# Databases & SQL for Data Science with Python

PROFESSIONAL CERTIFICATE IBM Data Analyst

# In this week!

- Using String Patterns and Ranges
- Sorting Result Sets
- Grouping Result Sets
- Reference data in formulas
- Built-in Database Functions
- Sub-Queries and Nested Selects

# SELECT Statement Review

- select * from  <table name> ;

- SELECT *column1, column2, ...*
FROM *table_name*;

- SELECT *column1, column2, ...*
FROM *table_name*
WHERE *condition*;

# WHERE Clause

- The WHERE clause always requires a predicate, which is a condition that evaluates to true, false or unknown

- But what if we don't know exactly what value the predicate is?

    "Answer is in the next slide"

# String pattern: LIKE Operator

- The like predicate is used in a WHERE clause to search for a pattern in a column.

- SELECT column1, column2, …
  FROM table_name
  WHERE columnN LIKE pattern;

# LIKE operators with '%' and '_' wildcards

The percent sign is used to define missing letters.

The percent sign is called a wildcard character

| LIKE Operator | Description |
|---|---|
| WHERE CustomerName LIKE 'a%' | Finds any values that start with "a" |
| WHERE CustomerName LIKE '%a' | Finds any values that end with "a" |
| WHERE CustomerName LIKE '%or%' | Finds any values that have "or" in any position |
| WHERE CustomerName LIKE '_r%' | Finds any values that have "r" in the second position |
| WHERE CustomerName LIKE 'a_%' | Finds any values that start with "a" and are at least 2 characters in length |
| WHERE CustomerName LIKE 'a__%' | Finds any values that start with "a" and are at least 3 characters in length |
| WHERE ContactName LIKE 'a%o' | Finds any values that start with "a" and ends with "o" |

https://www.w3schools.com/sql/sql_like.asp

# Exercise

- Write SQL statement that retrieves all students with a StudentName starting with "T", form University table.

# Exercise

- Write SQL statement that retrieves all students with a StudentName starting with "T", form University table.

- SELECT * FROM University
  WHERE StudentName LIKE 'T%';

# Between Operator

- SELECT *column_name(s)*
  FROM *table_name*
  WHERE *column_name* BETWEEN *value1* AND *value2;*

# Exercise

- Write SQL statement that selects all Participants from NPower table, with a score BETWEEN 60 and 90.

# Exercise

- Write SQL statement that selects all Participants from NPower table, with a score BETWEEN 60 and 90.

- SELECT * FROM  NPower
  WHERE score BETWEEN 60 AND 90;

# Exercise

- Write SQL statement that selects all Participants from Participants table, with a score BETWEEN 60 and 90. [use where clause]

- SELECT * FROM  Participants
  WHERE score>= 60 AND score <=90;

# IN Operator

- SELECT *column_name(s)*
  FROM *table_name*
  WHERE *column_name* IN (*value1, value2, ...*);

# Exercise

- Select all Participants from NPower table who are located in "Calgary, GTA, Halifax"

# Exercise

- Select all Participants from NPower table who are located in "Calgary, GTA, Halifax"

- SELECT * FROM Npower
  WHERE Location IN (' Calgary ', ' GTA ', ' Halifax ');

# Exercise

- Select all Participants from Participants table who are located in "Calgary, GTA, Halifax" [don't use IN]

- SELECT * FROM Participants
WHERE Location='Calgary' OR Location='GTA' OR Location='Halifax';

# Sorting Result Sets

- How to display the result in alphabetical order?

- How to display the result in descending order?

- How to display the result in descending order for a specific column?

# Sorting Result Sets

- How to display the result in alphabetical order?
- Select title from Book ORDER BY title

- How to display the result in descending  order?
- Select title from Book Order BY title DESC

- How to display the result in descending  order for a specific column?
- Select title from Book Order BY 2 DESC

# Built-in Database Functions

List some aggregate or column function, what do they do?

List some Scalar and String functions, what do they do?

List some built-in BD2 functions for date and time?

# Grouping Result Sets

- Eliminate duplicates from a result set
- Describe how to further restrict a result set

# Exercise

- What is the output from the following query?
- SELECT  Country, COUNT(CustomerID) as Count FROM Customers GROUP BY Country;

# Exercise

- What is the output from the following query?
- SELECT  Country, COUNT(CustomerID) as Count FROM Customers GROUP BY Country;

- Countries are grouped and then counted using the count function.

# Hands-on Lab

- Take 30 minutes to complete the hands-on Lab : String Patterns, Sorting & Grouping

# Exercise: **True or False**

True or False

•Aggregate functions can be used in the WHERE clause without a select statement

# Sub-Queries and Nested Selects

- What is meant by sub_queries?
- When should we use sub_queries?

# Exercise

What should be the output of the following SQL statement?

Select EMP_ID, SALARY, AVG(SALARY) AS AVG_SALARY  from employees

# Correct statement without Group By

select EMP_ID, SALARY, (select AVG(SALARY) from employees) AS AVG_SALARY from employees

# Breakout Room Activity

- Take 40 minutes to complete week 3 activity posted on Blackboard

# Any questions