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

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.

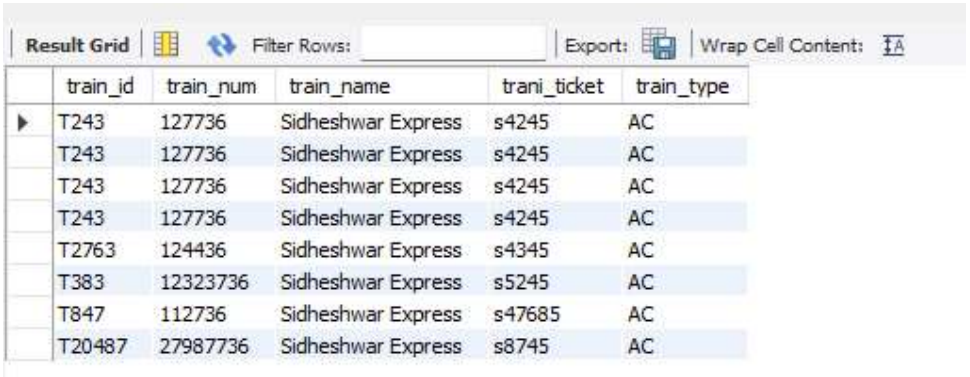
Benefits of Understanding These Concepts:

- 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:

1. Select all trains

SELECT * FROM train;

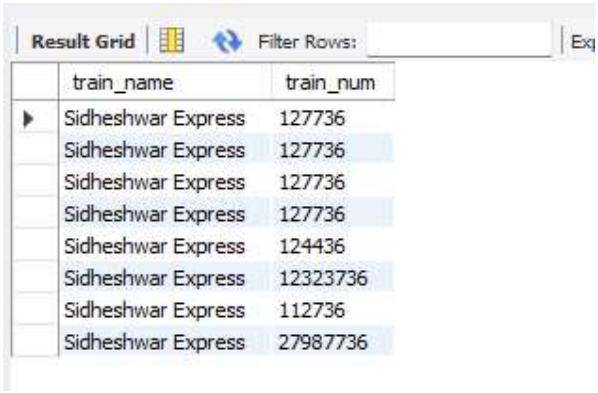


Result Grid | Filter Rows: | Export: | Wrap Cell Content:

train_id	train_num	train_name	trani_ticket	train_type
T243	127736	Sidheshwar Express	s4245	AC
T243	127736	Sidheshwar Express	s4245	AC
T243	127736	Sidheshwar Express	s4245	AC
T243	127736	Sidheshwar Express	s4245	AC
T2763	124436	Sidheshwar Express	s4345	AC
T383	12323736	Sidheshwar Express	s5245	AC
T847	112736	Sidheshwar Express	s47685	AC
T20487	27987736	Sidheshwar Express	s8745	AC

2. Select train names and train numbers

SELECT train_name, train_num FROM train;

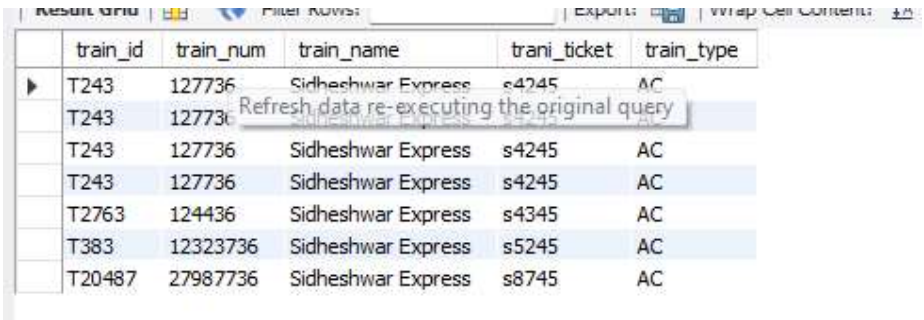


Result Grid | Filter Rows:

train_name	train_num
Sidheshwar Express	127736
Sidheshwar Express	127736
Sidheshwar Express	127736
Sidheshwar Express	127736
Sidheshwar Express	124436
Sidheshwar Express	12323736
Sidheshwar Express	112736
Sidheshwar Express	27987736

3. Select trains with train_num greater than 120000

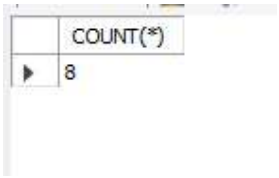
SELECT * FROM train WHERE train_num > 120000;



train_id	train_num	train_name	trani_ticket	train_type
T243	127736	Sidheshwar Express	s4245	AC
T243	127736	Sidheshwar Express	s4245	AC
T243	127736	Sidheshwar Express	s4245	AC
T2763	124436	Sidheshwar Express	s4345	AC
T383	12323736	Sidheshwar Express	s5245	AC
T20487	27987736	Sidheshwar Express	s8745	AC

4.. Count the total number of trains

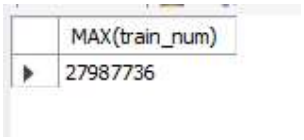
SELECT COUNT(*) FROM train;



	COUNT(*)
▶	8

5. Find the maximum train number

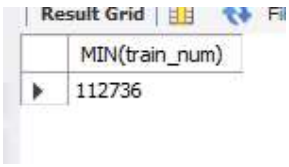
SELECT MAX(train_num) FROM train;



	MAX(train_num)
▶	27987736

6. Find the minimum train number

SELECT MIN(train_num) FROM train;

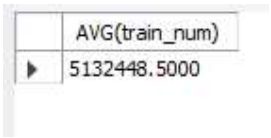


Result Grid | Fil

	MIN(train_num)
▶	112736

7. Calculate the average train number

SELECT AVG(train_num) FROM train;



	AVG(train_num)
▶	5132448.5000

8. Find the length of each train name

SELECT train_name, LENGTH(train_name) FROM train;

train_name	LENGTH(train_name)
Sidheshwar Express	18
Sidheshwar Express	18
Sidheshwar Express	18
Sidheshwar Express	18
Sidheshwar Express	18
Sidheshwar Express	18
Sidheshwar Express	18

9. Convert train names to uppercase

SELECT UPPER(train_name) FROM train;

Result Grid | Filter Rows:

UPPER(train_name)
SIDHESHWAR EXPRESS
SIDHESHWAR EXPRESS
SIDHESHWAR EXPRESS
SIDHESHWAR EXPRESS
SIDHESHWAR EXPRESS
SIDHESHWAR EXPRESS
SIDHESHWAR EXPRESS
SIDHESHWAR EXPRESS

10. Order the trains by train_num in descending order.

SELECT * FROM train ORDER BY train_num DESC;

train_id	train_num	train_name	trani_ticket	train_type
T20487	27987736	Sidheshwar Express	s8745	AC
T383	12323736	Sidheshwar Express	s5245	AC
T243	127736	Sidheshwar Express	s4245	AC
T243	127736	Sidheshwar Express	s4245	AC
T243	127736	Sidheshwar Express	s4245	AC
T243	127736	Sidheshwar Express	s4245	AC
T2763	124436	Sidheshwar Express	s4345	AC
T847	112736	Sidheshwar Express	s47685	AC

11. Order the trains by train_name in ascending order.

SELECT * FROM train ORDER BY train_name ASC;

train_id	train_num	train_name	trani_ticket	train_type
T243	127736	Sidheshwar Express	s4245	AC
T243	127736	Sidheshwar Express	s4245	AC
T243	127736	Sidheshwar Express	s4245	AC
T243	127736	Sidheshwar Express	s4245	AC
T2763	124436	Sidheshwar Express	s4345	AC
T383	12323736	Sidheshwar Express	s5245	AC
T847	112736	Sidheshwar Express	s47685	AC
T20487	27987736	Sidheshwar Express	s8745	AC

Conclusion:

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

Ans:-**1. COUNT()**

- **Syntax:**
  - `COUNT(*)`: Counts all rows in a table (including NULLs).
  - `COUNT(column_name)`: Counts the number of non-NULL values in a specified column.
  - `COUNT(DISTINCT column_name)`: Counts the number of unique, non-NULL values in a specified column.
- **Explanation:**
  - The `COUNT()` function is used to determine the number of rows that meet a specific criteria.
  - `COUNT(*)` provides a total row count.
  - `COUNT(column_name)` is useful for finding the number of populated entries in a column, ignoring any NULL values.
  - `COUNT(DISTINCT column_name)` is used to find the number of unique values inside of a column.

2. SUM()

- **Syntax:**
  - `SUM(column_name)`
- **Explanation:**
  - The `SUM()` function calculates the total sum of numeric values in a specified column.

- It ignores NULL values.
- It only works on numeric datatypes.

3. AVG()

- **Syntax:**
  - `AVG(column_name)`
- **Explanation:**
  - The `AVG()` function calculates the average (arithmetic mean) of numeric values in a specified column.
  - It ignores NULL values.
  - It only works on numeric datatypes.

4. MIN()

- **Syntax:**
  - `MIN(column_name)`
- **Explanation:**
  - The `MIN()` function finds the smallest value in a specified column.
  - It can be used with numeric, string, and date/time data types.
  - It ignores NULL values.

5. MAX()

- **Syntax:**
  - `MAX(column_name)`
- **Explanation:**
  - The `MAX()` function finds the largest value in a specified column.
  - It can be used with numeric, string, and date/time data types.
  - It ignores NULL values.

2. Show results of operations performed.

Ans:-

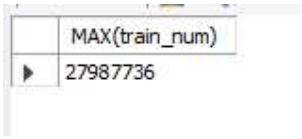
1.Count the total number of trains

SELECT COUNT(*) FROM train;

	COUNT(*)
▶	8

2.Find the maximum train number

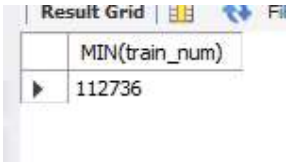
SELECT MAX(train_num) FROM train;



	MAX(train_num)
▶	27987736

3.Find the minimum train number

SELECT MIN(train_num) FROM train;

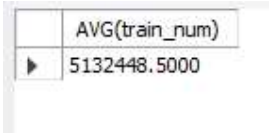


Result Grid

	MIN(train_num)
▶	112736

4.Calculate the average train number

SELECT AVG(train_num) FROM train;



	AVG(train_num)
▶	5132448.5000