

# Introduction to SQL for Data Analysis (Student Version)

BISA x Deloitte Workshop

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Business Information Systems Association

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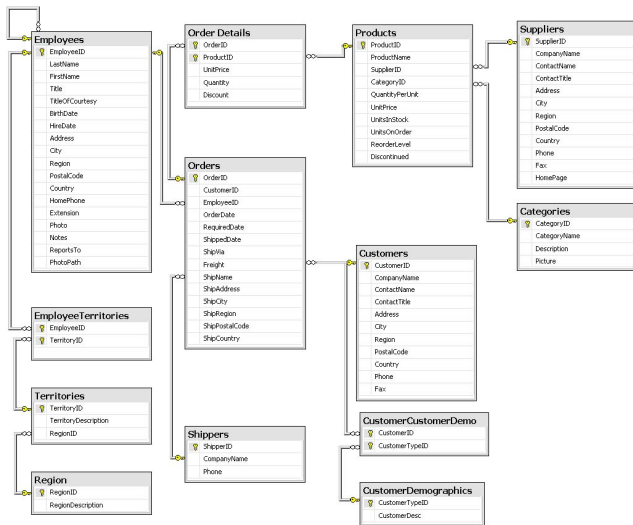
# Activities Outline

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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# Northwind ERD



# SQLite Interface

Import database      Execute command      Create extra tabs to run different codes

Tables

The screenshot shows the SQLite Interface with a green header bar. The left sidebar contains a tree view of database objects: Table, View, Index, Trigger, and Syntax. The 'Table' section is expanded, showing a list of tables including Category, Customer, CustomerCustomerDemo, CustomerDemographic, Employee, EmployeeTerritory, Order, OrderDetail, Product, Region, Shipper, Supplier, and Territory. The main area displays a SQL query: `1. SELECT * FROM demo;` Below the query is a table with 4 columns: id, name, and hint. The table contains 15 rows of data. The right sidebar contains a 'Sign in' button and a 'Create extra tabs to run different codes' button.

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 "PopupMenu" or [DbClick]
7	Link	Create public link DB
8	ai.Uri	<a href="https://old.sqliteonline.com/">https://old.sqliteonline.com/</a>
9	ai.Color	#9393ad
10	ai.Image	Blob - png, jpg, gif 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 Products table: ProductName, UnitPrice, Discontinued

## 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:

- Run a query that 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 LIMIT & ORDER BY Clauses

```
SELECT *  
FROM Orders LIMIT 5
```

The above code will limit the results to just the first 5 rows.

```
SELECT *  
FROM Orders ORDER BY ShipName ASC
```

The above code will order the results in ascending order by the specified column.

### Your Turn:

- Run a query that shows a list of customers who live in Germany. Display them in descending order by their ContactName, and limit the results to the first 8 only.

## 1.7 Column Alias

```
SELECT CompanyName AS Company  
FROM Suppliers
```

Note that, the alias won't change the column name - it will just change the display name in the SELECT clause (i.e. in the result only).

### Your Turn:

- What is the minimum unit price of the Products table? Display that under a new column alias name called "min\_price".

## 1.8 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 'Orders' 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 Order Details 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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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.