

Hands-on Lab: Sub-queries and Nested SELECTs

Estimated time needed: 20 minutes

In this lab, you will run through some SQL practice problems that will provide hands-on experience with nested SQL SELECT statements (also known as Sub-queries).

How does a typical Nested SELECT statement syntax look?

```
SELECT column_name [, column_name ]
FROM table1 [, table2 ]
WHERE column_name OPERATOR
(SELECT column_name [, column_name ]
FROM table1 [, table2 ]
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:

SAMPLE HR DATABASE TABLES

EMPLOYE				2,3,200					- 1						
EMP_ID	F_NAME	L_NAM	E	SSN	B_DATE		SEX	ADDRESS		JOB_ID	SALAF	RY N	MANAGER	CID.	DEP_ID
E1001	John			123456	1976-01-09		М	5631 Rice, C	5631 Rice, OakPark,IL		10000	00 3	30001		2
E1002	Alice			123457	1972-0	7-31	F	980 Berry In, Elgin,IL		200	80000) 3	30002		5
E1003	Steve	eve Wells		123458	1980-08-10		М	291 Springs, Gary,IL		300	50000 30002		0002		5
JOB_HIST	ORY						J	OBS							
EMPL_ID	START_D	START_DATE J		DBS_ID DE		ID J		OB_IDENT	JOB_TITLE			MIN_SALARY		MA	X_SALAR
E1001	2000-01	2000-01-30			2		1	00	Sr. Architect		60000		100000		
E1002	2010-08	2010-08-16		200			2	00	Sr.Softv	Sr.SoftwareDeveloper		60000		80000	
E1003	2016-08	2016-08-10 30		5			300		Jr.SoftwareDeveloper		40000		600	00	
DEPARTM	ENTS							LOCATIO	ONS						
DEPT_ID_DE	EP DEP_NA	DEP_NAME		MANAGER_ID		LOC_ID		LOCT_ID		DEP	_ID_LOC				
2	Architec	Architect Group		30001		L0001		L0001		2					
5	Softwar	Software Development		30002		L0002		L0002		5	5				
7	Design 1	Design Team		30003		L0003		L0003		7	7				
5	Software		30004 L0		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 demonstrate the necessity of using sub-queries
- Compose sub-queries in the where clause
- Build Column Expressions (i.e. sub-query in place of a column)
- Write Table Expressions (i.e. sub-query in place of a table)

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

Exercise:

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1	Pro	h	lem:

Execute a failing query (i.e. one which gives an error) to retrieve all employees records whose salary is lower than the average salary.

- ▶ Hint
- ▶ Solution
- ➤ Output

2. Problem:

Execute a working query using a sub-select to retrieve all employees records whose salary is lower than the average salary.

- ▶ Hint
- Solution
- ▶ Output

3. Problem:

Execute a failing query (i.e. one which gives an error) to retrieve all employees records with EMP_ID, SALARY and maximum salary as MAX_SALARY in every row.

- ► Hint
- ▶ Solution
- ▶ Output

4. Problem:

Execute a Column Expression that retrieves all employees records with EMP ID, SALARY and maximum salary as MAX SALARY in every row.

- ► Hint
- ► Solution
- ▶ Output

5. Problem:

Execute a Table Expression for the EMPLOYEES table that excludes columns with sensitive employee data (i.e. does not include columns: SSN, B DATE, SEX, ADDRESS, SALARY).

- ► Hint
- ► Solution
- ▶ Output

Solution Script

If you would like to run all the solution queries of the SQL problems in this lab with a script, download the script below. Upload the script to the Db2 console and run it. 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.

• SubQueries Solution Script.sql

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

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