Deccan Education Society's (DES)
Pune University, Pune
School of Engineering and Technology
Department of Computer Engineering and Technology
Program: B. Tech in Computer Science and Engineering

Academic Year: 2024-25	**Year:** Second Year	**Semester:** II
PRN No.:	**Name:**	
Subject: Database Management System		
Assignment No.: 3		
Date:		

Lab Assignment: 03

Title: DML Queries: Write DML (Data Manipulation Language) queries for a suitable database application. The queries should cover:
Basic Queries: Insert, update, delete and select records in the database.
Search and Filtering: Retrieve specific data using WHERE clauses with conditions such as equality, range.
Sorting and Limiting: Use ORDER BY and LIMIT clauses to arrange and restrict the result set, and pattern matching (LIKE).

Theory:

What is DML?

DML is a subset of SQL (Structured Query Language) that deals with modifying and managing data within a database. The key DML commands are:

- INSERT – Adds new records to a table.
- UPDATE – Modifies existing records.
- DELETE – Removes records from a table.
- SELECT – Retrieves data from a database (though primarily part of DQL, it is often considered in DML).

Arithmetic Operators

Operator	Description	Example
+	Addition	SELECT 10 + 5; → 15

-	Subtraction	SELECT 10 - 5; → 5
*	Multiplication	SELECT 10 * 5; → 50
/	Division	SELECT 10 / 5; → 2
%	Modulus (Remainder)	SELECT 10 % 3; → 1

Logical Operators

Operator	Description	Example
AND	Returns true if both conditions are true	WHERE age > 18 AND city = 'Pune'
OR	Returns true if at least one condition is true	WHERE age > 18 OR city = 'Pune'
NOT	Returns true if the condition is false	WHERE NOT city = 'Pune'

Comparison Operators

Operator	Description	Example
=	Equal to	WHERE age = 25
!= or <>	Not equal to	WHERE age != 25
>	Greater than	WHERE age > 25
<	Less than	WHERE age < 25
>=	Greater than or equal to	WHERE age >= 25
<=	Less than or equal to	WHERE age <= 25

Order By

The ORDER BY clause is used to sort query results in ascending (ASC, default) or descending (DESC) order.

```
1. SELECT name, age FROM students ORDER BY age ASC;
2. SELECT name, age FROM students ORDER BY age DESC;
3.
```

Like

The LIKE operator is used for pattern matching in text columns. It works with wildcards:

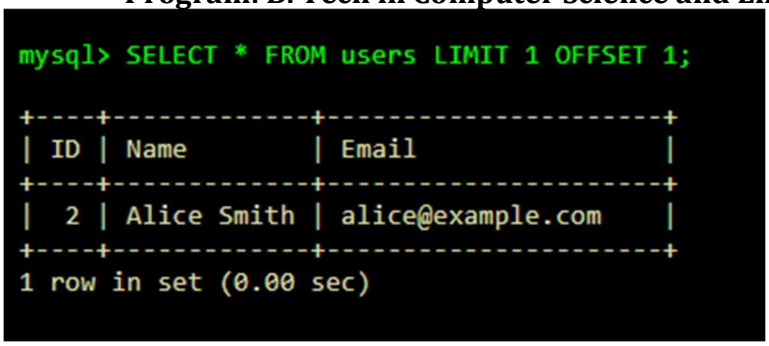
Wildcard	Description	Example
%	Matches zero or more characters	WHERE name LIKE 'A%' (Names starting with A)
_	Matches a single character	WHERE name LIKE '_o%' (Second letter is 'o')

Show Query Execution Screenshots for:

- Insert – Single Record
- Insert – Multiple Records
- Update
- Delete
- Select
- Where clause with AND, OR, NOT, ALL, ANY, NOT ANY, EXISTS, NOT EXISTS, BETWEEN, NOT BETWEEN, LESS THAN, GREATER THAN, EQUAL TO, NULL, NOT NULL, UNIQUE, DISTINCT
- Order By – Ascending
- Order By – Descending
- Limit
- With Offset, and two parameters
- Like with % and _

```
mysql> INSERT INTO users (id, name, email) VALUES (1, 'John Doe', 'john@example.com');

Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO users (id, name, email) VALUES (2, 'Alice Smith', 'alice@example.com'), (3, 'Bob Johnson',
'bob@example.com');

Query OK, 2 rows affected (0.02 sec)

mysql> UPDATE users SET email='john.doe@example.com' WHERE id=1;

Query OK, 1 row affected (0.01 sec)

mysql> DELETE FROM users WHERE id=3;

Query OK, 1 row affected (0.01 sec)
```

```
mysql> SELECT * FROM users;

+----+-------------+----------------------+
| ID | Name        | Email                |
+----+-------------+----------------------+
|  1 | John Doe    | john.doe@example.com |
|  2 | Alice Smith | alice@example.com    |
+----+-------------+----------------------+
2 rows in set (0.00 sec)

mysql> SELECT * FROM users WHERE id > 1 AND email LIKE '%example.com';

+----+-------------+----------------------+
| ID | Name        | Email                |
+----+-------------+----------------------+
|  2 | Alice Smith | alice@example.com    |
+----+-------------+----------------------+
1 row in set (0.00 sec)

mysql> SELECT * FROM users ORDER BY name ASC;

(Sorted in Ascending Order, 2 rows in set)

mysql> SELECT * FROM users ORDER BY name DESC;

(Sorted in Descending Order, 2 rows in set)

mysql> SELECT * FROM users LIMIT 1;

+----+-------------+----------------------+
| ID | Name        | Email                |
+----+-------------+----------------------+
|  1 | John Doe    | john.doe@example.com |
+----+-------------+----------------------+
1 row in set (0.00 sec)
```



FAQs:

1. Which commands come under DML?

   DML (Data Manipulation Language) includes commands used to manipulate data in tables:

   - **INSERT** – Adds new records to a table.
   - **UPDATE** – Modifies existing records in a table.
   - **DELETE** – Removes records from a table.
   - **SELECT** – Retrieves records from a table.

2. What is the difference between DML and DDL (Data Definition Language)?

Feature	**DML (Data Manipulation Language)**	**DDL (Data Definition Language)**
Purpose	Modifies data within tables	Modifies database structure (schema)
Commands	INSERT, UPDATE, DELETE, SELECT	CREATE, ALTER, DROP, TRUNCATE

Effects	Affects rows in a table	Affects entire table or database
Rollback	Can be rolled back (COMMIT, ROLLBACK)	Mostly permanent changes
Example	INSERT INTO users VALUES (1, 'Alice');	CREATE TABLE users (id INT, name VARCHAR(50));

3. Explain Different between ANY and ALL

ANY:

Compares a value with **any** value in a subquery (at least one condition must be true).

```
1. SELECT * FROM employees WHERE salary > ANY (SELECT salary FROM interns);
```

- This retrieves employees whose salary is greater than the lowest intern salary.

ALL:

Compares a value with **all** values in a subquery (must satisfy all conditions).

```
1. SELECT * FROM employees WHERE salary > ALL (SELECT salary FROM interns);
```

- This retrieves employees whose salary is higher than the highest intern salary.