learn-co-curriculum / dsc-sql-subqueries-lab Public

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solution

This branch is 7 commits ahead, 9 commits behind master. Contribute

hoffm386 pd.read_sql ... on Apr 15, 2021 8

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README.md

SQL Subqueries - Lab

Introduction

Now that you've seen how subqueries work, it's time to get some practice writing them! Not all of the queries will require subqueries, but all will be a bit more complex and require some thought and review about aggregates, grouping, ordering, filtering, joins and subqueries. Good luck!

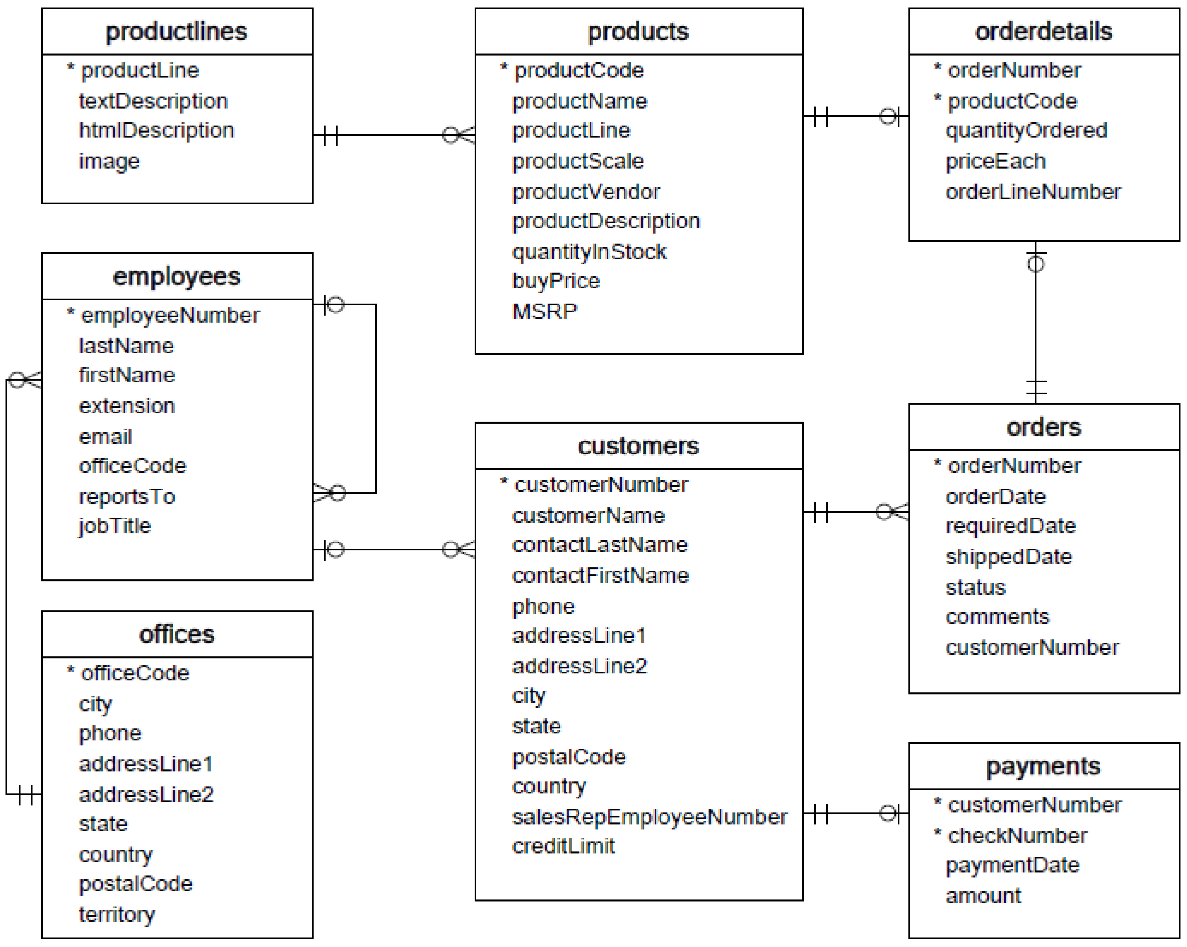
Objectives

You will be able to:

- Write subqueries to decompose complex queries

CRM Database ERD

Once again, here's the schema for the CRM database you'll continue to practice with.



Connect to the Database

As usual, start by importing the necessary packages and connecting to the database `data.sqlite`.

```
import sqlite3
import pandas as pd
```

```
conn = sqlite3.Connection('data.sqlite')
```

Write an Equivalent Query using a Subquery

The following query works using a `JOIN`. Rewrite it so that it uses a subquery instead.

```
SELECT
    customerNumber,
    contactLastName,
    contactFirstName
FROM customers
JOIN orders
    USING(customerNumber)
WHERE orderDate = '2003-01-31'
;
```

```
q = """
SELECT
    customerNumber,
    contactLastName,
    contactFirstName
FROM customers
WHERE customerNumber IN (
    SELECT customerNumber
    FROM orders
    WHERE orderDate = '2003-01-31'
)
;
"""
pd.read_sql(q, conn)
```

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	customerNumber	contactLastName	contactFirstName
0	141	Freyre	Diego

Select the Total Number of Orders for Each Product Name

Sort the results by the total number of items sold for that product.

```
q = """
SELECT
    productName,
    COUNT(orderNumber) AS numberOrders,
    SUM(quantityOrdered) AS totalUnitsSold
FROM products
JOIN orderdetails
    USING (productCode)
GROUP BY productName
ORDER BY totalUnitsSold DESC
;
"""
pd.read_sql(q, conn)
```

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	productName	numberOrders	totalUnitsSold
0	1992 Ferrari 360 Spider red	53	1808
1	1937 Lincoln Berline	28	1111
2	American Airlines: MD-11S	28	1085
3	1941 Chevrolet Special Deluxe Cabriolet	28	1076
4	1930 Buick Marquette Phaeton	28	1074
...	...	...	...
104	1999 Indy 500 Monte Carlo SS	25	855
105	1911 Ford Town Car	25	832
106	1936 Mercedes Benz 500k Roadster	25	824
107	1970 Chevy Chevelle SS 454	25	803

	productName	numberOrders	totalUnitsSold
108	1957 Ford Thunderbird	24	767

109 rows × 3 columns

Select the Product Name and the Total Number of People Who Have Ordered Each Product

Sort the results in descending order.

A quick note on the SQL `SELECT DISTINCT` statement:

The `SELECT DISTINCT` statement is used to return only distinct values in the specified column. In other words, it removes the duplicate values in the column from the result set.

Inside a table, a column often contains many duplicate values; and sometimes you only want to list the unique values. If you apply the `DISTINCT` clause to a column that has `NULL`, the `DISTINCT` clause will keep only one NULL and eliminates the other. In other words, the DISTINCT clause treats all `NULL` “values” as the same value.

```
q = """
SELECT productName, COUNT(DISTINCT customerNumber) AS numPurchasers
FROM products
JOIN orderdetails
    USING(productCode)
JOIN orders
    USING(orderNumber)
GROUP BY productName
ORDER BY numPurchasers DESC
;
"""
pd.read_sql(q, conn)
```

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	productName	numPurchasers
0	1992 Ferrari 360 Spider red	40
1	Boeing X-32A JSF	27
2	1972 Alfa Romeo GTA	27
3	1952 Alpine Renault 1300	27
4	1934 Ford V8 Coupe	27
...	...	...
104	1958 Chevy Corvette Limited Edition	19
105	2002 Chevy Corvette	18
106	1969 Chevrolet Camaro Z28	18
107	1952 Citroen-15CV	18
108	1949 Jaguar XK 120	18

109 rows × 2 columns

Select the Employee Number, First Name, Last Name, City (of the office), and Office Code of the Employees Who Sold Products That Have Been Ordered by Fewer Than 20 people.

This problem is a bit tougher. To start, think about how you might break the problem up. Be sure that your results only list each employee once.

```
q = """
SELECT
    DISTINCT employeeNumber,
    officeCode,
    o.city,
    firstName,
    lastName
FROM employees AS e
JOIN offices AS o
    USING(officeCode)
```

```
JOIN customers AS c
    ON e.employeeNumber = c.salesRepEmployeeNumber
JOIN orders
    USING(customerNumber)
JOIN orderdetails
    USING(orderNumber)
WHERE productCode IN (
    SELECT productCode
    FROM products
    JOIN orderdetails
        USING(productCode)
    JOIN orders
        USING(orderNumber)
    GROUP BY productCode
    HAVING COUNT(DISTINCT customerNumber) < 20
)
;
"""
pd.read_sql(q, conn)
```

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	employeeNumber	officeCode	city	firstName	lastName
0	1370	4	Paris	Gerard	Hernandez
1	1501	7	London	Larry	Bott
2	1337	4	Paris	Loui	Bondur
3	1166	1	San Francisco	Leslie	Thompson
4	1286	3	NYC	Foon Yue	Tseng
5	1612	6	Sydney	Peter	Marsh
6	1611	6	Sydney	Andy	Fixter
7	1401	4	Paris	Pamela	Castillo

	employeeNumber	officeCode	city	firstName	lastName
8	1621	5	Tokyo	Mami	Nishi
9	1323	3	NYC	George	Vanauf
10	1165	1	San Francisco	Leslie	Jennings
11	1702	4	Paris	Martin	Gerard
12	1216	2	Boston	Steve	Patterson
13	1188	2	Boston	Julie	Firrelli
14	1504	7	London	Barry	Jones

Select the Employee Number, First Name, Last Name, and Number of Customers for Employees Whose Customers Have an Average Credit Limit Over 15K

```
q = """
SELECT
    employeeNumber,
    firstName,
    lastName,
    COUNT(customerNumber) AS numCustomers
FROM employees AS e
JOIN customers As c
    ON e.employeeNumber = c.salesRepEmployeeNumber
GROUP BY employeeNumber
HAVING AVG(creditLimit) > 15000
;
"""
pd.read_sql(q, conn)
```

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	employeeNumber	firstName	lastName	numCustomers
0	1165	Leslie	Jennings	6
1	1166	Leslie	Thompson	6
2	1188	Julie	Firrelli	6
3	1216	Steve	Patterson	6
4	1286	Foon Yue	Tseng	7
5	1323	George	Vanauf	8
6	1337	Loui	Bondur	6
7	1370	Gerard	Hernandez	7
8	1401	Pamela	Castillo	10
9	1501	Larry	Bott	8
10	1504	Barry	Jones	9
11	1611	Andy	Fixter	5
12	1612	Peter	Marsh	5
13	1621	Mami	Nishi	5
14	1702	Martin	Gerard	6

Summary

In this lesson, you got to practice some more complex SQL queries, some of which required subqueries. There's still plenty more SQL to be had though; hope you've been enjoying some of these puzzles!

Contributors 6

Languages

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