Database Programming
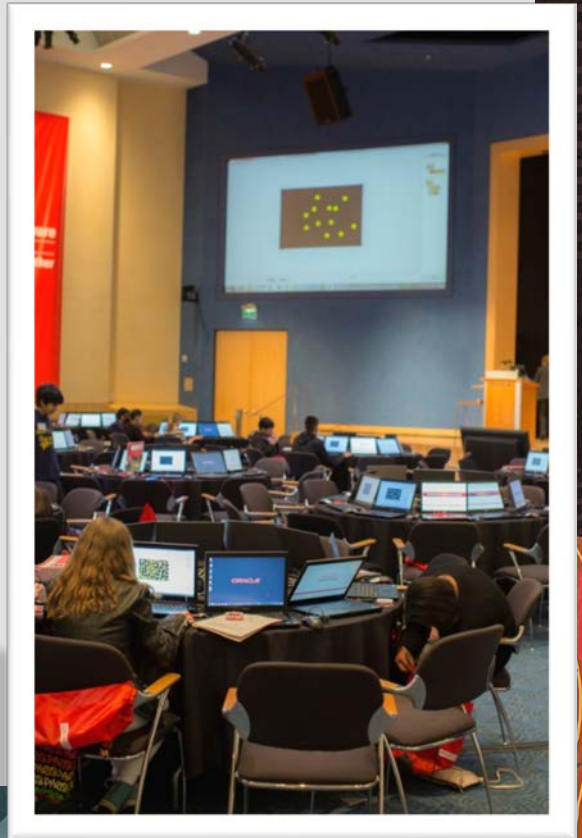
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Introduction to Functions

Objectives

- This lesson covers the following objectives:
  - Identify appropriate applications of single-row functions in query statements
  - Classify a function as a single-row or multi-row function
  - Differentiate between single-row functions and multi-row functions and the results returned by each

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Introduction to Functions

Purpose

- When you put money in a drink machine, something happens between the time the money is deposited and your favorite drink is dispensed

- The transaction is processed internally by the machine.

- Your money is the input and the drink is the output

- The machine performs a function

- The machine:
  - Counts your money
  - Makes sure your selection is chosen
  - Returns change, if necessary

Purpose

- In SQL, there are many types of functions that are used to transform input in one form to output in another form

- These functions are used to manipulate data values

- Functions are small programs that perform an action on a value or column and produce something different as output

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Introduction to Functions

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Functions

- Functions have both input and output. Input into a function is referred to as an argument

Input
(Argument) → **Function** → Output

- In the drink machine example, the input is money and the output is a drink

Money → **Drink Machine** → **Drink**

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Functions

- Oracle has two distinct types of functions:
    - Single-Row
    - Multiple-Row
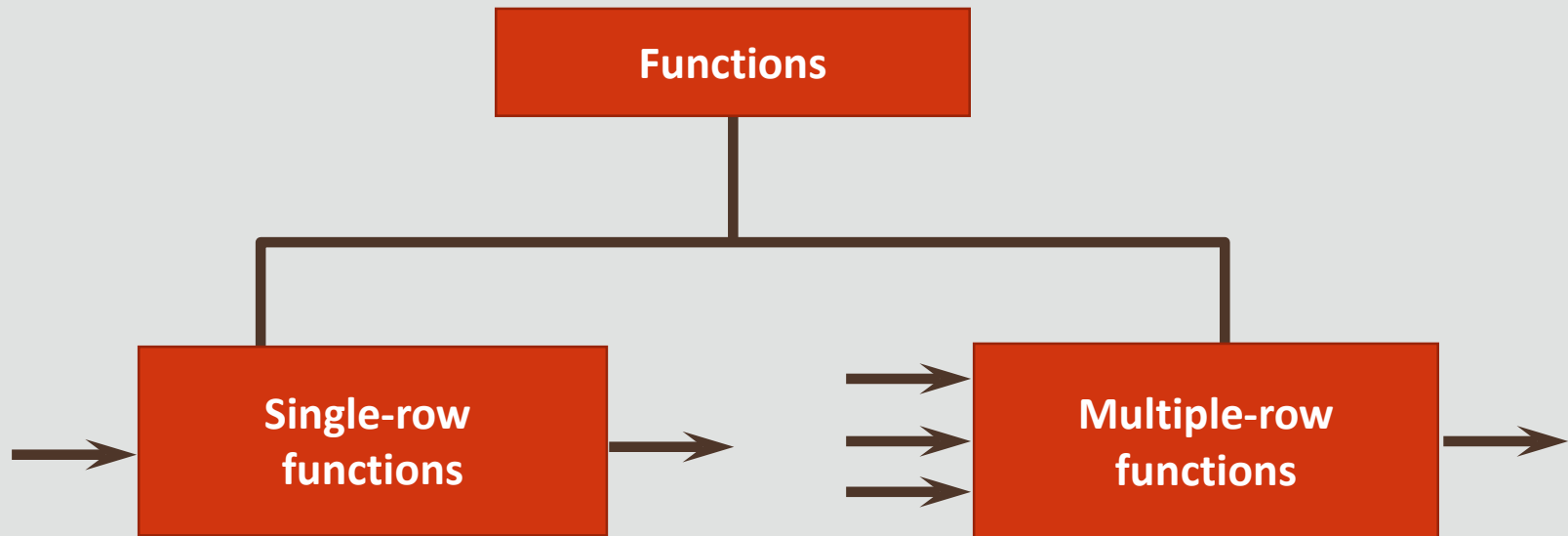
Single-Row Versus Multiple-Row Functions

- Single-row functions operate on single rows only and return one result per row

- There are different types of single-row functions including character, number, date, and conversion functions
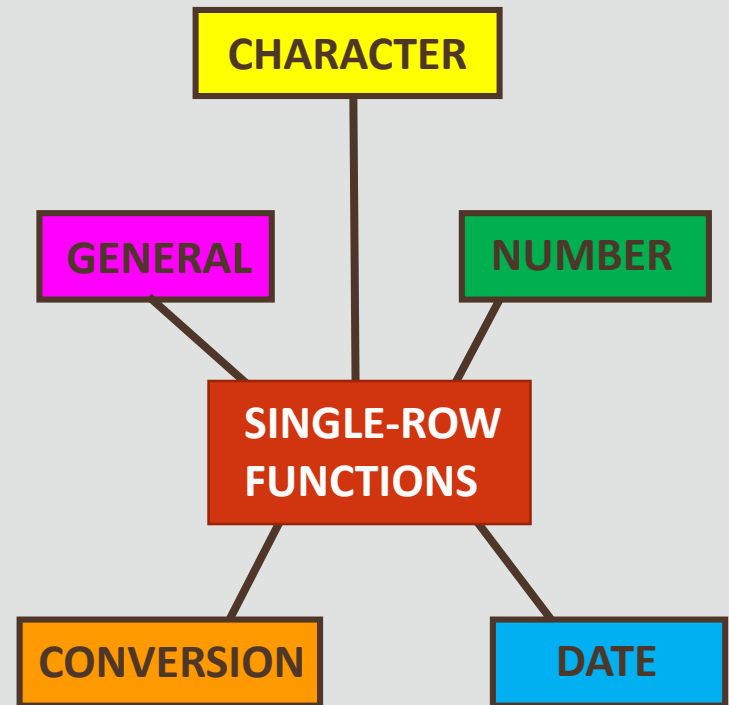
→ **Single-row functions** →

- Multiple-row functions can manipulate groups of rows to give one result per group of rows

- These functions are also known as group functions

→
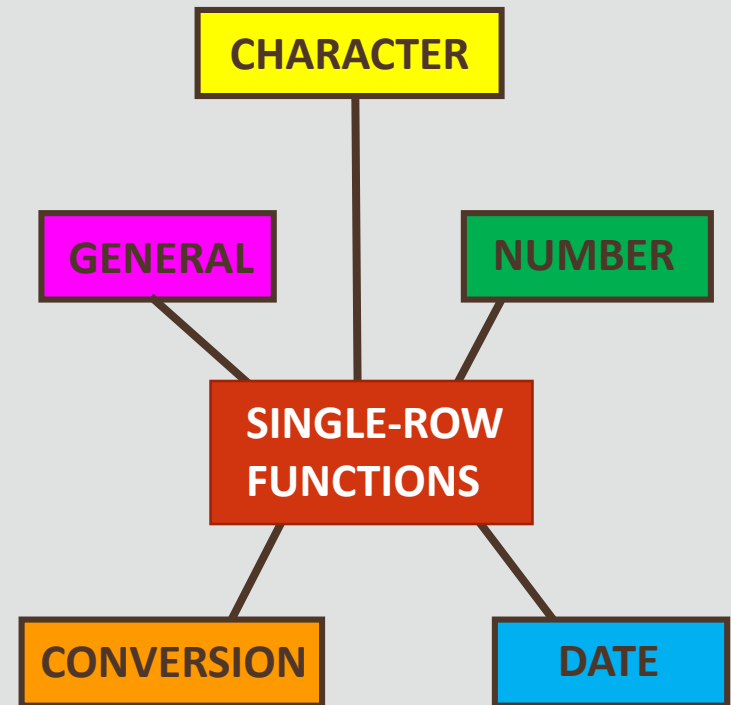→ **Multiple-row functions** →
→

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Single-Row Functions

- In SQL, Single-Row functions can be used to:
  - Perform calculations such as rounding numbers to a specified decimal place
  - Modify individual data items such as converting character values from uppercase to lowercase

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Single-Row Functions

- Format dates and numbers for display such as converting the internal numeric database date format to a standard format

- Convert column data types such as converting a character string to a number or date

CHARACTER

GENERAL

NUMBER

SINGLE-ROW
FUNCTIONS

CONVERSION

DATE

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Single-Row Functions

- Single-Row Functions accept one or more arguments and will return a single result per row

- So if you apply the single row function to 12 rows, you will get 12 results out of the single row function

- In summary, single-row functions do the following:
  - Manipulate data items
  - Accept arguments and return one value
  - Act on each row returned
  - Return one result per row
  - Can modify the data type
  - Can be nested

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Multiple-Row Functions

- Multiple-Row (or Group) functions take many rows as input, and return a single value as output

- The rows input may be the whole table or the table split into smaller groups

- Examples of Multiple-Row (Group) functions include:
  - MAX: finds the highest value in a group of rows
  - MIN: finds the lowest value in a group of rows
  - AVG: finds the average value in a group of rows

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Introduction to Functions

Terminology

- Key terms used in this lesson included:
  - Single Row Function
  - Multiple Row Function

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Summary

- In this lesson, you should have learned how to:
  - Identify appropriate applications of single-row functions in query statements
  - Classify a function as a single-row or multi-row function
  - Differentiate between single-row functions and multi-row functions and the results returned by each