

# **Introduction to SQL for Data Analysis (Student Version)**

BISA x Deloitte Workshop

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Business Information Systems Association

Wednesday 1st May, 2019

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## Activities Outline

1. Activity 1 - SQL Fundamentals
2. Activity 2 - SQL Joins & Union
3. Activity 3 - Exercises
4. Feedback

## **Activity 1 - SQL Fundamentals**

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# SQLite Interface

Import database      Execute command      Create extra tabs to run different codes

Tables

The screenshot shows the SQLite Interface application. On the left, a sidebar lists various database objects: Table, Category, Customer, CustomerCustomerDemo, CustomerDemographic, Employee, EmployeeTerritory, Order, OrderDetail, Product, Region, Shipper, Supplier, and Territory. Below these are View, Index, Trigger, and Syntax. A blue bracket on the left groups the 'Table' section under the label 'Tables'. The main area displays a table with 15 rows and 3 columns: id, name, and hint. The first row is a header, and the following 14 rows contain data. Above the table, there is a text input field with the SQL command '1. SELECT \* FROM demo;'. To the right of the command input, there are buttons for 'Run', 'Export', and 'Import'. At the top of the application window, there is a green header bar with a menu (File, Link, Run, Export, Import) and a 'Sign In' button. A blue arrow points from the 'Import database' label to the 'Import' button. Another blue arrow points from the 'Execute command' label to the 'Run' button. A third blue arrow points from the 'Create extra tabs to run different codes' label to the tab management icons (plus, minus, and refresh) in the top right corner.

id	name	hint
1	SQLite 3.27.2	OnLine on JavaScript
2	MultiVersion	3.15.0 to Last (load on settings)
3	Dark style	Sign in - Premium (free test)
4	Size table	Fast scroll million rows
5	SQL Editor	autocomplete: [Ctrl-Space] or [Alt-Space], run: [Shift-Enter]
6	Left-Panel, Table	[RightClick] mouse "PopMenu" or [DbClick]
7	Link	Create public link DB
8	ai Url	<a href="https://old.sqliteonline.com/">https://old.sqliteonline.com/</a>
9	ai Color	#9999ad
10	ai Image	Blob - png, jpg or String(base64) [DbClick] row
11	SQL	Syntax example library
12	CREATE	CREATE TABLE table_name (col1, col2)
13	SELECT	SELECT * FROM table_name
14	INSERT	INSERT INTO table_name (col1, col2) VALUES ('example', 'test')
15	UPDATE	UPDATE table_name SET col1='work' WHERE col2='test'

## 1.1 SELECT Statement

```
SELECT *  
FROM Products
```

### Questions:

- What does the \* mean?
- What is “Products” in the 2nd line?
- After running the above code, how many products are there?

### Your Turn:

- Show only three columns from the Product table:  
ProductName, UnitPrice, Discontinued
- Bonus: After trying the above, can you try and add an  
ORDER BY clause (similar to the FROM clause), to sort the  
result by UnitPrice?

## 1.2 WHERE Clause (Basic Filtering)

```
SELECT ProductName, UnitPrice, Discontinued  
FROM Products  
WHERE Discontinued = 1
```

### Questions:

- What does the WHERE clause mean?
- What is the unit price for the product “Alice Mutton”?

### Your Turn:

- How to only show products with UnitsInStock less than 10?

## 1.3 BETWEEN Operator

```
SELECT OrderID, CustomerID, OrderDate, ShippedDate, Freight  
FROM Orders  
WHERE OrderDate BETWEEN '2012-12-25' AND '2012-12-31'
```

### Question:

- How many orders were placed between 25th and 31st December in 2012?

### Your Turn:

- What are the total costs of Freight for orders shipped between 17th and 18th September in 2013? Hint: add up the three freight manually.

## 1.4 LIKE Operator

```
SELECT *  
FROM Customers  
WHERE ContactName LIKE 'a%'
```

### Questions:

- What does this show?
- Why do we use wildcards and the LIKE operator?

### Your Turn:

- List all customers with a phone number that contains '555'  
e.g. (5) 555-4729



## 1.5 AVG ( ) and COUNT ( ) Functions

```
SELECT AVG(UnitPrice)  
FROM Products
```

### Question:

- What is the average unit price of products in the database?

### Your Turn:

- Using the count ( ) function, how many products are there which has a UnitPrice between \$15 and \$30? Hint: you will need to add another clause to specify the additional constraint.

## 1.6 GROUP BY Clause

```
SELECT CategoryID, AVG(UnitPrice)
FROM Products
GROUP BY CategoryID
```

### Questions:

- What is the average unit price for category 5?
- What do you notice when you added the Group By clause, compared to just the aggregation

### Your Turn:

- What is the maximum Freight Cost for each ShipRegion?  
Hint: use the 'Order' table

## **Activity 2 - SQL Joins & Union**

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## 2.1 INNER and LEFT Join Clauses

```
SELECT Customers.CustomerID, Customers.ContactName,  
Orders.OrderID  
FROM Customers  
INNER JOIN Orders  
ON Customers.CustomerID = Orders.CustomerID
```

### Question:

- The Customer and Order tables have a 1:M relationship. The convention is FROM table 1 JOIN table 2. For an Inner Join, does the order of specifying tables matter?

### Your Turn:

- Change the join type to LEFT JOIN. Do you think you get more results returned compared to an INNER JOIN?

## 2.2 Union Clause

```
SELECT City, Region, Country  
FROM Customers  
UNION  
SELECT City, Region, Country  
FROM Suppliers
```

### Question:

- What is the point of using a union in the above example?

### Your Turn:

- Find which tables in the database have phone numbers, and collect the entire list of phone numbers in one result.

## **Activity 3 - Exercises**

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## Exercise 1

Run a query that retrieves a list of products that has less units in stock than units on order. List the product name, units on order, units in stock. Order by the product name.

Question: How many products are on the list?

## Exercise 2

Run a query that shows a list of orders shipped to Belgium (country), and the first and last name of employees who placed those orders.

Hint: you will need to use JOIN and WHERE clauses.

Question: How many orders that shipped to Belgium did Margaret Peacock place?



## Exercise 3

Below shows the first 5 rows of the OrderDetail table, which shows what products are inside each Order. The first 2 rows show that there are 2 products ordered in OrderId 10250. Similarly, there are 3 products in OrderId 10251.

i	Id	OrderId	ProductId	UnitPrice	Quantity	Discount
	10250/51	10250	51	42.4	35	0.15
	10250/65	10250	65	16.8	15	0.15
	10251/22	10251	22	16.8	6	0.05
	10251/57	10251	57	15.6	15	0.05
	10251/65	10251	65	16.8	20	0

Run a query that calculates the **revenue for each order**.

Hint: You only need to use the Order Details table. **Revenue for each product** is  $(\text{UnitPrice} - \text{Discount}) * \text{Quantity}$

# Feedback

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## Feedback

Please fill a short survey about the workshop, we would really appreciate it!

[tinyurl.com/bisaSQLfeedback](https://tinyurl.com/bisaSQLfeedback)

The complete set of slides will be uploaded after the workshop.