

## 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

EMPLOYEE	S													
EMP_ID	F_NAME	L_NAME	SSN	B_DATE	3	SEX	ADDRESS		JOB_ID	SALAI	RY	MANAGE	R_ID	DEP_ID
E1001	John	Thomas	123456	1976-0	1-09	М	5631 Rice,	OakPark,IL	100	10000	00	30001		2
E1002	Alice	James	123457	1972-0	7-31	F	980 Berry Ir	n, Elgin,IL	200	80000	D	30002		5
E1003	Steve	Steve Wells		1980-0	8-10	М	291 Springs, Gary,JL		300	50000		30002		5
JOB_HISTO	DRY					J	OBS							
EMPL_ID	START_DATE J		JOBS_ID	DEPT_ID		JC	JOB_IDENT JOB_TIT		LE		MIN_SALARY		MA	X_SALAR
E1001	2000-01	2000-01-30 100		2		10	100 Sr. Arch		itect		60000		100000	
E1002	2010-08	2010-08-16 200		5		20	200 Sr.Softv		wareDeveloper		60000		80000	
E1003	2016-08	2016-08-10 300		5		30	300 Jr.Softv		wareDeveloper		40000		600	00
DEPARTME	NTS						LOCATI	ONS						
DEPT_ID_DE	DEP_NA	DEP_NAME		MANAGER_ID I			LOCT_ID		DEP_ID_LOC					
2	Architec	Architect Group		30001			L0001		2	2				
5	Softwar	Software Development		30002			L0002		5					
7	Design 1	Design Team		3 L0003			L0003		7					
5	Software		30004		L0004									

**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 gueries 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**

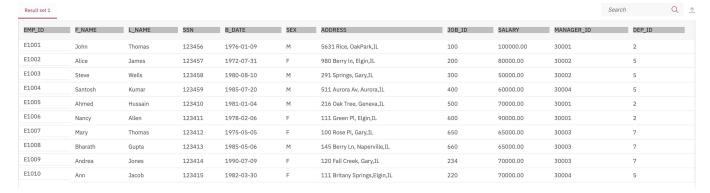
1. Problem:

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

**▼** Solution

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

**▼** Output



### 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 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 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



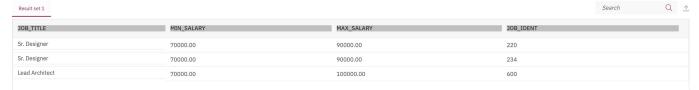
#### 5. Problem:

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



# **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

Result set 1													Search	Q
EMP_ID	F_NAME	L_NAME	SSN	B_DATE	SEX	ADDRESS	JOB_ID	SALARY	MANAGER_ID	DEP_ID	JOB_IDENT	JOB_TITLE	MIN_SALARY	MAX_SALARY
E1001	John	Thomas	123456	1976-01-09	М	5631 Rice, OakPark,IL	100	100000.00	30001	2	100	Sr. Architect	60000.00	100000.00
E1002	Alice	James	123457	1972-07-31	F	980 Berry ln, Elgin,IL	200	80000.00	30002	5	200	Sr.Software Dev	60000.00	80000.00
E1003	Steve	Wells	123458	1980-08-10	М	291 Springs, Gary,IL	300	50000.00	30002	5	300	Jr.Software Dev	40000.00	60000.00
E1004	Santosh	Kumar	123459	1985-07-20	М	511 Aurora Av, Aurora,IL	400	60000.00	30004	5	400	Jr.Software Dev	40000.00	60000.00
E1005	Ahmed	Hussain	123410	1981-01-04	М	216 Oak Tree, Geneva,IL	500	70000.00	30001	2	500	Jr. Architect	50000.00	70000.00
E1006	Nancy	Allen	123411	1978-02-06	F	111 Green Pl, Elgin,IL	600	90000.00	30001	2	600	Lead Architect	70000.00	100000.00
E1007	Mary	Thomas	123412	1975-05-05	F	100 Rose Pl, Gary,IL	650	65000.00	30003	7	650	Jr. Designer	60000.00	70000.00
E1008	Bharath	Gupta	123413	1985-05-06	М	145 Berry Ln, Naperville,IL	660	65000.00	30003	7	660	Jr. Designer	60000.00	70000.00
E1009	Andrea	Jones	123414	1990-07-09	F	120 Fall Creek, Gary,IL	234	70000.00	30003	7	234	Sr. Designer	70000.00	90000.00
E1010	Ann	Jacob	123415	1982-03-30	F	111 Britany Springs,Elgin,IL	220	70000.00	30004	5	220	Sr. Designer	70000.00	90000.00

### 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

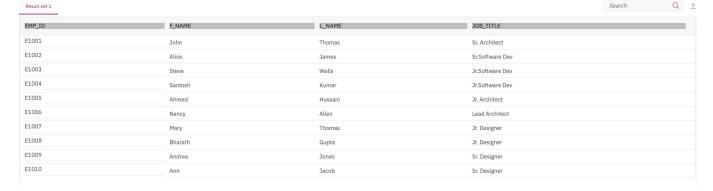


Redo the previous query, but specify the fully qualified column names with aliases in the SELECT clause.

### **▼** 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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# Other Contributor(s)

### 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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