Introduction to DML and DQL

Pre-requisites

Hope you have gone through the self-learning content for this session on the PRISM portal.

By the End of this Session, You Will:

- Learn how to manipulate data in a database using the DML commands.
- Insert data into a database using the INSERT command.
- Update existing data in a database using the UPDATE command.
- Delete the existing data from a database using the DELETE command.
- Learn to query the existing data from a database using advance SELECT queries.

What Have We Learned So Far?

- Introduction to SQL, MySQL, and MySQL Workbench.
- Benefits of learning SQL.
- Types of SQL commands – DDL, DML, DQL, and DCL.
- Use of different DDL commands – CREATE, ALTER, DROP, and TRUNCATE.
- Difference between DROP, TRUNCATE, and DELETE commands.
- Introduction to DQL command – SELECT.

Pop Quiz

Q. Which of the following DDL commands is used to modify the structure of an existing table by adding a new column with a default value?

a. ALTER TABLE

b. CREATE TABLE

c. UPDATE TABLE

d. MODIFY TABLE

Pop Quiz

Q. Which of the following DDL commands is used to modify the structure of an existing table by adding a new column with a default value?

a. **ALTER TABLE**

b. CREATE TABLE

c. UPDATE TABLE

d. MODIFY TABLE

Introduction to DML

Introduction to DML

DML (Data Manipulation Language) commands are used in SQL to manipulate or modify the data stored within a database. These commands enable users to insert, retrieve, update, and delete data from database tables.

Key Components of DML

INSERT

- Used to add new records or rows into a table. It allows you to specify the values for each column or select values from another table.

UPDATE

- Used to modify existing records in a table. It allows you to update specific columns with new values based on specified conditions.

DELETE

- Used to remove records from a table. It allows you to delete specific rows based on specified conditions.

Importance of DML

ORDER ID	CUSTOMER ID	ORDER DATE	PAYMENT STATUS	ORDER TOTAL
Order_1	Cust_1	12-01-2023	Success	1500
Order_2	Cust_2	12-01-2023	Success	500
Order_3	Cust_1	3-02-2023	Pending	500

Insert a new row

Importance of DML

ORDER ID	CUSTOMER ID	ORDER DATE	PAYMENT STATUS	ORDER TOTAL
Order_1	Cust_1	12-01-2023	Success	1500
Order_2	Cust_2	12-01-2023	Success	500
Order_3	Cust_1	3-02-2023	Pending	500
Order_4	Cust_3	30-03-2023	Success	800

Update the status to Success

Importance of DML

ORDER ID	CUSTOMER ID	ORDER DATE	PAYMENT STATUS	ORDER TOTAL
Order_1	Cust_1	12-01-2023	Success	1500
Order_2	Cust_2	12-01-2023	Success	500
Order_3	Cust_1	3-02-2023	Success	500
Order_4	Cust_3	30-03-2023	Success	800

Pop Quiz

Q. Which of the following SQL commands is used to remove specific records from a table?

a. DELETE

b. UPDATE

c. DROP

d. TRUNCATE

Pop Quiz

Q. Which of the following SQL commands is used to remove specific records from a table?

a. **DELETE**

b. UPDATE

c. DROP

d. TRUNCATE

The INSERT Command

Purpose and Syntax of INSERT Command

The INSERT command is used to add new records or rows to a table. It allows you to specify the values for each column or select values from another table.

Syntax of INSERT

```
INSERT INTO table_name
(column1, column2, ...) VALUES
(value1, value2, ...);
```

Demo – The INSERT Command

Pop Quiz

Q. Which of the following is the correct syntax for inserting a new row into a table named "customers" with values for columns "name" and "email" in SQL?

a. INSERT INTO (name, email) VALUES ('John Doe', 'john@example.com') INTO customers;

b. INSERT INTO customers (name, email) VALUES ('John Doe', 'john@example.com');

c. INSERT customers (name, email) INTO VALUES ('John Doe', 'john@example.com');

d. INSERT (name, email) INTO customers VALUES ('John Doe', 'john@example.com');

Pop Quiz

Q. Which of the following is the correct syntax for inserting a new row into a table named "customers" with values for columns "name" and "email" in SQL?

a. INSERT INTO (name, email) VALUES ('John Doe', 'john@example.com') INTO customers;

b. INSERT INTO customers (name, email) VALUES ('John Doe', 'john@example.com');

c. INSERT customers (name, email) INTO VALUES ('John Doe', 'john@example.com');

d. INSERT (name, email) INTO customers VALUES ('John Doe', 'john@example.com');

The UPDATE Command

Purpose and Syntax of UPDATE Command

The UPDATE command is used to modify the existing records in a table. It allows you to update specific columns with new values based on specified conditions.

Syntax of UPDATE

```
UPDATE table_name SET
column1 = value1, column2 =
value2, ... WHERE condition;
```

Demo – The UPDATE Command

Pop Quiz

Q. True or False: The UPDATE command in SQL can modify multiple tables simultaneously.

a. TRUE

b. FALSE

Pop Quiz

Q. True or False: The UPDATE command in SQL can modify multiple tables simultaneously.

a. TRUE

b. FALSE

The DELETE Command

Purpose and Syntax of DELETE Command

The DELETE command is used to remove records from a table. It allows you to delete specific rows based on specified conditions.

Syntax of DELETE

```
DELETE FROM table_name
WHERE condition;
```

Demo – The DELETE Command

Pop Quiz

Q. Which of the below scenarios will not result in an error while running a DELETE command?

a. Forgetting to specify the table name in the DELETE statement

b. Using the DELETE command without a WHERE clause

c. Including unnecessary columns in the DELETE statement

d. Using the wrong syntax for specifying the condition in the WHERE clause

Pop Quiz

Q. Which of the below scenarios will not result in an error while running a DELETE command?

a. Forgetting to specify the table name in the DELETE statement

b. Using the DELETE command without a WHERE clause

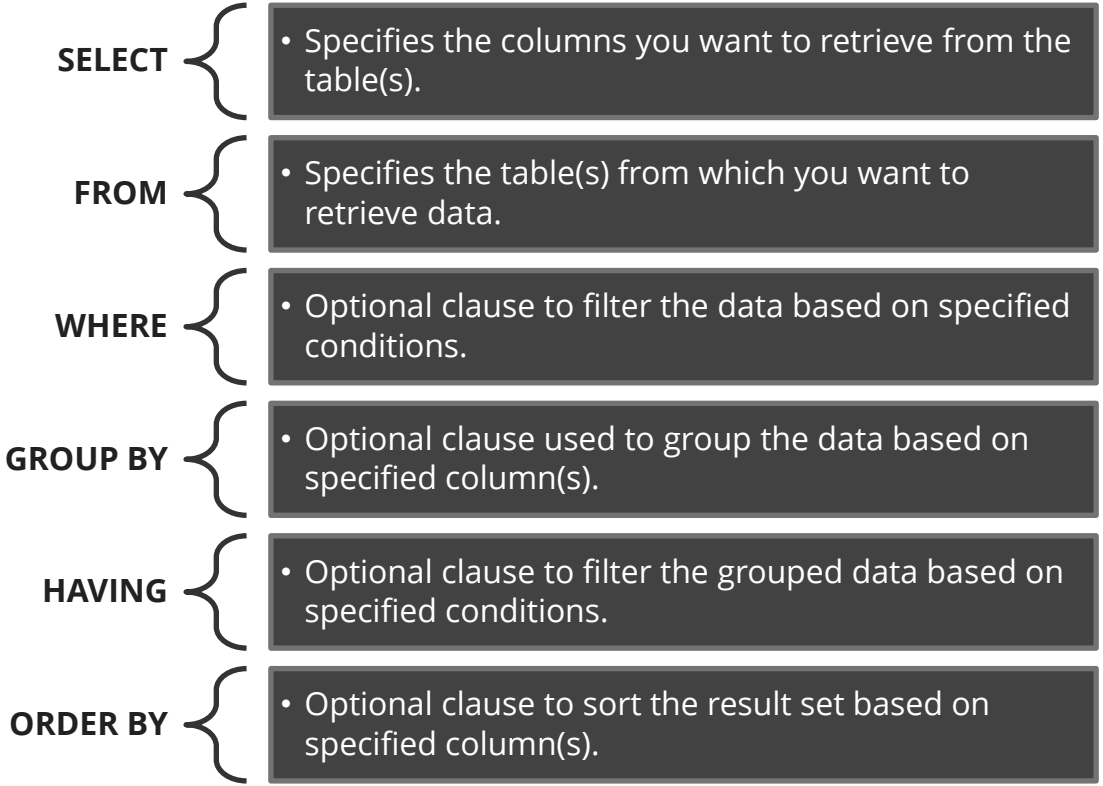
c. Including unnecessary columns in the DELETE statement

d. Using the wrong syntax for specifying the condition in the WHERE clause


Q&A

Introduction to DQL

Introduction to DQL



Demo – Advanced SELECT Command Usage

Pop Quiz

Q. Which of the following best describes the purpose of the WHERE clause in SQL?

a. It specifies the columns to include in the SELECT statement.

b. It defines the order in which the result set is sorted.

c. It filters the rows to include based on specified conditions.

d. It groups the result set based on specified columns.

Pop Quiz

Q. Which of the following best describes the purpose of the WHERE clause in SQL?

a. It specifies the columns to include in the SELECT statement.

b. It defines the order in which the result set is sorted.

c. It filters the rows to include based on specified conditions.

d. It groups the result set based on specified columns.


Q&A

Summary

- Identified the significance of DML commands in manipulating data within a database.
- Understood the purpose of the INSERT command, which is to add new rows to a table in a database.
- Used the UPDATE command to modify or revise existing data within a table in a database.
- Evaluated the DELETE command to eliminate specific data entries from a table in a database.
- Worked on the SELECT command as a means to retrieve or extract desired information from a table in a database.

Activity 1

Pre-requisites:

- MySQL Workbench

Scenario:

You want to set up a new database for an organization to store information about it's employees, projects, and departments.

- Populate the employee table to contain the information mentioned below.

emp_id	emp_name	dept_no	manager_id	salary	hire_date
123456789	John Smith	5	333445555	30000	1/9/1965
333445555	Franklin Wong	5	888665555	40000	1/9/1955
453453453	Joyce English	5	333445555	25000	1/9/1972
666884444	Ramesh Narayan	5	333445555	38000	1/9/1962
888665555	James Borg	1	NULL	55000	1/9/1937
987654321	Jennifer Wallace	4	888665555	43000	1/9/1941
987987987	Ahmad Jabbar	4	987654321	25000	1/9/1969
999887777	Alicia Zelaya	4	987654321	25000	1/9/1968

Activity 2

Pre-requisites:

- MySQL Workbench

Scenario:

You want to setup a new database for an organization to store information about its employees, projects, and departments. Perform the below mentioned queries on the employee table.

- Filter all the employees working for department 5.
- Query the employee table to such that the results are sorted in the descending order of the salary.
- Query the employee table to filter employees whose names start with ‘F’.

Next Session:
Advanced SQL Operations

THANK YOU

Please complete your assessments and review the self-learning content for this session on the **PRISM** portal.

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Advanced SQL Operations

Pre-requisites

Hope you have gone through the self-learning content for this session on the PRISM portal.

By the End of this Session, You Will:

- Filter data using LIKE, IN, BETWEEN, and NOT operators in conjunction with the WHERE clause.
- Sort the data using the ORDER BY clause.
- Aggregate numerical columns using various aggregate functions – COUNT, MIN, MAX, SUM, and AVG.
- Perform aggregation based on specific columns using the GROUP BY clause.
- Filter grouped data using the HAVING clause.

Recap

Pop Quiz

Q. Which of the following operators is NOT supported by the WHERE clause in SQL for specifying conditions?

a. BETWEEN

b. LIKE

c. IN

d. ORDER BY

Pop Quiz

Q. Which of the following operators is NOT supported by the WHERE clause in SQL for specifying conditions?

a. BETWEEN

b. LIKE

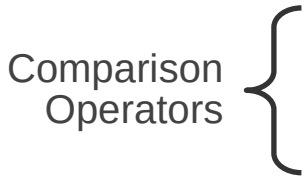
c. IN

d. ORDER BY

Introduction to Filtering Data

Purpose and Syntax of WHERE Clause

```
SELECT column1, column2, ... FROM table_name WHERE condition;
```



Demo – The WHERE Clause

Pop Quiz

Q. Which wildcard character is used with the LIKE operator in SQL to match any sequence of characters?

a. %

b. _

c. *

d. $

Pop Quiz

Q. Which wildcard character is used with the LIKE operator in SQL to match any sequence of characters?

a. %

b. _

c. *

d. $

Introduction to IN, BETWEEN and LIKE Operators in SQL

Purpose and Syntax of IN Operator

emp_id	emp_name	dept_no	manager_id	salary	hire_date
123456789	John Smith	5	333445555	30000	1/9/1965
333445555	Franklin Wong	5	888665555	40000	1/9/1955
453453453	Joyce English	5	333445555	25000	1/9/1972
666884444	Ramesh Narayan	5	333445555	38000	1/9/1962
888665555	James Borg	1	NULL	55000	1/9/1937
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987987987	Ahmad Jabbar	4	987654321	25000	1/9/1969
999887777	Alicia Zelaya	4	987654321	25000	1/9/1968

?

Filter all employees from department 1, 2, 3, and 5

dept_no = 1 OR dept_no = 2 OR dept_no = 3 OR dept_no = 5

Purpose and Syntax of IN Operator

emp_id	emp_name	dept_no	manager_id	salary	hire_date
123456789	John Smith	5	333445555	30000	1/9/1965
333445555	Franklin Wong	5	888665555	40000	1/9/1955
453453453	Joyce English	5	333445555	25000	1/9/1972
666884444	Ramesh Narayan	5	333445555	38000	1/9/1962
888665555	James Borg	1	NULL	55000	1/9/1937
987654321	Jennifer Wallace	4	888665555	43000	1/9/1941
987987987	Ahmad Jabbar	4	987654321	25000	1/9/1969
999887777	Alicia Zelaya	4	987654321	25000	1/9/1968

Filter all employees from department 1, 2, 3, and 5

dept_no IN (1, 2, 3, 5)

Purpose and Syntax of BETWEEN Operator

emp_id	emp_name	dept_no	manager_id	salary	hire_date
123456789	John Smith	5	333445555	30000	1/9/1965
333445555	Franklin Wong	5	888665555	40000	1/9/1955
453453453	Joyce English	5	333445555	25000	1/9/1972
666884444	Ramesh Narayan	5	333445555	38000	1/9/1962
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987987987	Ahmad Jabbar	4	987654321	25000	1/9/1969
999887777	Alicia Zelaya	4	987654321	25000	1/9/1968

Filter all employees who earn more than 30000 but less than 50000.

?

Salary > 30000 AND salary < 50000

Purpose and Syntax of BETWEEN Operator

emp_id	emp_name	dept_no	manager_id	salary	hire_date
123456789	John Smith	5	333445555	30000	1/9/1965
333445555	Franklin Wong	5	888665555	40000	1/9/1955
453453453	Joyce English	5	333445555	25000	1/9/1972
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999887777	Alicia Zelaya	4	987654321	25000	1/9/1968

Filter all employees who earn more than 30000 but less than 50000.

Salary BETWEEN 30000 AND 50000

Purpose and Syntax of LIKE Operator

emp_id	emp_name	dept_no	manager_id	salary	hire_date
123456789	John Smith	5	333445555	30000	1/9/1965
333445555	Franklin Wong	5	888665555	40000	1/9/1955
453453453	Joyce English	5	333445555	25000	1/9/1972
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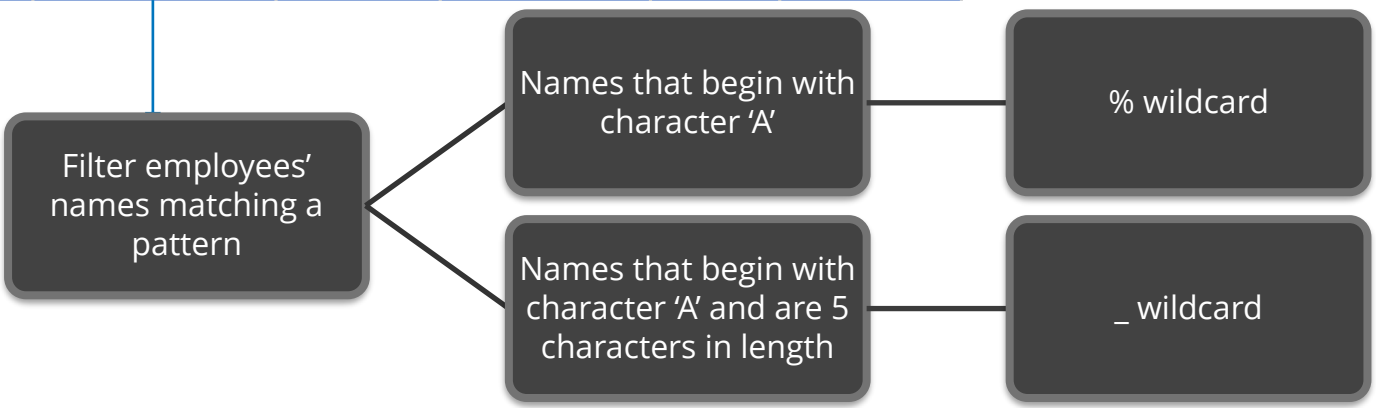

Demo – The IN, BETWEEN, and LIKE Operators

Pop Quiz

Q. The BETWEEN operator in SQL is inclusive, meaning which of the following?

a. Includes both the starting and ending values in the range

b. Includes only the starting value in the range

c. Includes only the ending value in the range

d. Excludes both the starting and ending values in the range

Pop Quiz

Q. The BETWEEN operator in SQL is inclusive, meaning which of the following?

a. Includes both the starting and ending values in the range

b. Includes only the starting value in the range

c. Includes only the ending value in the range

d. Excludes both the starting and ending values in the range

Introduction to ORDER BY Clause

Purpose and Syntax of ORDER BY Clause

The ORDER BY clause in SQL is used to sort the result set of a query based on one or more columns. It allows you to specify the sorting order as either Ascending (ASC) or Descending (DESC).

Syntax of ORDER BY clause

```
SELECT column1, column2, ... FROM
table_name ORDER BY column1 ASC,
column2 DESC;
```

Demo – The ORDER BY Clause

Pop Quiz

Q. True or False: The ORDER BY clause can be used with both the SELECT and UPDATE statements in SQL.

a. True

b. False

Pop Quiz

Q. True or False: The ORDER BY clause can be used with both the SELECT and UPDATE statements in SQL.

a. True

b. False


Q&A

Introduction to Aggregation Function in SQL

Purpose and Syntax of Aggregation Function

Aggregation functions in MySQL are used to perform calculations on sets of values and return a single computed result.

Purpose and Syntax of Aggregation Function

COUNT

- This function counts the number of rows in a table or the number of occurrences of a specific column value.

SUM

- This function calculates the sum of values in a specified column. It is commonly used with numeric columns.

AVG

- This function calculates the average of values in a specified column. It is commonly used with numeric columns.

MIN

- This function returns the minimum value from a specified column.

MAX

- This function returns the maximum value from a specified column.

Introduction to COUNT Function in SQL

Purpose and Syntax of COUNT Function

Count all rows in a table:

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

Count the occurrences of a specific column:

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

Count distinct values in a specific column:

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

Demo - COUNT Function in SQL

Pop Quiz

Q. The COUNT() function in MySQL is used to _____.

a. Calculate the sum of values in a column

b. Return the maximum value from a column

c. Count the number of rows in a table

d. Concatenate the values from a column into a single string

Pop Quiz

Q. The COUNT() function in MySQL is used to _____.

a. Calculate the sum of values in a column

b. Return the maximum value from a column

c. Count the number of rows in a table

d. Concatenate the values from a column into a single string

Introduction to MIN and MAX Functions in SQL

Purpose and Syntax of MIN and MAX Functions

Find the minimum value in a column:

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

Find the maximum value in a column:

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

Demo - MIN and MAX Functions

Pop Quiz

Q. The MIN() and MAX() functions in MySQL are aggregate functions that operate on _____.

a. Individual values within a column

b. Rows in a table

c. Columns in a table

d. Conditions specified in the WHERE clause

Pop Quiz

Q. The MIN() and MAX() functions in MySQL are aggregate functions that operate on _____.

a. Individual values within a column

b. Rows in a table

c. Columns in a table

d. Conditions specified in the WHERE clause

Introduction to SUM and AVG Functions in SQL

Purpose and Syntax of SUM and AVG Functions

Calculate the sum of values in a column:

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

Calculate the average of values in a column:

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

Demo – SUM and SVG Functions

Pop Quiz

Q. When using the AVG() function in SQL, which of the following statements is true?

a. It can only be applied to numeric data types

b. It can be applied to both numeric and non-numeric data types

c. It can only be used in conjunction with the GROUP BY clause

d. It returns the sum of all values in the column

Pop Quiz

Q. When using the AVG() function in SQL, which of the following statements is true?

a. **It can only be applied to numeric data types**

b. It can be applied to both numeric and non-numeric data types

c. It can only be used in conjunction with the GROUP BY clause

d. It returns the sum of all values in the column

Introduction to GROUP BY Function in SQL

Purpose and Syntax of GROUP BY Function

The GROUP BY clause is used to group rows based on one or more columns. It allows you to divide the rows of a result set into groups based on common values in the specified column(s).

Syntax of GROUP BY

```
SELECT column1, column2,
aggregate_function(column)
FROM table_name GROUP BY
column1, column2;
```

Purpose and Syntax of GROUP BY Function

Calculate the average salary for each department

emp_id	emp_name	dept_no	manager_id	salary	hire_date
123456789	John Smith	5	333445555	30000	1/9/1965
333445555	Franklin Wong	5	888665555	40000	1/9/1955
453453453	Joyce English	5	333445555	25000	1/9/1972
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999887777	Alicia Zelaya	4	987654321	25000	1/9/1968

dept_no	avg_salary
1	55000
4	31000
5	33250

Demo – GROUP BY Function in SQL

Pop Quiz

Q. Which of the following aggregate functions can be used in conjunction with the GROUP BY clause?

a. COUNT()

b. JOIN()

c. ORDER BY()

d. WHERE()

Pop Quiz

Q. Which of the following aggregate functions can be used in conjunction with the GROUP BY clause?

a. **COUNT()**

b. JOIN()

c. ORDER BY()

d. WHERE()


Q&A

Summary

- Explored the IN and BETWEEN operators to filter data using WHERE clause.
- Worked with the LIKE operator that helped us in filtering data by performing pattern matching.
- Reviewed how aggregate functions summarize the values in a numerical column down to a single computed result.
- Aggregated numerical data for each unique value from a categorical column using the GROUP BY clause.

Activity 1

Pre-requisites:

- MySQL Workbench

Scenario:

Use the employee table shown and execute the below mentioned queries:

- Write a query to filter all employees having 11 characters in their names.
- Write a query to calculate the total number of employees working in each department.

emp_id	emp_name	dept_no	manager_id	salary	hire_date
123456789	John Smith	5	333445555	30000	1/9/1965
333445555	Franklin Wong	5	888665555	40000	1/9/1955
453453453	Joyce English	5	333445555	25000	1/9/1972
666884444	Ramesh Narayan	5	333445555	38000	1/9/1962
888665555	James Borg	1	NULL	55000	1/9/1937
987654321	Jennifer Wallace	4	888665555	43000	1/9/1941
987987987	Ahmad Jabbar	4	987654321	25000	1/9/1969
999887777	Alicia Zelaya	4	987654321	25000	1/9/1968

Session Feedback

Next Session:
Introduction to Data Analysis using SQL

THANK YOU

Please complete your assessments and review the self-learning content for this session on the **PRISM** portal.

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