



# Vidyavardhini's College of Engineering and Technology

## Department of Artificial Intelligence & Data Science

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Experiment No.5
Perform simple queries, string manipulation operations and aggregate functions.
Date of Performance:
Date of Submission:



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**Aim :-** Write simple query to manipulate string operations and perform aggregate functions like (MIN, MAX, SUM, AVERAGE, COUNT).

**Objective :-** To apply aggregate functions and string manipulation functions to perform simple queries in the database system

### Theory:

#### Simple Queries in SQL:

In SQL, a simple query is a request for data from a database table or tables. It allows users to retrieve specific information by specifying the columns they want to retrieve and any conditions for filtering rows based on certain criteria. Simple queries are the backbone of interacting with databases, enabling users to extract the data they need for analysis, reporting, or further processing.

#### String Manipulation Operations:

String manipulation operations in SQL involve modifying or transforming string values stored in database columns. These operations are crucial for tasks such as formatting data, combining strings, converting case, or extracting substrings. By using string functions and operators, users can manipulate text data to suit their requirements, whether it's for display purposes or for further analysis.

#### Aggregate Functions:

Aggregate functions in SQL are used to perform calculations on sets of values and return a single result. These functions allow users to summarize data across multiple rows, providing insights into the overall characteristics of the dataset. Common aggregate functions include calculating counts, sums, averages, minimums, and maximums of numerical values. They are essential tools for data analysis, enabling users to derive meaningful insights from large datasets.


#### Benefits of Understanding These Concepts:

- **Data Retrieval:** Simple queries allow users to fetch specific data from databases, facilitating data retrieval for various purposes.
- **Data Transformation:** String manipulation operations enable users to format and transform text data according to their needs, improving data consistency and readability.
- **Data Analysis:** Aggregate functions help users summarize and analyze large datasets, providing valuable insights into trends, patterns, and statistical measures.
- **Data Reporting:** By combining simple queries, string manipulation operations, and aggregate functions, users can generate reports and visualizations that communicate key findings effectively.

### Implementation:


#### Database:



Result Grid			 Filter Rows:		Edit:	
	employee_id	employee_name	department	salary		
▶	1	John Doe	Finance	50000.00		
	2	Jane Smith	Finance	55000.00		
	3	Michael Johnson	HR	48000.00		
	4	Emily Brown	HR	52000.00		
	5	David Lee	IT	60000.00		
	6	Sarah Clark	IT	65000.00		
	7	Jennifer White	Marketing	52000.00		
	8	Kevin Taylor	Marketing	58000.00		

1)Concatenate two strings:

```
SELECT CONCAT(employee_name, ' in ', department) AS full_info
FROM office_employees;
```

Result Grid				Filter Rows:
	full_info			
▶	John Doe in Finance			
	Jane Smith in Finance			
	Michael Johnson in HR			
	Emily Brown in HR			
	David Lee in IT			
	Sarah Clark in IT			
	Jennifer White in Marketing			
	Kevin Taylor in Marketing			

2)Get the length of employee names:

```
SELECT employee_name, LENGTH(employee_name) AS name_length
FROM office_employees;
```

Result Grid	Filter Rows:
employee_name	name_length
John Doe	8
Jane Smith	10
Michael Johnson	15
Emily Brown	11
David Lee	9
Sarah Clark	11
Jennifer White	14
Kevin Taylor	12

3)Find the department with the longest name:



```
SELECT department
FROM office_employees
GROUP BY department
ORDER BY LENGTH(department) DESC
LIMIT 1;
```

Result Grid	
	department
▶	Marketing

4) Calculate the total salary expenditure for all employees:

```
SELECT SUM(salary) AS total_salary_expenditure
FROM office_employees;
```

Result Grid		Filter Rows:
	total_salary_expenditure	
▶	440000.00	

5) Find the highest and lowest salary in the company:

```
SELECT MAX(salary) AS highest_salary, MIN(salary) AS lowest_salary
FROM office_employees;
```

Result Grid		Filter Rows:
	highest_salary	lowest_salary
▶	65000.00	48000.00

6) Calculate the average salary of employees in each department:

```
SELECT department, AVG(salary) AS avg_salary
FROM office_employees
GROUP BY department;
```



	department	avg_salary
▶	Finance	52500.000000
	HR	50000.000000
	IT	62500.000000
	Marketing	55000.000000

7) Count the number of employees in each department:

```
SELECT department, COUNT(*) AS num_employees
FROM office_employees
GROUP BY department;
```

	department	num_employees
▶	Finance	2
	HR	2
	IT	2
	Marketing	2

### Conclusion:

1. Write syntax and explanation for each of the five aggregate function

Ans.: The syntax and brief explanations for five common aggregate functions in SQL:

1. SUM():

Syntax: 'SUM(column\_name)'

Explanation: Calculates the sum of all values in the specified column. It is commonly used to find the total of numeric values in a column.

2. AVG():

Syntax: 'AVG(column\_name)'

Explanation: Calculates the average (mean) of all values in the specified column. It is useful for finding the average value of numeric data.

3. MAX():

Syntax: 'MAX(column\_name)'

Explanation: Returns the maximum value from the specified column. It is used to find the highest value in a set of data.

4. MIN():

Syntax: 'MIN(column\_name)'

Explanation: Returns the minimum value from the specified column. It is used to find the lowest value in a set of data.

5. COUNT():

Syntax: 'COUNT(column\_name)' or 'COUNT(\*)'

Explanation: Returns the number of rows that match the specified condition. It can count the number of non-null values in a column when a column name is provided, or it can count all rows when 'COUNT(\*)' is used.



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These aggregate functions are commonly used in SQL queries to perform calculations and summarizations on data within a table.

2. Show results of operations performed.

Ans.:

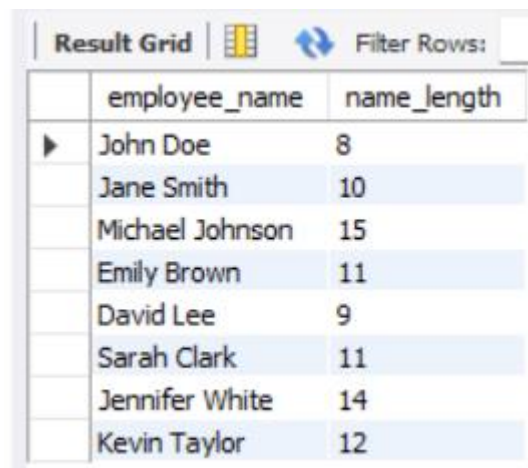
1)Concatenate two strings:



The screenshot shows a 'Result Grid' with a 'Filter Rows' button. The table has one column named 'full\_info' and ten rows of concatenated employee names and departments.

full_info
John Doe in Finance
Jane Smith in Finance
Michael Johnson in HR
Emily Brown in HR
David Lee in IT
Sarah Clark in IT
Jennifer White in Marketing
Kevin Taylor in Marketing

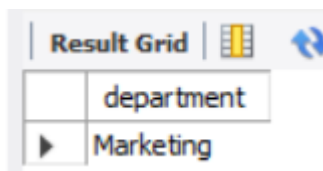
2)Get the length of employee names:



The screenshot shows a 'Result Grid' with a 'Filter Rows' button. The table has two columns: 'employee\_name' and 'name\_length'. It contains ten rows of employee names and their corresponding name lengths.

employee_name	name_length
John Doe	8
Jane Smith	10
Michael Johnson	15
Emily Brown	11
David Lee	9
Sarah Clark	11
Jennifer White	14
Kevin Taylor	12

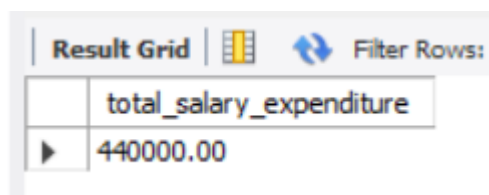
3)Find the department with the longest name:



The screenshot shows a 'Result Grid' with a 'Filter Rows' button. The table has one column named 'department' and one row showing 'Marketing'.

department
Marketing

4)Calculate the total salary expenditure for all employees:



The screenshot shows a 'Result Grid' with a 'Filter Rows' button. The table has one column named 'total\_salary\_expenditure' and one row showing the value '440000.00'.

total_salary_expenditure
440000.00



5) Find the highest and lowest salary in the company:

Result Grid	Filter Rows:
highest_salary	lowest_salary
65000.00	48000.00

6) Calculate the average salary of employees in each department:

Result Grid	Filter Rows:
department	avg_salary
Finance	52500.000000
HR	50000.000000
IT	62500.000000
Marketing	55000.000000

7) Count the number of employees in each department:

Result Grid	Filter Rows:
department	num_employees
Finance	2
HR	2
IT	2
Marketing	2