sheCodesNow

Welcome to CDK Global!

Wi-Fi Name: CDKGUEST

Wi-Fi Username:

Wi-Fi Password:

SQL Workshop - Guest Intro

Guest speaker: Lisa Hare lisa@launchcode.org

Upcoming Dev Bootcamp: This is ***FREE*** 20-week course that meets Mondays and Wednesdays from 6-9pm at Seattle Central. (Back and Front end tracks)

Course Dates: April 3rd - September 1st

Application Date Deadline: March 8th

Website: https://www.launchcode.org/lc101

Syllabus: https://www.launchcode.org/assets/LC101Syllabus-929fa8f19bcb0927c29bb6f7ef30a577.pdf

Welcome - Ice Breaker

Tell us a little about yourself:

What is your name?

Favorite Country you have visited, or a country you really want to visit?

My answer:

My Name: Tina Brownfield

Favorite Country – France

Background Basics

THINGS TO KNOW BEFORE WE PLAY

What is SQL

SQL (pronounced "ess-que-el" or "see-quill") stands for **Structured Query Language**.

SQL is used to communicate with a database. Used for creation and modification

SQL is considered the standard language for RDBMS (Relational Database Management Systems).

SQL statements are used to perform tasks such as retrieving data stored in a database, updating data, deleting data and more.

Most RDBMS's use SQL, but use their particular 'flavor' of it. Common Flavors are

- Oracle -SQLite - Postgres -MSQL (Microsoft) -MySQL - Microsoft Access

Standard SQL commands (such as Select, Insert, Update, etc.) can be used across SQL types.

What is a Database

The technical definition: A structured set of data held in a computer, especially one that is accessible in various ways.

User Friendly: A database at its core – is a set of related information.

A real world example: A Restaurant menu- it is a listing of all items, their prices, their descriptions, broken down into sections.

What is a Table

Technical Definition: In relational databases and flat file databases, a **table** is a set of data elements (values) using a model of vertical columns (identifiable by name) and horizontal rows, the cell being the unit where a row and column intersect. A **table** has a specified number of columns, but can have any number of rows.

User Friendly: A table is a collection of related data entries and it consists of columns and rows.

Real World Example: City Weather Highs and Lows

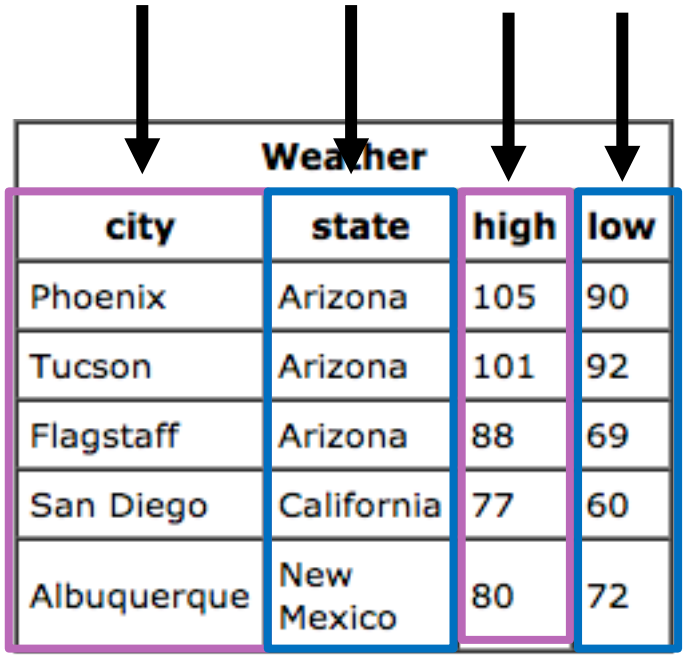
Weather			
city	**state**	**high**	**low**
Phoenix	Arizona	105	90
Tucson	Arizona	101	92
Flagstaff	Arizona	88	69
San Diego	California	77	60
Albuquerque	New Mexico	80	72

What is a Column

Technical Definition: In the context of a relational **database** table, a **column** is a set of data values of a particular simple type, one for each row of the table. The **columns** provide the structure according to which the rows are composed.

User Friendly: An individual piece of data.
Also known as an attribute of field

Real World Example: In our Weather table:
City, State, High, and Low are all columns.
They refer to a specific dimension in our table.



Weather			
city	**state**	**high**	**low**
Phoenix	Arizona	105	90
Tucson	Arizona	101	92
Flagstaff	Arizona	88	69
San Diego	California	77	60
Albuquerque	New Mexico	80	72

What is a Row

Technical Definition: In the context of a relational database, a **row**—also called a record or tuple—represents a single, implicitly structured data item in a **table**. In simple terms, a database **table** can be thought of as consisting of **rows** and columns or fields

User Friendly: A data set representing a single item.

Real World Example: In our Weather table:
Phoenix Arizona 105 90 is a single record.
Each row has the same columns.

Weather			
city	**state**	**high**	**low**
Phoenix	Arizona	105	90
Tucson	Arizona	101	92
Flagstaff	Arizona	88	69
San Diego	California	77	60
Albuquerque	New Mexico	80	72

SQL stands for Structured Query Language… and what is a query?? It’s a Question!

We all know how to ask questions!

SQL Syntax

SQL syntax is the framework into which we build (or phrase) our questions into a query to send to the database.

SQL queries will always be written with this framework in the order shown.

Not all options listed are required to run a query

The minimum requirements for a query to run against any database is **SELECT** and **FROM**.

select [columns]

from [tablename]

where [condition]

group by [column]

having [condition]

order by [column]

limit [number];

Learning To Think in SQL

Step One – The Business question/ask
Step Two – Rephrase the question using the SQL syntax
Step Three – Trim to only the SQL syntax

Example:
Who won the academy award for best actor in 1997?

SELECT actor name FROM the best actor academy award WHERE the year is 1997

```
SELECT actor_name
FROM Best_Actor_Award
WHERE Year = 1997
```

SELECT – What do you want to know? What is the answer you are looking to return?

- These will be the column names listed

FROM – The name of the location where this information will be coming from.

- This will be the table or tables where the data is stored.

WHERE – Is used to extract only those records that fulfill a specified criterion.

- This is a filter for the data you want returned

Hands on Activities

NOW FOR THE FUN!

Our Sandbox

Environments where users can play without breaking anything are often referred to as sandboxes. They are usually personal spaces where an analyst or developer can experiment with code without affecting a production environment.

The sandbox environment we will be using is the w3 schools SQL editor:

http://bit.ly/1foSkgu

Time to play in the Sandbox!

We are all going into business together!

We are all now part owners of the SheCodesNow Online Store.

This is an online store where our people can browse through our selection of **Products** offered from various **Suppliers** all organized neatly by **Category**.

Once our **Customers** check out, our **Employees** go over the **OrderDetails** to prep and ship the **Orders** using one of preapproved list of **Shippers**.

Our first query

Business Question/Ask:
We need a detailed list of information on all of our customers.

Rephrase - Using the framework we saw earlier :
We want to SELECT all the rows FROM the Customers table.

Trim: Then we trim it –
SELECT all FROM Customers

Extra step – change ‘all’ to ‘*’
SELECT * FROM Customers

Type into the ‘SQL Statement’ Box:
SELECT * FROM Customers

LIMIT-ing returns

THE LIMIT STATEMENT IS USED TO RETRIEVE RECORDS FROM ONE OR MORE TABLES IN A DATABASE AND LIMIT THE NUMBER OF RECORDS RETURNED BASED ON A LIMIT VALUE.

```
SELECT *
FROM Customers
LIMIT 10
```

For Reference

Some flavors of SQL – like Oracle – don't support the limit syntax/clause.

For Oracle the equivalent syntax is:

```
SELECT column_name(s)
FROM table_name
WHERE ROWNUM <= number
```

Selecting Specifics

Business Question/Ask:
Instead of a list of all customer data, we only want a list of customer names and customer IDs

Rephrase:
I want to SELECT Customer Name and Customer ID FROM the Customers table

Trim:
SELECT CustomerID, CustomerName FROM Customers

Type into the ‘SQL Statement’ Box:

SELECT CustomerID, CustomerName
FROM Customers

Selecting Specifics

Business Question/Ask:
What are the name of the categories we have on our site?

Rephrase:
SELECT the name of the categories (categoryname) FROM the Categories table

Trim:
SELECT CategoryName FROM Categories

Type into the ‘SQL Statement’ Box:

```
SELECT CategoryName
FROM Categories
```

Where clause – Our Filters

Business Question/Ask:
What are the names and addresses of the customers we have that live in my favorite country?

Rephrase:
SELECT Customer Name and address, city, country FROM the Customers table who have addresses WHERE the country is France

Trim:
SELECT CustomerName, Address, City, Country FROM Customers WHERE Country = France

Type into the 'SQL Statement' Box:

```
SELECT CustomerName, Address, City, PostalCode, Country
FROM Customers
WHERE Country = 'France'
```

Joining Tables

A SQL JOIN clause is used to combine rows from two or more tables, based on a common field between them.

The most common type of join is: **SQL INNER JOIN**. An SQL INNER JOIN returns all rows from multiple tables where the join condition is met.

Different Types of Joins:

INNER JOIN: Returns all rows when there is at least one match in BOTH tables

LEFT JOIN: Return all rows from the left table, and the matched rows from the right table

RIGHT JOIN: Return all rows from the right table, and the matched rows from the left table

FULL JOIN: Return all rows when there is a match in ONE of the tables

Joining Tables – Practice

```
SELECT *
FROM Orders
LIMIT 3
```

Number of Records: 3

OrderID	CustomerID	EmployeeID	OrderDate	ShipperID
10248	90	5	1996-07-04	3
10249	81	6	1996-07-05	1
10250	34	4	1996-07-08	2

```
SELECT *
FROM OrderDetails
LIMIT 3
```

Number of Records: 3

OrderDetailID	OrderID	ProductID	Quantity
1	10248	11	12
2	10248	42	10
3	10248	72	5

Notice that the column OrderID is in both tables.

Since OrderID in the OrderDetails table refers to OrderID in orders – we can use this relationship to link the tables.

We can connect these tables by using an inner join following this format:

INNER JOIN table_name ON

table_name.column = table_name.column

So in this instance:

```
SELECT *
FROM Orders
INNER JOIN OrderDetails ON
Orders.OrderID=OrderDetails.OrderID
```

Things to remember

The SQL database we are using is not case sensitive. So whether you write SELECT or select or Select all will be read by the database the same.

Using Select * From *table* is very useful in specific cases (like when tables are small or you really need to return every row from a table) - But is normally not recommended for use without a limiter added: Select * From *table* limit 10

In the Where Clause: SQL requires single quotes around text values (most database systems will also allow double quotes). Numeric fields should not be enclosed in quotes

Where *column* = #/ 'string' - is not the only comparison operator that can be used: Less than, Greater than, Less than or equal to , Great than or equal to, Does not equal [<,>,<=,>=, !=] can also be used.

Dates need to be in quotations to be read by the database i.e. 'YYYY-MM-DD'

Classroom Exercises

1. What are the names of all of our shippers

2. Human Relations needs a list of all Employee Names and birthdays for their records.

3. Provide a list of Customers, addresses and point of contact who are in London for the sales team to offer special offers

4. Our Web Admins need a list of all the products we have.

5. The Web Admins need more than just Product Names now, they also need unit and pricing information for each product.

6. List all products and their prices where the price is GREATER THAN 20

7. Our warehouse manager needs a list of all the orders placed on July 8 1996.

8. Our Warehouse manager needs a list of all of the order details where the number product was ordered 12 times in a single order.

9. Provide a list of all products in the Beverages Category

10. The Sales department needs a detailed list of products provided by Shelley Burke of New Orleans Cajun Delights.

Terminology

Entity	Entity – Something of interest to the database user community. Examples include customers, parts, geographic locations etc.
Column	In the context of a relational **database** table, a **column** is a set of data values of a particular simple type, one for each row of the table. The **columns** provide the structure according to which the rows are composed.
Row	Set of columns that together completely describe an entity or some action on an entity. Also called a 'record'
Table	In relational databases and flat file databases, a table is a set of data elements (values) using a model of vertical columns (identifiable by name) and horizontal rows, the cell being the unit where a row and column intersect. A table has a specified number of columns, but can have any number of rows.
Primary Key	One or more columns that can be used as a unique identifier for each row in a table.
Foreign Key	One or more columns that can be used together to identify a single row in another table.

Terminology cont.

Join	A **SQL join** clause combines columns from one or more tables in a relational database. It creates a set that can be saved as a table or used as it is. A **JOIN** is a means for combining columns from one (self-table) or more tables by using values common to each.
SQL Clause	The commands in the SQL sytnax framework : SELECT, INSERT, UPDATE, DELETE, WHERE, JOIN, DISTINCT, ORDER BY, GROUP BY, HAVING, and UNION
Alias	You can rename a table or a column temporarily by giving another name known as an **alias**. The use of table **aliases** means to rename a table in a particular **SQL** statement. ... The column **aliases** are used to rename a table's columns for the purpose of a particular **SQL** query.
LIMIT	The **SQL** SELECT **LIMIT** statement is used to retrieve records from one or more tables in a database and **limit** the number of records returned based on a **limit** value.
WHERE Clause	The **SQL WHERE clause** is used to specify a condition while fetching the data from single table or joining with multiple tables. If the given condition is satisfied then only it returns specific value from the table. You would use WHERE **clause** to filter the records and fetching only necessary records.

Suggested Study Material

Books

- SQL for Dummies
- Oreily Learning SQL
  - O'Reily books are available at Seattle Libraries
- SQL in 10 Minutes, Sams Teach Yourself

Online Resources:

W3schools.com :
http://www.w3schools.com/sql/default.asp

Code Acedemy:

https://www.codecademy.com/

References

https://en.wikipedia.org/wiki/Row_(database)
https://en.wikipedia.org/wiki/Relational_database
http://www.w3schools.com/sql/default.asp