Lab Activity: 14 Understanding Indexes in DBMS

Objective:
The goal of this lab is to understand the concept of indexing in a Database Management System (DBMS) and how it improves query performance. You will learn how to create and utilize indexes in a relational database, and analyze their effect using query execution.

1. Create Table

First, create a sample database and a table to perform the lab activity.

```
CREATE TABLE employees (
    employee_id INT PRIMARY KEY,
    employee_name VARCHAR(100),
    department VARCHAR(50),
    salary DECIMAL(10, 2)
);
```

2. Insert Sample Data

Insert some data into the `employees` table.

INSERT INTO employees (employee_id, employee_name, department, salary)

VALUES

(101, 'John Doe', 'Sales', 60000.00),

(102, 'Jane Smith', 'HR', 50000.00),

(103, 'Alice Johnson', 'IT', 80000.00),

(104, 'Bob Brown', 'Finance', 90000.00),

(105, 'Carol White', 'Sales', 55000.00);

3. Perform Queries Without Indexes

Run a query that searches for a specific department and analyze its performance.

SELECT * FROM employees WHERE department = 'Sales';

4. Create an Index

Create an Index on the department Column
Now, create an index to improve the performance of the query.

CREATE INDEX idx_department ON employees(department);

5. Query with the Index

Run the same query again:

```
SELECT * FROM employees WHERE department = 'Sales';
```

6. Analyze the Query Performance

Explain Query Performance
You can check whether the index is being used by using the `EXPLAIN` statement.

```
EXPLAIN SELECT * FROM employees WHERE department = 'Sales';
```

7. Drop the Index

Remove the Index
If you want to remove the index, use the following command:

```
DROP INDEX idx_department ON employees;
```