SQL | Functions (Aggregate and Scalar Functions)

For doing operations on data SQL has many built-in functions, they are categorized in two categories and further sub-categorized in different seven functions under each category. The categories are:

1. **Aggregate functions:**
   These functions are used to do operations from the values of the column and a single value is returned.
   1. AVG()
   2. COUNT()
   3. FIRST()
   4. LAST()
   5. MAX()
   6. MIN()
   7. SUM()

2. **Scalar functions:**
   These functions are based on user input, these too returns single value.
   1. UCASE()
   2. LCASE()
   3. MID()
   4. LEN()
   5. ROUND()
   6. NOW()
   7. FORMAT()

Students-Table

ID	NAME	MARKS	AGE
1	Harsh	90	19
2	Suresh	50	20
3	Pratik	80	19
4	Dhanraj	95	21
5	Ram	85	18

Aggregate Functions

AVG(): It returns the average value after calculating from values in a numeric column.

Syntax:

```
SELECT AVG(column_name) FROM table_name;
```

Queries:

- Computing average marks of students.

```
SELECT AVG(MARKS) AS AvgMarks FROM Students;
```

Output:

AvgMarks
80

- Computing average age of students.

```
SELECT AVG(AGE) AS AvgAge FROM Students;
```

Output:

AvgAge
19.4

COUNT(): It is used to count the number of rows returned in a SELECT statement. It can't be used in MS ACCESS.

Syntax:

```
SELECT COUNT(column_name) FROM table_name;
```

Queries:

- Computing total number of students.

```
SELECT COUNT(*) AS NumStudents FROM Students;
```

Output:

NumStudents
5

- Computing number of students with unique/distinct age.

```
SELECT COUNT(DISTINCT AGE) AS NumStudents FROM Students;
```

Output:

NumStudents
4

FIRST(): The FIRST() function returns the first value of the selected column.

Syntax:

```
SELECT FIRST(column_name) FROM table_name;
```

Queries:

- Fetching marks of first student from the Students table.

```
SELECT FIRST(MARKS) AS MarksFirst FROM Students;
```

Output:

MarksFirst
90

- Fetching age of first student from the Students table.

```
SELECT FIRST(AGE) AS AgeFirst FROM Students;
```

Output:

AgeFirst
19

LAST(): The LAST() function returns the last value of the selected column. It can be used only in MS ACCESS.

Syntax:

```
SELECT LAST(column_name) FROM table_name;
```

Queries:

- Fetching marks of last student from the Students table.

```
SELECT LAST(MARKS) AS MarksLast FROM Students;
```

Output:

MarksLast
85

- Fetching age of last student from the Students table.

```
SELECT LAST(AGE) AS AgeLast FROM Students;
```

Output:

AgeLast
18

MAX(): The MAX() function returns the maximum value of the selected column.

Syntax:

```
SELECT MAX(column_name) FROM table_name;
```

Queries:

- Fetching maximum marks among students from the Students table.

```
SELECT MAX(MARKS) AS MaxMarks FROM Students;
```

Output:

MaxMarks
95

- Fetching max age among students from the Students table.

```
SELECT MAX(AGE) AS MaxAge FROM Students;
```

Output:

MaxAge
21

MIN(): The MIN() function returns the minimum value of the selected column.

Syntax:

```
SELECT MIN(column_name) FROM table_name;
```

Queries:

- Fetching minimum marks among students from the Students table.

```
SELECT MIN(MARKS) AS MinMarks FROM Students;
```

Output:

MinMarks
50

- Fetching minimum age among students from the Students table.

```
SELECT MIN(AGE) AS MinAge FROM Students;
```

Output:

MinAge
18

SUM(): The SUM() function returns the sum of all the values of the selected column.

Syntax:

```
SELECT SUM(column_name) FROM table_name;
```

Queries:

- Fetching summation of total marks among students from the Students table.

```
SELECT SUM(MARKS) AS TotalMarks FROM Students;
```

Output:

TotalMarks
400

- Fetching summation of total age among students from the Students table.

```
SELECT SUM(AGE) AS TotalAge FROM Students;
```

Output:

TotalAge
97

Scalar Functions

UCASE(): It converts the value of a field to uppercase.

Syntax:

```
SELECT UCASE(column_name) FROM table_name;
```

Queries:

- Converting names of students from the table Students to uppercase.

```
SELECT UCASE(NAME) FROM Students;
```

Output:

NAME
HARSH
SURESH
PRATIK
DHANRAJ
RAM

LCASE(): It converts the value of a field to lowercase.

Syntax:

```
SELECT LCASE(column_name) FROM table_name;
```

Queries:

- Converting names of students from the table Students to lowercase.

```
SELECT LCASE(NAME) FROM Students;
```

Output:

NAME
harsh
suresh
pratik
dhanraj
ram

MID(): The MID() function extracts texts from the text field.

Syntax:

```
SELECT MID(column_name,start,length) AS some_name FROM table_name;

specifying length is optional here, and start signifies start position ( starting
from 1 )
```

Queries:

- Fetching first four characters of names of students from the Students table.

```
SELECT MID(NAME,1,4) FROM Students;
```

Output:

NAME
HARS
SURE

PRAT
DHAN
RAM

LEN(): The LEN() function returns the length of the value in a text field.

Syntax:

```
SELECT LENGTH(column_name) FROM table_name;
```

Queries:

- Fetching length of names of students from Students table.

```
SELECT LENGTH(NAME) FROM Students;
```

Output:

NAME
5
6
6
7
3

ROUND(): The ROUND() function is used to round a numeric field to the number of decimals specified.NOTE: Many database systems have adopted the IEEE 754 standard for arithmetic operations, which says that when any numeric .5 is rounded it results to the nearest even integer i.e, 5.5 and 6.5 both gets rounded off to 6.

Syntax:

```
SELECT ROUND(column_name,decimals) FROM table_name;

decimals- number of decimals to be fetched.
```

Queries:

- Fetching maximum marks among students from the Students table.

```
SELECT ROUND(MARKS,0) FROM table_name;
```

Output:

MARKS
90
50
80
95
85

NOW(): The NOW() function returns the current system date and time.

Syntax:

```
SELECT NOW() FROM table_name;
```

Queries:

- Fetching current system time.

```
SELECT NAME, NOW() AS DateTime FROM Students;
```

Output:

NAME	DateTime
HARSH	1/13/2017 1:30:11 PM
SURESH	1/13/2017 1:30:11 PM
PRATIK	1/13/2017 1:30:11 PM

DHANRAJ	1/13/2017 1:30:11 PM
RAM	1/13/2017 1:30:11 PM

FORMAT(): The FORMAT() function is used to format how a field is to be displayed.

Syntax:

```
SELECT FORMAT(column_name,format) FROM table_name;
```

Queries:

- Formatting current date as 'YYYY-MM-DD'.

```
SELECT NAME, FORMAT(Now(),'YYYY-MM-DD') AS Date FROM Students;
```

Output:

NAME	Date
HARSH	2017-01-13
SURESH	2017-01-13
PRATIK	2017-01-13
DHANRAJ	2017-01-13
RAM	2017-01-13

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