Using Single Row Function to customize output

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Functions in SQL

Functions are a very powerful feature of SQL. They can be used to do the following:

- Perform calculations on data
- Modify individual data items
- Manipulate output for groups of rows
- Format dates and numbers for display
- Convert column data types

Functions in SQL

There are two types of functions:

- Single-row functions
- Multiple-row functions

Single Row Functions in SQL

– These functions operate on single rows only and return one result per row.

– There are different types of single-row functions.

- Character
- Number
- Date
- Conversion
- General

Features of single-row functions

Features of single-row functions:

- Acting on each row that is returned in the query
- Returning one result per row
- Possibly returning a data value of a different type than the one that is referenced
- Can be used in SELECT, WHERE, and ORDER BY clauses

Functions Syntax in SQL

Syntax:

- function_name is the name of the function
- arg1, arg2 is any argument to be used by the function.
- This can be represented by a column name or expression.

Types of Single Row functions

- Character functions: Accept character input and can return both character and number values
- Number functions: Accept numeric input and return numeric values
- Date functions: Operate on values of the DATE data type (All date functions return a value of the DATE data type except the MONTHS_BETWEEN function, which returns a number.)
- Conversion functions: Convert a value from one data type to another

Character functions

- Single-row character functions accept character data as input and can return both character and numeric values.

- Types of Character functions

  - Case-conversion functions
  - Character-manipulation functions

Case-Conversion Functions

- LOWER: Converts mixed-case or uppercase character strings to lowercase
- UPPER: Converts mixed-case or lowercase character strings to uppercase
- INITCAP: Converts the first letter of each word to uppercase and the remaining letters to lowercase

Case-Conversion Functions

– SQL Code

- Select upper(census_reg) from hospital
- Select lower(census_reg) from hospital
- Select initcap(census_reg) from hospital

Character Manipulation Functions

- CONCAT: Joins values together (You are limited to using two parameters with CONCAT.)
- SUBSTR: Extracts a string of determined length
- LENGTH: Shows the length of a string as a numeric value
- INSTR: Finds the numeric position of a named character
- LPAD: Returns an expression left-padded to the length of n characters with a character expression
- RPAD: Returns an expression right-padded to the length of n characters with a character expression
- TRIM: Trims leading or trailing characters (or both) from a character string

Character Manipulation Functions

– SQL Code

```
SELECT
    hosp_id,
    CONCAT(rural_urban, acute_nonacute) as hospital_type,
    LENGTH (acute_nonacute) as length_of_column,
    INSTR(census_reg, 'W') as contains_w,
    SUBSTR(census_reg, 0, 2) as read_first_2_alphabets
FROM   hospital
```

Number Functions

Number functions accept numeric input and return numeric values. Examples:

- ROUND: rounds value to a specified decimal
- TRUNC: Truncates value to a specified decimal
- MOD: Returns remainder of division. The MOD function is often used to determine whether a value is odd or even.

Number Functions

Examples:

Function	Results
ROUND(45.926, 2)	45.93
TRUNC(45.926, 2)	45.92
MOD(1600,300)	100

Number Functions

SQL Code:

```
select round(45.923,2),
    round(45.923,0),
    round(45.923,-1)
from dual
```

- Dual is a dummy table that you can use to view results from functions and calculations.

Number Functions

Round Function:

- The ROUND function rounds the column, expression, or value to n decimal places.
- If the second argument is 0 or is missing, the value is rounded to zero decimal places.
- If the second argument is 2, the value is rounded to two decimal places.
- Conversely, if the second argument is –2, the value is rounded to two decimal places to the left (rounded to the nearest unit of 100).
- The ROUND function can also be used with date functions.

Number Functions

SQL Code:

```
select trunc(45.923,2),
       trunc(45.923,0),
       trunc(45.923,-1)
from dual
```

Number Functions

Trunc Function:

- The TRUNC function truncates the column, expression, or value to n decimal places.
- The TRUNC function works with arguments similar to those of the ROUND function.
- If the second argument is 0 or is missing, the value is truncated to zero decimal places.
- If the second argument is 2, the value is truncated to two decimal places. Conversely, if the second argument is –2, the value is truncated to two decimal places to the left.
- If the second argument is –1, the value is truncated to one decimal place to the left.
- Like the ROUND function, the TRUNC function can be used with date functions.

Number Functions

SQL Code:

```
select mod(1600,400),
        mod(1600,300)
from dual
```

- Returns remainder of division.
- The MOD function is often used to determine whether a value is odd or even.
- This function also works on fractional values and returns the exact remainder. The function returns dividend when the value of divisor is 0.

Date Functions

SQL Code:

```
select sysdate
from dual
```

- The Sysdate function returns the current database server date and time.
- Dual is a dummy table that you can use to view results from functions and calculations.

Arithmetic with Dates

SQL Code:

```
SELECT sysdate+2 as add_days FROM DUAL
SELECT sysdate-3 as sub_days FROM DUAL
SELECT sysdate+3/24 as add_hours FROM DUAL
SELECT sysdate-2/24 as sub_hours FROM DUAL
```

You can add or subtract the number of days or hours to the dates. You can also subtract the dates

Date Functions

SQL Code:

```
SELECT add_months(sysdate,3) FROM DUAL
SELECT add_months(sysdate,-3) FROM DUAL
```

The Add_Months is used to add or subtract the number of calendar months to the given date.

Date Functions

SQL Code:

```
SELECT months_between('01-JUL-2000', '23-JAN-2000')
FROM DUAL;
```

The Months_Between function returns the number of months between the two given dates.

Date Functions

SQL Code:

```
SELECT next_day(sysdate,'FRIDAY') FROM DUAL
SELECT next_day(sysdate,5) FROM DUAL
```

The Next_Day function finds the date of the next specified day of the week.

Date Functions

SQL Code:

```
SELECT last_day(sysdate) FROM DUAL
SELECT last_day('01-JUL-2000') FROM DUAL
```

The Last_Day function returns the last day of the month.

General Functions

Syntax –

NVL (expr1, expr2)

- NVL() converts a null value to an actual value.
- expr1 and expr2 must of same data type.
- expr1 is the source value or expression that may contain a null.
- expr2 is the target value for converting the null.

General Functions

SQL Code

```
select nvl(teaching_ind,0)
from hospital
```

General Functions

Decode()

The DECODE function decodes an expression in a way similar to the IF-THEN-ELSE logic.

Syntax –

DECODE(col|expression, search1, result1

[, search2, result2,...,][, default])

General Functions

SQL Code

```
select
   decode(teaching_ind, 1, 'Yes', 0, 'No‘, ’NOT MAPPED’)
from hospital
```

General Functions

NULLIF()

- The NULLIF function compares two expressions.
- If they are equal, the function returns null.
- If they are not equal, the function returns the first expression.
- You cannot specify the literal NULL for first expression.

Syntax –

NULLIF (expr_1, expr_2)

General Functions

SQL Code

```
SELECT LENGTH(rural_urban) "expr1",
        LENGTH(acute_nonacute) "expr2",
        NULLIF(LENGTH(rural_urban),LENGTH(acute_nonacute))  as result
FROM hospital
```

Your homework

- Round the value 29.526 to two decimal places.
- Truncate the value 29.526 to zero decimal places.
- Calculate the remainder of the value 2500 after it is divided by 500
- Put your code and output in a single pdf file