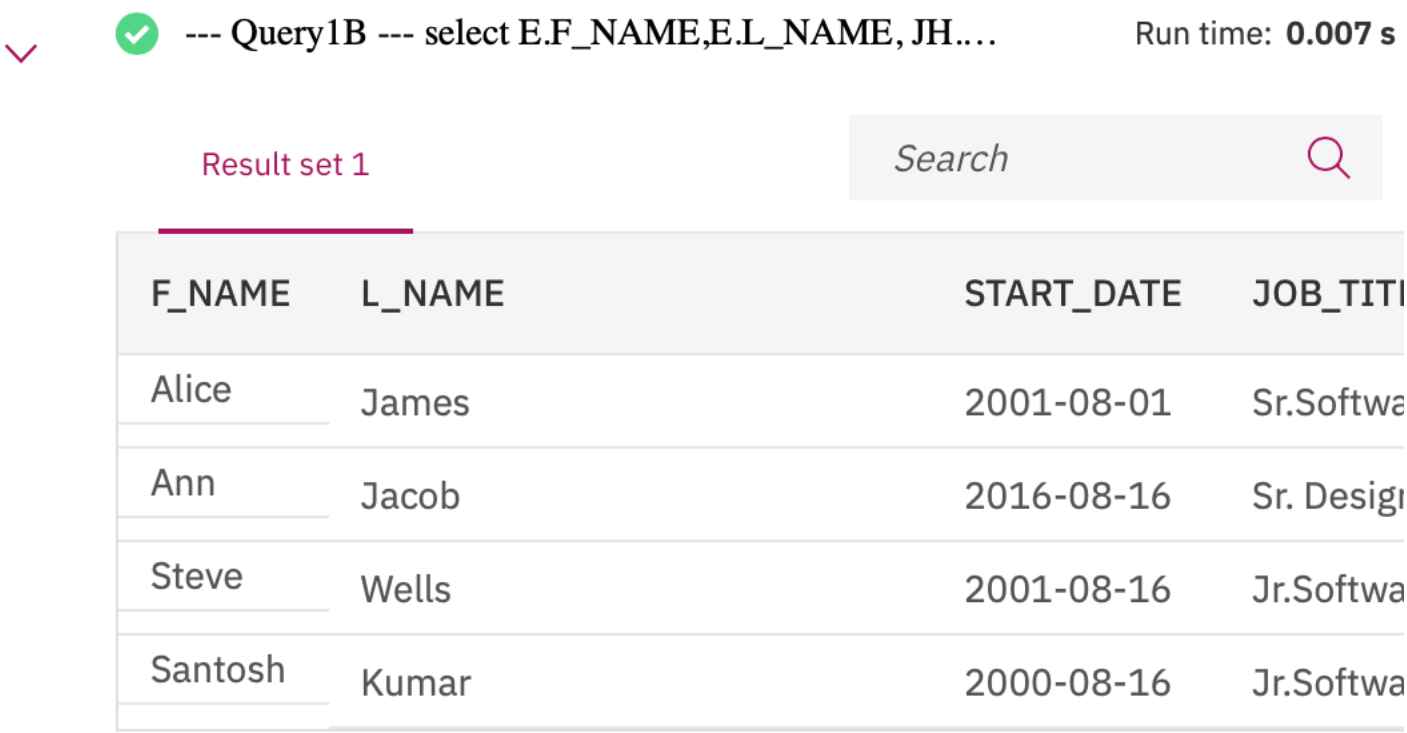
   ▼ Hint

   Perform an INNER JOIN with 3 tables 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';
```

   ▼ Output



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.

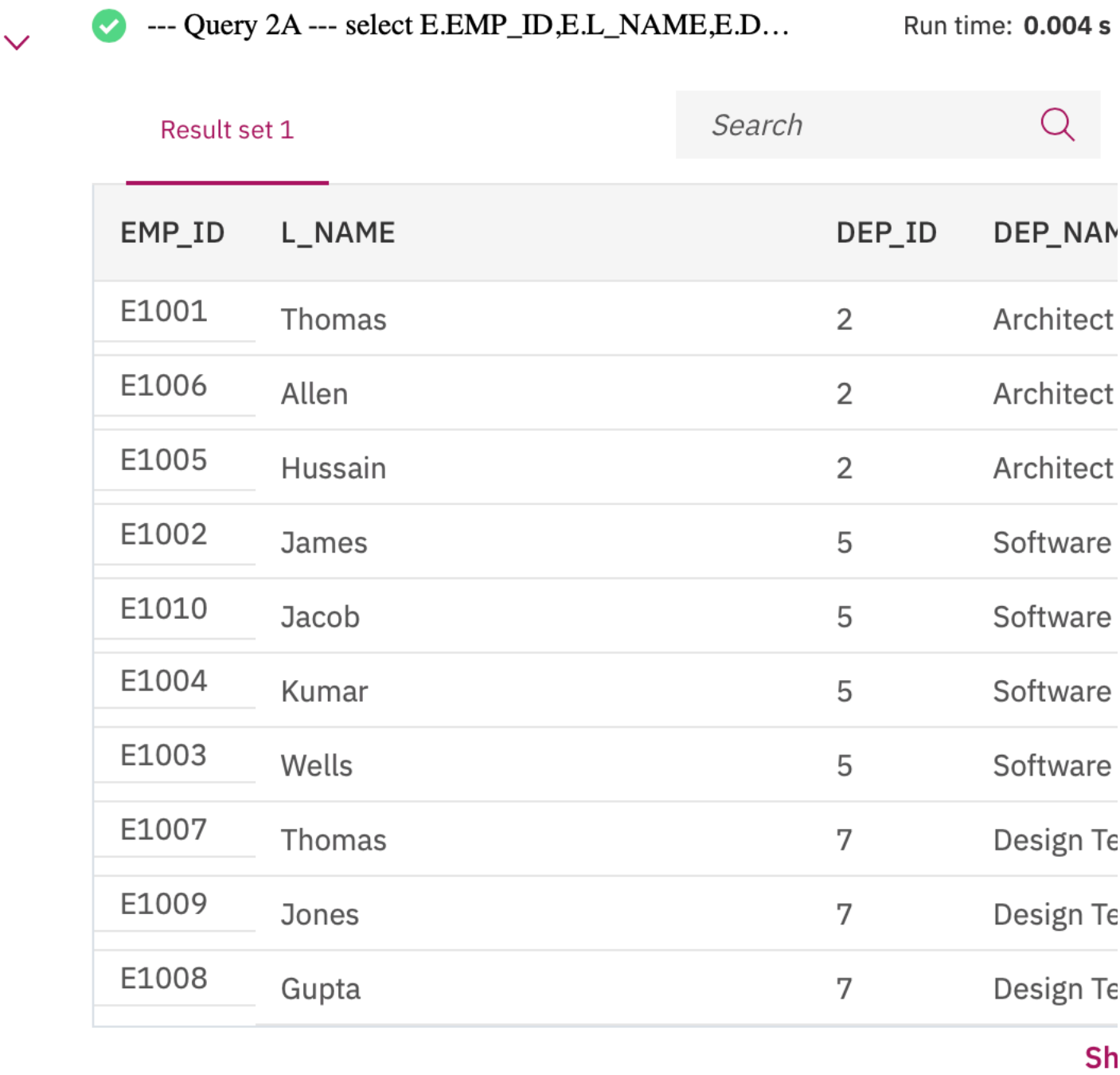
   ▼ Hint

   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;
```

   ▼ Output



4. Problem:

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

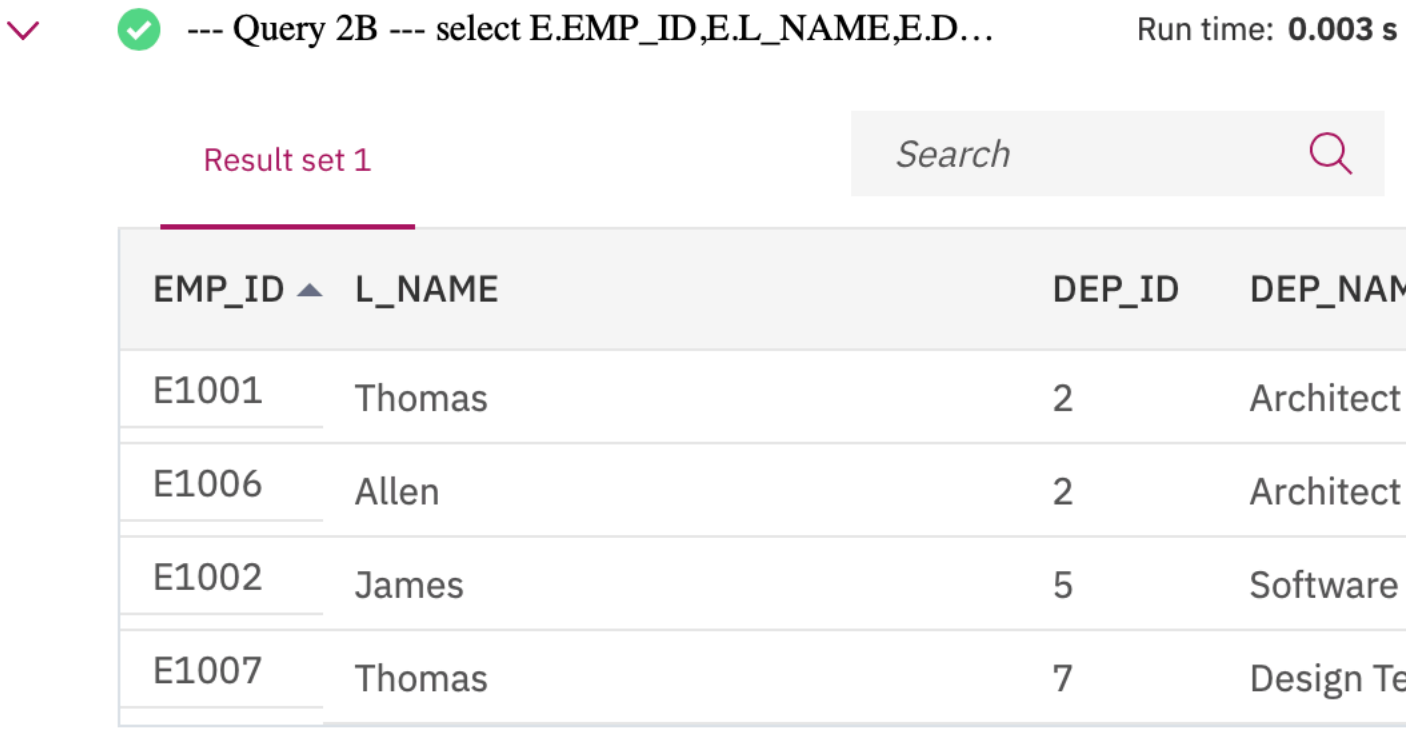
   ▼ Hint

   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;
```

   ▼ Output



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.

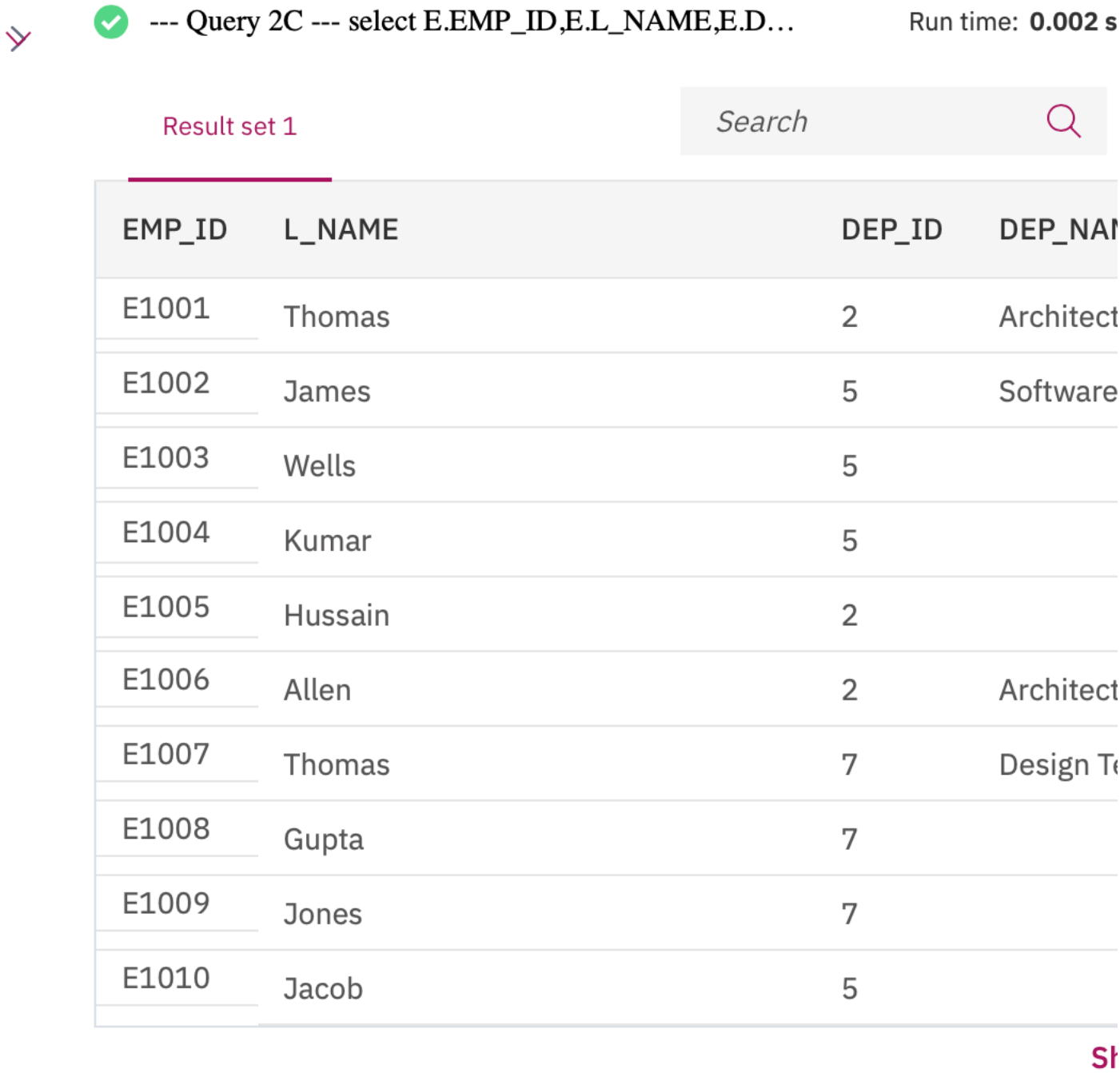
   ▼ Hint

   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;
```

   ▼ Output



EMP_ID	L_NAME	DEP_ID	DEP_NAI
E1001	Thomas	2	Architect
E1002	James	5	Software
E1003	Wells	5	
E1004	Kumar	5	
E1005	Hussain	2	
E1006	Allen	2	Architect
E1007	Thomas	7	Design Te
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.

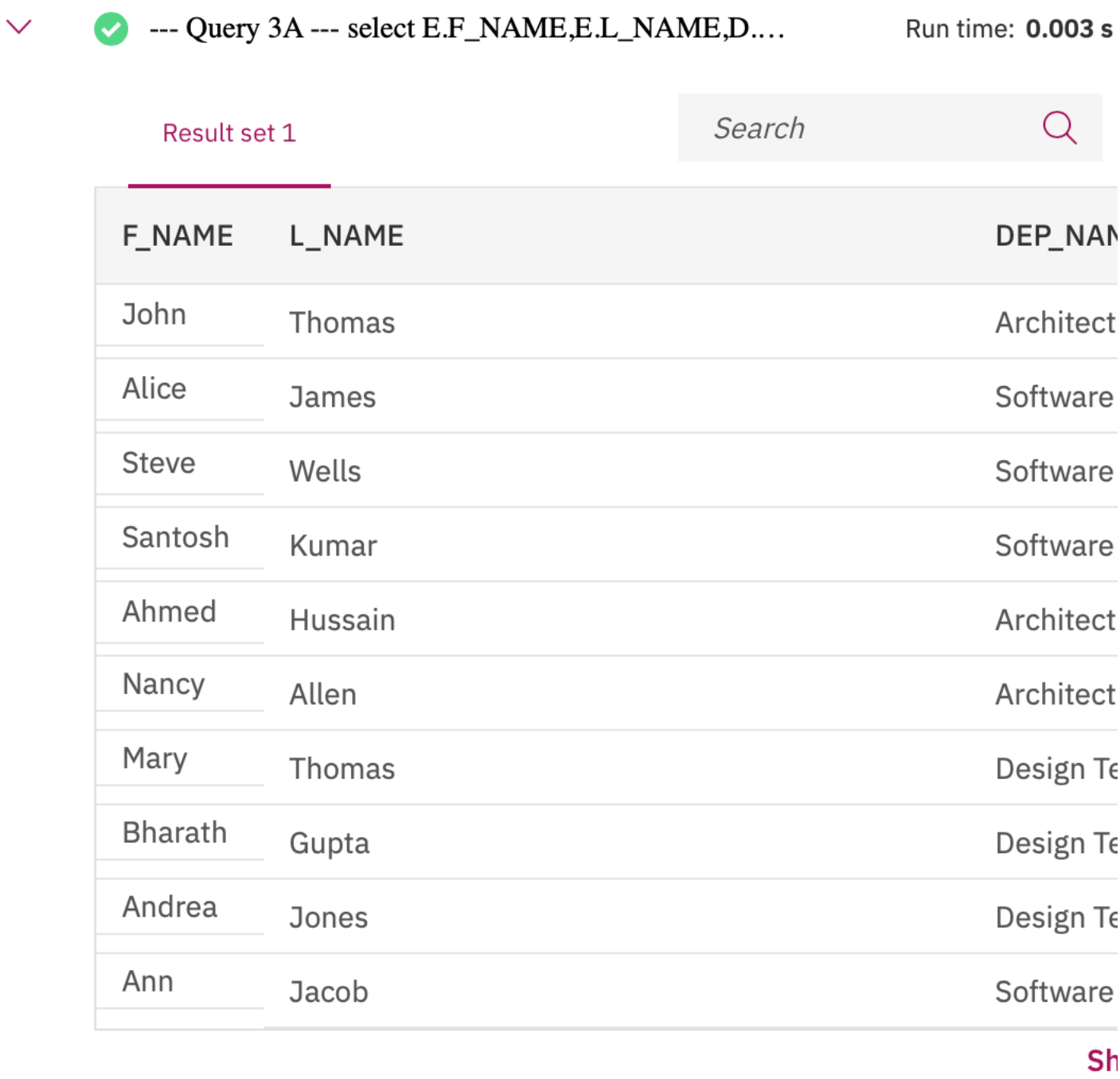
▼ Hint

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
```

▼ Output



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';
```

▼ Output

--- Query 3B --- select E.F_NAME,E.L_NAME,D.... Run time: **0.003 s**

Result set 1

Search

F_NAME	L_NAME	DEPT_ID_DEP	DEP_NAM
John	Thomas	2	Architect
Steve	Wells	5	Software
Santosh	Kumar	5	Software
Ahmed	Hussain	2	Architect
Bharath	Gupta	7	Design Te
Alice	James		
Nancy	Allen		
Mary	Thomas		
Andrea	Jones		
Ann	Jacob		

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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 Hands-on Lab : Create tables using SQL scripts and Load data into tables 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.

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