Hands-on Lab: Joins

Estimated time needed: 25 minutes

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
FULL OUTER JOIN table2
ON table1.column_name = table2.column_name
WHERE condition;
```

How does a SELF JOIN statement syntax look?

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

Software Used in this Lab

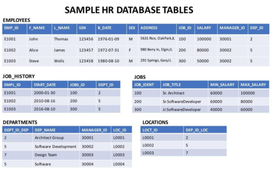
In this lab, you will use an IBM Db2 Database. Db2 is a Relational Database Management System (RDBMS) from IBM, designed to store, analyze and retrieve data efficiently.

To complete this lab you will utilize a Db2 database service on IBM Cloud. If you did not already complete this lab task earlier in this module, you will not yet have access to Db2 on IBM Cloud, and you will need to follow the lab below first:

- Hands-on Lab : Sign up for IBM Cloud, Create Db2 service instance and Get started with the Db2 console

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:



NOTE: This lab requires you to have all 5 of these tables of the HR database populated with sample data on Db2. If you didn't complete the earlier lab in this module, you won't have the tables above populated with sample data on Db2, so you will need to go through the lab below first:

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

Objectives

After completing this lab you will be able to:

- Perform different kinds of join operations

Instructions

When you approach the exercises in this lab, follow the instructions to run the queries on Db2:

- Go to the Resource List of IBM Cloud by logging in where you can find the Db2 service instance that you created in a previous lab under **Services** section. Click on the **Db2-xx service**. Next, open the Db2 Console by clicking on **Open Console** button. Click on the 3-bar menu icon in the top left corner and go to the **Run SQL** page. The Run SQL tool enables you to run SQL statements.
  - If needed, follow Hands-on Lab : Sign up for IBM Cloud, Create Db2 service instance and Get started with the Db2 console

Exercise

1. Problem:

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

   ▶ Hint
   ▼ 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
   ▼ 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
   ▼ 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
   ▼ 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
   ▼ 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
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
   ▼ Solution

   ```
   select E.F_NAME,E.L_NAME,D.DEP_NAME
   from EMPLOYEES AS E
   FULL 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
   ▼ Solution

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

   ▶ 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. Upload the script to the Db2 console and run. Follow Hands-on Lab : Create tables using SQL scripts and Load data into tables on how to upload a script to Db2 console and run it.

- JOIN_Solution_Script.sql

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

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Other Contributor(s)

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Changelog

Date	Version	Changed by	Change Description
2020-12-25	2.1	Steve Ryan	ID Reviewed
2020-12-10	2.0	Sandip Saha Joy	Created revised version from DB0201EN
2020	1.0	Rav Ahuja	Created initial version