Assignment 5 :- Demonstrate the creation of an index on a table and discuss how it improves query performance. Use a DROP INDEX statement to remove the index and analyze the impact on query execution.

Solution:-
Create a table named as employee with columns 'employee_id','first_name','last_name' and 'department_id'.we'll create a index on the 'department_id'.

CREATE INDEX department_index ON employees (department_id);

This statement creates an index named 'department_index' on the 'department_id' column of the 'employee' table.

discuss how this index improves query performance:

Faster Data Retrieval: When you execute a query that involves filtering, sorting, or joining based on the **department_id** column, the index allows the database to quickly locate the relevant rows. Without the index, the database would have to scan through the entire table to find the matching rows, which can be slower, especially for large tables.

Reduced Disk I/O: With the index in place, the database engine can access the necessary data by reading the index structure rather than the entire table. This reduces the amount of disk I/O required, leading to faster query execution.

Improved Query Plan: The database optimizer can use the index to generate more efficient query execution plans. It can choose index scans or index seeks instead of table scans, which generally require fewer resources and execute faster.

Now, let's see the impact of removing the index. We'll use the 'DROP_INDEX' statement.

DROP INDEX department_index ON employees;

This statement removes the 'department_index' index from the 'employee' table.

After removing the index:

Slower Query Performance: Queries that relied on the index for efficient execution may now take longer to execute, especially those involving filtering, sorting, or joining based on the **department_id** column.

Increased Disk I/O: Without the index, the database engine may need to perform full table scans more frequently, leading to increased disk I/O and potentially slower performance, especially for large tables.