

Hands-on Lab: Working with Multiple Tables

Estimated time needed: 30 minutes

In this lab, you will through some SQL practice problems that will provide hands-on experience with SQL queries that access multiple tables. You will be:

- Accessing Multiple Tables with Sub-Queries
- Accessing Multiple Tables with Implicit Joins

How does an Implicit version of CROSS JOIN (also known as Cartesian Join) statement syntax look?

SELECT column_name(s)
FROM table1, table2;

How does an Implicit version of INNER JOIN statement syntax look?

SELECT column_name(s)
FROM table1, table2
WHERE table1.column_name = table2.column_name;

Software Used in this Lab

In this lab, you will use <u>IBM Db2 Database</u>. Db2 is a Relational Database Management System (RDBMS) from IBM, designed to store, analyze and retrieve the 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	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						
EMPL_ID	START_DATE	JOBS_ID	DEPT_ID			
E1001	2000-01-30	100	2			
E1002	2010-08-16	200	5			
F1003	2016-08-10	300	5			

DEDADTMENTS

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

DEPARTIVIENTS							
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:

- Write SQL queries that access more than one table
- Compose queries that access multiple tables using a nested statement in the WHERE clause
- Build queries with multiple tables in the FROM clause
- Write Implicit Join queries with join criteria specified in the WHERE clause
- Specify aliases for table names and qualify column names with table aliases

NOTE: Make sure that you are using the CSV file and datasets from the same instruction file.

Instructions

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

- Go to the <u>Resource List</u> 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.
 - o If needed, follow Hands-on Lab: Sign up for IBM Cloud, Create Db2 service instance and Get started with the Db2 console

Exercise 1: Accessing Multiple Tables with Sub-Queries

1. Problem:

Retrieve only the EMPLOYEES records that correspond to jobs in the JOBS table.



2. Problem:

Retrieve only the list of employees whose JOB_TITLE is Jr. Designer.

select * from employees where JOB_ID IN (select JOB_IDENT from jobs where JOB_TITLE= 'Jr. Designer');

► Output

3. Problem:

Retrieve JOB information and who earn more than \$70,000.

▼ Solution

select JOB_TITLE, MIN_SALARY,MAX_SALARY,JOB_IDENT from jobs where JOB_IDENT IN (select JOB_ID from employees where SALARY >
70000);

▼ Output

Result set 1				Search	Q <u>1</u>
JOB_TITLE	MIN_SALARY	MAX_SALARY	JOB_IDENT		
Sr. Architect	60000.00	100000.00	100		
Sr.Software Dev	60000.00	80000.00	200		
Lead Architect	70000.00	100000.00	600		

4. Problem:

Retrieve JOB information and whose birth year is after 1976.

▼ Solution

select JOB_TITLE, MIN_SALARY,MAX_SALARY,JOB_IDENT from jobs where JOB_IDENT IN (select JOB_ID from employees where
YEAR(B_DATE)>1976);

▼ Output

Result set 1				Search	Q	\triangle
JOB_TITLE	MIN_SALARY	MAX_SALARY	JOB_IDENT			
Sr. Designer	70000.00	90000.00	220			
Sr. Designer	70000.00	90000.00	234			
Jr.Software Dev	40000.00	60000.00	300			
Jr.Software Dev	40000.00	60000.00	400			
Jr. Architect	50000.00	70000.00	500			
Lead Architect	70000.00	100000.00	600			
Jr. Designer	60000.00	70000.00	660			

5. Problem:

Retrieve JOB information for female employees whose birth year is after 1976.

▼ Solution

select JOB_TITLE, MIN_SALARY,MAX_SALARY,JOB_IDENT from jobs where JOB_IDENT IN (select JOB_ID from employees where
YEAR(B_DATE)>1976 and SEX='F');

▼ Output

Result set 1				Search	Q	\triangle
JOB_TITLE	MIN_SALARY	MAX_SALARY	JOB_IDENT			
Sr. Designer	70000.00	90000.00	220			
Sr. Designer	70000.00	90000.00	234			
Lead Architect	70000.00	100000.00	600			

Exercise 2: Accessing Multiple Tables with Implicit Joins

1. Problem:

Perform an implicit cartesian/cross join between EMPLOYEES and JOBS tables.

▼ Solution

select * from employees, jobs;

▼ Output



2. Problem:

Retrieve only the EMPLOYEES records that correspond to jobs in the JOBS table.

▼ Solution

select * from employees, jobs where employees.JOB_ID = jobs.JOB_IDENT;

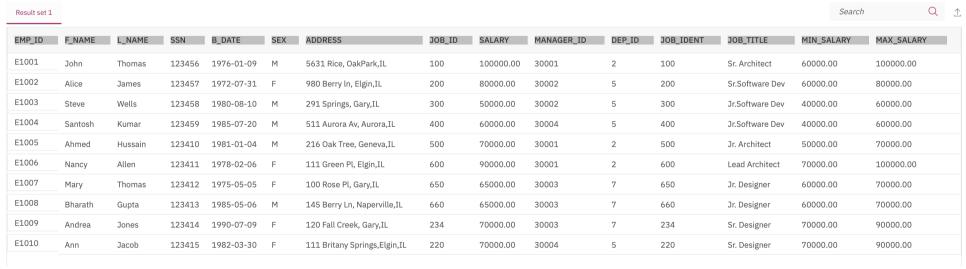
- ▶ Output
- 3. Problem:

Redo the previous query, using shorter aliases for table names.

▼ Solution

select * from employees E, jobs J where E.JOB_ID = J.JOB_IDENT;

▼ Output



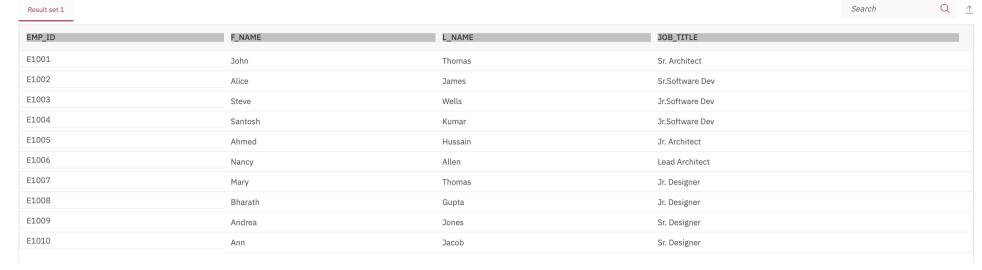
4. Problem:

Redo the previous query, but retrieve only the Employee ID, Employee Name and Job Title.

▼ Solution

select EMP_ID,F_NAME,L_NAME, JOB_TITLE from employees E, jobs J where E.JOB_ID = J.JOB_IDENT;

▼ Output



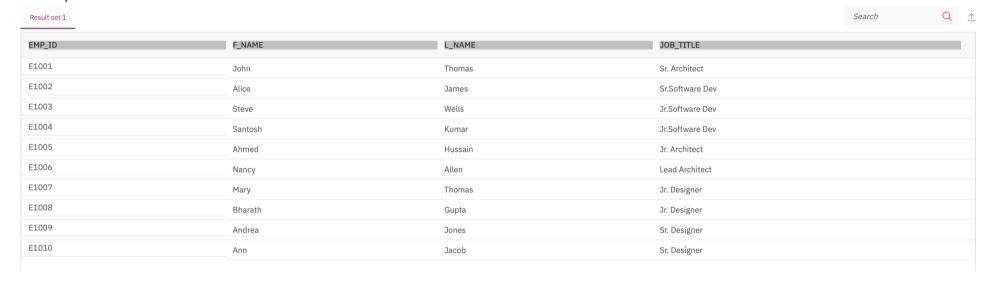
5. Problem:

Redo the previous query, but specify the fully qualified column names with aliases in the SELECT clause.

▼ Solution

select E.EMP_ID,E.F_NAME,E.L_NAME, J.JOB_TITLE from employees E, jobs J where E.JOB_ID = J.JOB_IDENT;

▼ 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 <u>Hands-on Lab</u>: <u>Create tables using SQL scripts and Load data into tables</u> on how to upload a script to Db2 console and run it.

MultipleTables Solution Script.sql

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

Author(s)

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Changelog

Date	Version	Changed by	Change Description
2022-01-20	2.2	Malika	Updated Exercise 1 problem statement 3,4 and 5
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

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