

## 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 L\_NAME B\_DATE SEX ADDRESS SALARY MANAGER\_ID DEP\_ID 5631 Rice, OakPark,IL 100 123456 1976-01-09 E1001 Thomas 100000 30001 123457 1972-07-31 E1002 Alice James 80000 123458 1980-08-10 291 Springs, Gary, IL E1003 Wells 30002 Steve 50000

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:

- 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

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

## Exercise 1: Accessing Multiple Tables with Sub-Queries

1. Problem:

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

Solution

select \* from employees where JOB\_ID IN (select JOB\_IDENT from jobs);

▼ Output

Result set 1										Search	Q 2
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	100000.00	30001	2	
E1002	Alice	James	123457	1972-07-31	F	980 Berry ln, Elgin,IL	200	80000.00	30002	5	
E1003	Steve	Wells	123458	1980-08-10	М	291 Springs, Gary,IL	300	50000.00	30002	5	
E1004	Santosh	Kumar	123459	1985-07-20	М	511 Aurora Av, Aurora,IL	400	60000.00	30004	5	
E1005	Ahmed	Hussain	123410	1981-01-04	М	216 Oak Tree, Geneva,IL	500	70000.00	30001	2	
E1006	Nancy	Allen	123411	1978-02-06	F	111 Green Pl, Elgin,IL	600	90000.00	30001	2	
E1007	Mary	Thomas	123412	1975-05-05	F	100 Rose Pl, Gary,IL	650	65000.00	30003	7	
E1008	Bharath	Gupta	123413	1985-05-06	М	145 Berry Ln, Naperville,IL	660	65000.00	30003	7	
E1009	Andrea	Jones	123414	1990-07-09	F	120 Fall Creek, Gary,IL	234	70000.00	30003	7	
E1010	Ann	Jacob	123415	1982-03-30	F	111 Britany Springs,Elgin,IL	220	70000.00	30004	5	

#### 2. Problem:

Retrieve only the list of employees whose JOB\_TITLE is Jr. Designer.

#### **▼** Solution

select \* from employees where JOB\_ID IN (select JOB\_IDENT from jobs where JOB\_TITLE= 'Jr. Designer');

#### ▼ Output

Result set 1										Search	Q 1
EMP_ID	F_NAME	L_NAME	SSN	B_DATE	SEX	ADDRESS	JOB_ID	SALARY	MANAGER_ID	DEP_ID	
E1007	Mary	Thomas	123412	1975-05-05	F	100 Rose Pl, Gary,IL	650	65000.00	30003	7	
E1008	Bharath	Gupta	123413	1985-05-06	М	145 Berry Ln, Naperville,IL	660	65000.00	30003	7	

#### 3. Problem:

Retrieve JOB information and list of employees 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



#### 4. Problem:

Retrieve JOB information and list of 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 );

### ▼ Output

5/15/2021  $https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork/DB0201EN-SkillsNetwork/labs/Labs\_Coursera\_V5/labs/Lab-\ Working\ with\ Multiple\ Tables\ /instructional-labs.md.html?orig...$ 



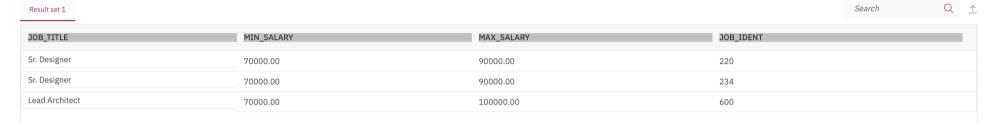
#### 5. Problem:

Retrieve JOB information and list of 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



# Exercise 2: Accessing Multiple Tables with Implicit Joins

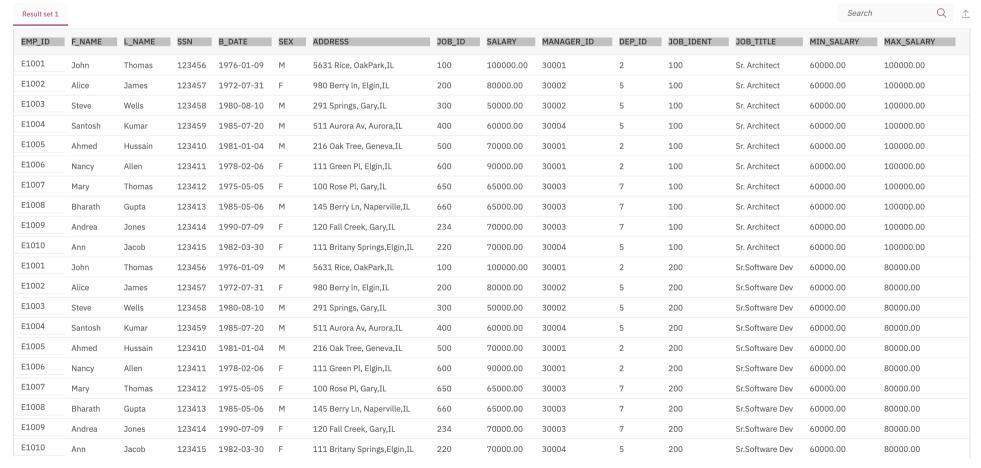
#### 1. Problem:

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



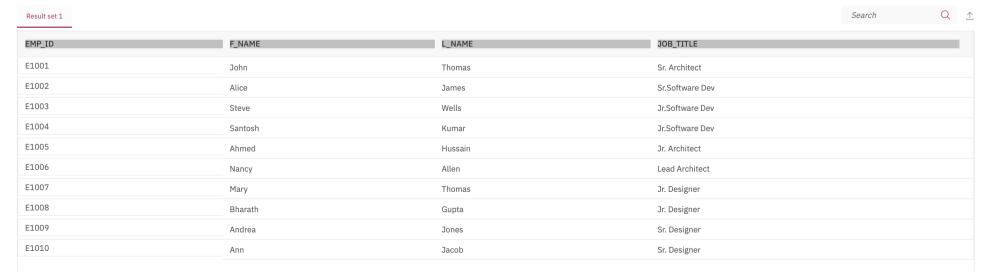
#### 4. Problem:

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

#### ▼ Solution

 $\texttt{select EMP\_ID}, \texttt{F\_NAME}, \texttt{L\_NAME}, \ \textbf{JOB\_TITLE} \ \ \texttt{from employees E}, \ \ \textbf{jobs J} \ \ \texttt{where E}. \textbf{JOB\_ID} = \textbf{J}. \textbf{JOB\_IDENT};$ 

#### 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 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.

• MultipleTables Solution Script.sql

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

## Author(s)

- Rav Ahuja
- Sandip Saha Joy

## Other Contributor(s)

### 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

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