

# Row Level Functions

# Row Level Functions

- Row level functions: Applies to every row being processed
- Examples:
  - `UPPER(Instructor_Name): 'Obi Wan Kenobi' => 'OBI WAN KENOBI'`
- Note: Functions are DBMS specific
  - Focus on functionality and usage pattern
  - Memorize common ones
  - Check DBMS manual when in doubt

# Data Type Conversion Functions

- :: (casting)
- TO\_CHAR
  - TO\_CHAR(number\_column, format\_string)
  - TO\_CHAR(date\_column, format\_string)
- TO\_NUMBER(text\_column, format\_string)
- TO\_DATE(text\_column, format\_string)

# String Functions

- || (Concatenation)
- LENGTH
- UPPER, LOWER
- POSITION
- REPLACE, TRIM
- SUBSTRING, LEFT, RIGHT

# TO\_CHAR Function

- TO\_CHAR(number\_column, format\_string)
- TO\_CHAR(date\_time\_column, format\_string)

# Datetime Functions

- CURRENT\_DATE, CURRENT\_TIME, CURRENT\_TIMESTAMP
- +/-
- DATE\_PART
- AGE
- AT TIME ZONE

# TO\_DATE Function

- TO\_DATE(text\_column, format\_string)
  - YYYY-MM-DD
  - YYYY-MM-DD HH24:MI:SS.MS

# CASE Function

CASE

WHEN condition\_1 THEN expression\_1

WHEN ... THEN ... -- Optional

ELSE expression\_else -- Optional

END

- It is a good practice to always have ELSE branch



# NULL Functions

- Coalesce: Return the first non-null argument

`COALESCE (Column_1, Column_2, ...)`

- NULLIF

# Aggregation Functions

# Aggregation Functions

- Operates to a selected dataset. Provides statistical information of the selected data.
  - SUM function
  - AVG, MAX and MIN functions
  - COUNT function

# COUNT

- COUNT function
  - COUNT(<column\_name>): The number of rows where a value exists in this column (not null)
  - COUNT(\*): The number of rows regardless of the value in any column
    - Difference is in whether NULL is counted
  - COUNT(distinct <column\_name>): The number of unique values in the column, not counting NULL

# NULL Handling

- NULL in aggregation:
  - Ignored in aggregations
  - Only exception is COUNT(\*)

# Window Functions

# Functions

- Row level functions:
  - Get value of one row.
  - Output one result for each row.
- Aggregation functions:
  - Get value of many rows.
  - Output one result for all the input rows.

# Window Functions

- Window functions receive a set (window) of rows affiliated with an input row, usually ordered, and return one value for the input row.
  - Aggregation functions return one row for a group of rows.
  - Window functions return one row for each row based on that row's window, e.g., the rank of a student's grade in his/her class



# Window Definition

- Window functions return one value for each input row and a set (window) of rows affiliated with the input row, usually ordered.
  - PARTITION BY
  - ORDER BY
  - RANGE (size of window)

Example: Stock Ticker 2020

# Rank Function

```
SELECT
    Student_Name,
    Course_Name,
    RANK() OVER (
        PARTITION BY Student_Name
        ORDER BY Actual_Tuition DESC
    ) AS Tuition_Rank
FROM Registration
```

# RANGE Definition

ROWS BETWEEN <Starting> AND <Ending>

UNBOUNDED PRECEDING

*value* PRECEDING

CURRENT ROW

*value* FOLLOWING

UNBOUNDED FOLLOWING

# Window Functions

`ROW_NUMBER()`

`RANK()` / `DENSE_RANK()`

`NTILE()`

`PERCENT_RANK()`

`LAG()` / `LEAD()`

`SUM()` / `AVG()` / `MIN()` / `MAX()` / `COUNT()`

# Function Summary

- Row level functions:
  - Get value of one row.
  - Output one result for each row.
- Aggregation functions:
  - Get value of many rows.
  - Output one result for all the input rows.
- Windows functions:
  - Get value of many rows for each input row.
  - Output one result for each input row.

# LIMIT

Use LIMIT N to tell DBMS how much rows you want to return