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Working with Functions

Database Fundamentals

What you will learn

At the core of the lesson

You will learn how to do the following:

- Identify built-in functions.
- Examine the DATE functions that can be used in calculations.
- Calculate data by using aggregate functions.
- Manipulate string values.

Key terms:

- Aggregate functions
- Conversion functions
- Date functions
- String functions
- Mathematical functions
- Control flow functions
- DISTINCT
- COUNT
- Character strings

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Functions

Built-in functions

Some common functions include aggregate functions, conversion functions, date functions, string functions, mathematical functions, and control flow and window functions.

Aggregate functions

Conversion functions

Date functions

String functions

Mathematical functions

Control flow and
window functions

Built-in functions: Example syntax

The CURRENT_DATE() function returns the current date as a value in 'YYYY-MM-DD' format.

```
SELECT  CURRENT_DATE();
```

Function

```
->  'YYYY-MM-DD'
```

Returns current date

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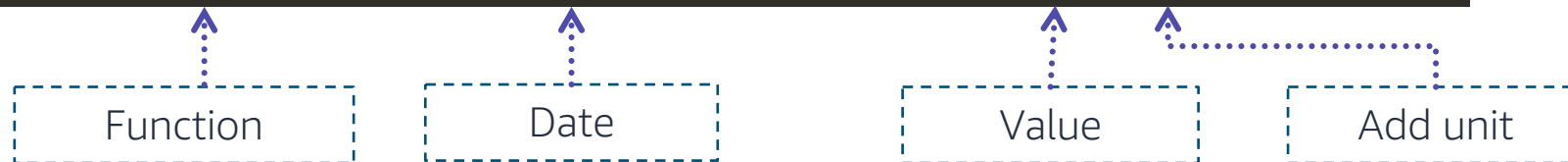
Built-in functions: Another example syntax

The DATE_ADD() function adds a time or date interval to a date and returns a value.

Query

```
DATE_ADD (date, INTERVAL value addunit);
```

Output

```
SELECT DATE_ADD ('YYYY-MM-DD', INTERVAL 3 DAY);
```

Function	Date	Value	Add unit

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Aggregate functions

Common aggregate functions

Aggregate Function	Use Case and Example
AVG	• Returns the average of a set • Can be used to find the average population for cities within a specified country
COUNT	• Returns the number of items in a set • Can be used to find the total number of cities listed within a specified country
MAX	• Returns the maximum value in a set • Can be used to find the city with the greatest number or the highest population
MIN	• Returns the minimum value in a set • Can be used to find the city with the smallest number or the lowest population
SUM	• Returns the total of all values in a set • Can be used to find the total population for all of the cities that are listed for a specified country

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Aggregate functions: Example syntax

Query

Aggregate function name

```
SELECT COUNT(*) AS 'Total Number of Rows' FROM countrylanguage;
```

AS clause creates an alias

Table

Output

```
Total Number of Rows
--------------------
                 984
```

Aggregate function return value

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Aggregate functions: Example syntax (continued)

Query

```
SELECT AVG(LifeExpectancy)
FROM country;
```

Aggregate function

Aggregate function name

Output

```
AVG(LifeExpectancy)
-------------------
       72.51200
```

Aggregate function return value

Activity

Activity: Using the SUM function

In this activity:

- AnyCompany Publishing House is examining their country table.
- Discuss how to query the country table by using the SUM function. Feel free to annotate your findings to begin your discussion.

To do:

- Review the column headings, and annotate which columns you could use with the SUM function.
- Create a query that sums the total population for all of the countries.
- After creating your list and query, be ready to explain your findings to the class.

Hint: Review slides 7–9 for information about aggregate functions.

Country	
Column Headings	**Type**
Code	Character
Name	Character
Continent	Character
Region	Character
SurfaceArea	Float
IndepYear	Integer
Population	Integer
LifeExpectancy	Float
GNP	Float
GNPOId	Float
LocalName	Character
Capital	Character
Code2	Character

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DISTINCT keyword

DISTINCT (different) keyword

Query

DISTINCT keyword

Column names

```
SELECT DISTINCT CountryCode, District
FROM city;
```

Output

```
CountryCode    District
----------     ----------------
BRA            Distrito Federal
BRA            Rio de Janeiro
BRA            Sao Paulo
CHN            Guangdong
CHN            Shanghai
GBR            England
GBR            Scotland
```

Distinct (unique) value combinations for the selected columns

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DISTINCT in a COUNT function

Query

DISTINCT keyword

```
SELECT COUNT(DISTINCT CountryCode) AS Unique_Country_Codes
FROM city;
```

Output

```
Unique_Country_Codes
--------------------
118
```

The query returns the number of unique country code values in the table.

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Character strings and string functions

String function: CHAR_LENGTH()

Query

```
SELECT CHAR_LENGTH('District');
```

A string literal is enclosed in single quotation marks (' ') or double quotation marks (" ").

String parameter

Returns the length of the string measured in characters
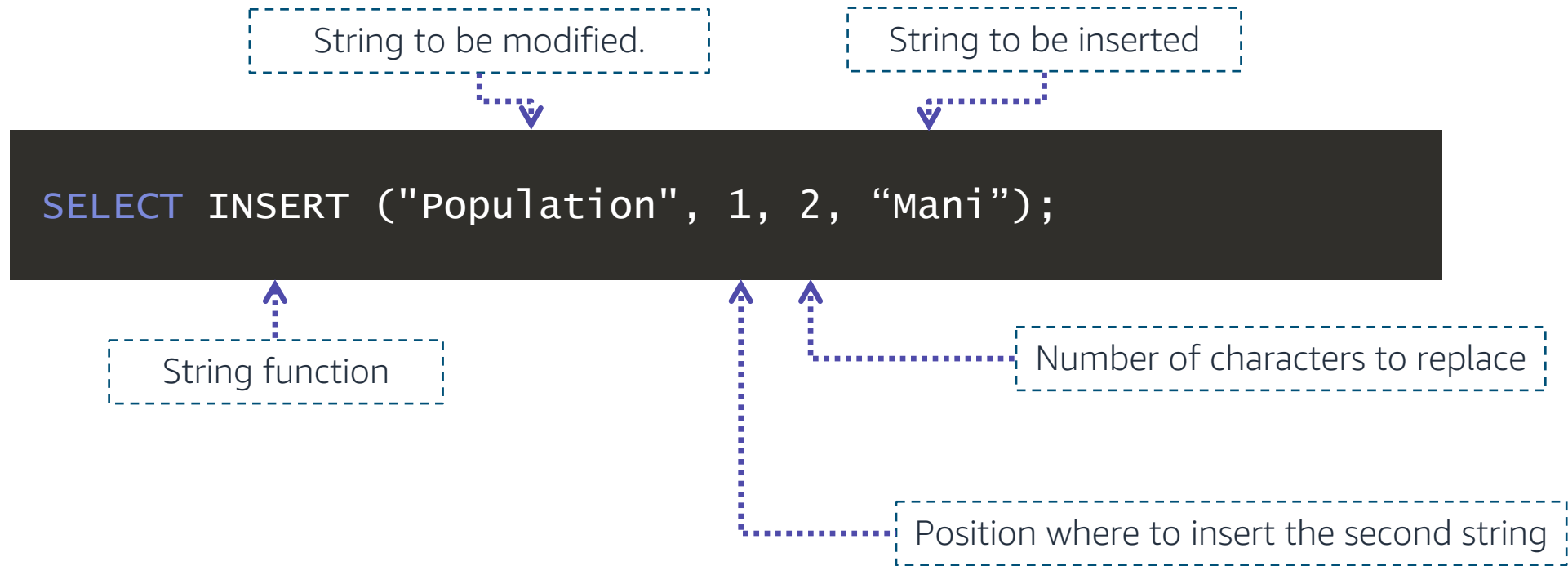
Output

```
CHAR_LENGTH('District')
------------------------
8
```

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String function: INSERT()

String to be modified.

String to be inserted

```
SELECT INSERT ("Population", 1, 2, "Mani");
```

String function

Number of characters to replace

Position where to insert the second string

Output

```
INSERT ("Population", 1, 2, "Mani")
-----------------------------------
Manipulation
```

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Leading and trailing spaces in a string

Extra spaces in a string can cause issues when querying for specific data.

T E X T

Leading space

Character string data

Trailing space

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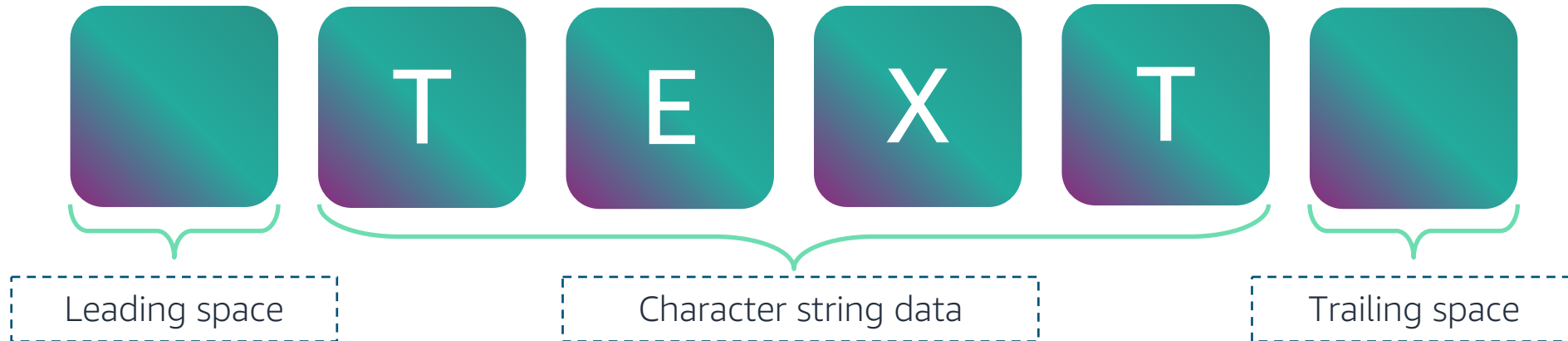
TRIM functions: RTRIM() and LTRIM()

- The RTRIM() function removes blank spaces to the right of a string.
- The LTRIM() function removes blank spaces to the left of a string.

Query

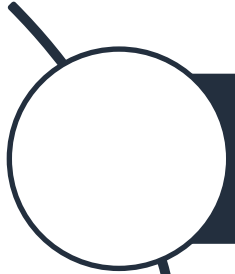RTRIM removes blank spaces on the right end of the string data values.

```
SELECT ID, RTRIM(District) AS District
FROM city;
```

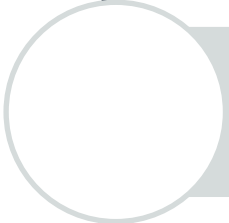**Output**

```
ID       District
-----    --------
1024     Maharashtra
2331     Seoul
3793     New York
```

No spaces to the right of the string values for the District column

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Checkpoint questions

Which functions remove leading and trailing spaces on strings?

What is an aggregate function?

What are five common aggregate functions?

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Key takeaways

- SQL has built-in functions. Common functions include the following:

  - Aggregate functions
  - String functions
  - Date functions

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Thank you