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?

```
1. 1
2. 2
3. 3
```

```
1. SELECT column_name(s)
2. FROM table1
3. CROSS JOIN table2;
```

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How does an INNER JOIN statement syntax look?

```
1. 1
2. 2
3. 3
4. 4
5. 5
```

```
1. SELECT column_name(s)
2. FROM table1
3. INNER JOIN table2
4. ON table1.column_name = table2.column_name;
5. WHERE condition;
```

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How does a LEFT OUTER JOIN statement syntax look?

```
1. 1
2. 2
```

```
3. 3
4. 4
5. 5
```

```
1. SELECT column_name(s)
2. FROM table1
3. LEFT OUTER JOIN table2
4. ON table1.column_name = table2.column_name
5. WHERE condition;
```

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How does a RIGHT OUTER JOIN statement syntax look?

```
1. 1
2. 2
3. 3
4. 4
5. 5
```

```
1. SELECT column_name(s)
2. FROM table1
3. RIGHT OUTER JOIN table2
4. ON table1.column_name = table2.column_name
5. WHERE condition;
```

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How does a FULL OUTER JOIN statement syntax look?

```
1. 1
2. 2
3. 3
4. 4
5. 5
```

```
1. SELECT column_name(s)
2. FROM table1
3. FULL OUTER JOIN table2
4. ON table1.column_name = table2.column_name
5. WHERE condition;
```

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How does a SELF JOIN statement syntax look?

```
1. 1
2. 2
3. 3
```

```
1. SELECT column_name(s)
2. FROM table1 T1, table1 T2
3. WHERE condition;
```

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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:

SAMPLE HR DATABASE TABLES

EMPLOYEES

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	M	5631 Rice, OakPark,IL	100	100000	30001	2
E1002	Alice	James	123457	1972-07-31	F	980 Berry ln, Elgin,IL	200	80000	30002	5
E1003	Steve	Wells	123458	1980-08-10	M	291 Springs, Gary,IL	300	50000	30002	5

JOB_HISTORY

EMPL_ID	START_DATE	JOBS_ID	DEPT_ID
E1001	2000-01-30	100	2
E1002	2010-08-16	200	5
E1003	2016-08-10	300	5

JOBS

JOB_IDENT	JOB_TITLE	MIN_SALARY	MAX_SALARY
100	Sr. Architect	60000	100000
200	Sr.SoftwareDeveloper	60000	80000
300	Jr.SoftwareDeveloper	40000	60000

DEPARTMENTS

DEPT_ID_DEP	DEP_NAME	MANAGER_ID	LOC_ID
2	Architect Group	30001	L0001
5	Software Development	30002	L0002
7	Design Team	30003	L0003
5	Software	30004	L0004

LOCATIONS

LOCT_ID	DEP_ID_LOC
L0001	2
L0002	5
L0003	7

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

```
1. 1
2. 2
3. 3
4. 4
1. select E.F_NAME,E.L_NAME, JH.START_DATE
2. from EMPLOYEES as E
3. INNER JOIN JOB_HISTORY as JH on E.EMP_ID=JH.EMPL_ID
4. where E.DEP_ID ='5';
```

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▶ Output

2. Problem:

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

▶ Hint
▼ Solution

```
1. 1
2. 2
3. 3
4. 4
5. 5
1. select E.F_NAME,E.L_NAME, JH.START_DATE, J.JOB_TITLE
2. from EMPLOYEES as E
3. INNER JOIN JOB_HISTORY as JH on E.EMP_ID=JH.EMPL_ID
4. INNER JOIN JOBS as J on E.JOB_ID=J.JOB_IDENT
5. where E.DEP_ID ='5';
```

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▶ 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

```
1. 1
2. 2
3. 3
1. select E.EMP_ID,E.L_NAME,E.DEP_ID,D.DEP_NAME
2. from EMPLOYEES AS E
3. LEFT OUTER JOIN DEPARTMENTS AS D ON E.DEP_ID=D.DEPT_ID_DEP;
```

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▶ 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

```
1. 1
2. 2
3. 3
4. 4
1. select E.EMP_ID,E.L_NAME,E.DEP_ID,D.DEP_NAME
2. from EMPLOYEES AS E
3. LEFT OUTER JOIN DEPARTMENTS AS D ON E.DEP_ID=D.DEPT_ID_DEP
4. where YEAR(E.B_DATE) < 1980;
```

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▶ 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

```
1. 1
2. 2
3. 3
4. 4
1. select E.EMP_ID,E.L_NAME,E.DEP_ID,D.DEP_NAME
2. from EMPLOYEES AS E
3. LEFT OUTER JOIN DEPARTMENTS AS D ON E.DEP_ID=D.DEPT_ID_DEP
4. AND YEAR(E.B_DATE) < 1980;
```

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▶ 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

```
1. 1
2. 2
3. 3
1. select E.F_NAME,E.L_NAME,D.DEP_NAME
2. from EMPLOYEES AS E
3. FULL OUTER JOIN DEPARTMENTS AS D ON E.DEP_ID=D.DEPT_ID_DEP;
```

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▶ 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

```
1. 1
2. 2
3. 3
1. select E.F_NAME,E.L_NAME,D.DEPT_ID_DEP, D.DEP_NAME
2. from EMPLOYEES AS E
```

```
3. FULL OUTER JOIN DEPARTMENTS AS D ON E.DEP_ID=D.DEPT_ID_DEP AND E.SEX = 'M';
```

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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. 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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Changelog

Date	Version	Changed by	Change Description
2023-05-10	2.2	Eric Hao & Vladislav Boyko	Updated Page Frames
2020-12-25	2.1	Steve Ryan	ID Reviewed
2020-12-10	2.0	Sandip Saha Joy	Created revised version from DB0201EN

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2020	1.0	Rav Ahuja	Created initial version