UPES

UNIVERSITY OF TOMORROW

Course Name: DBMS Lab

Course Code: CSEG2146

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Batch: B1

Sap Id: 500120245

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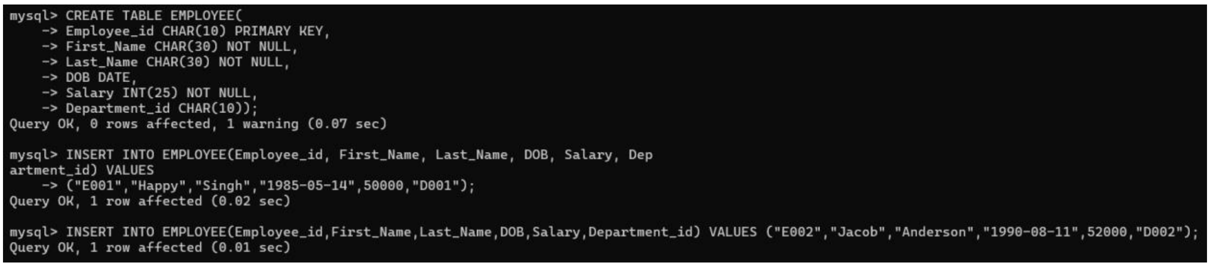
Experiment 11:

Title: To understand the concepts of Index.

Objective: Students will be able to implement the concept of index.

Create table of table name: EMPLOYEES and add 6 rows

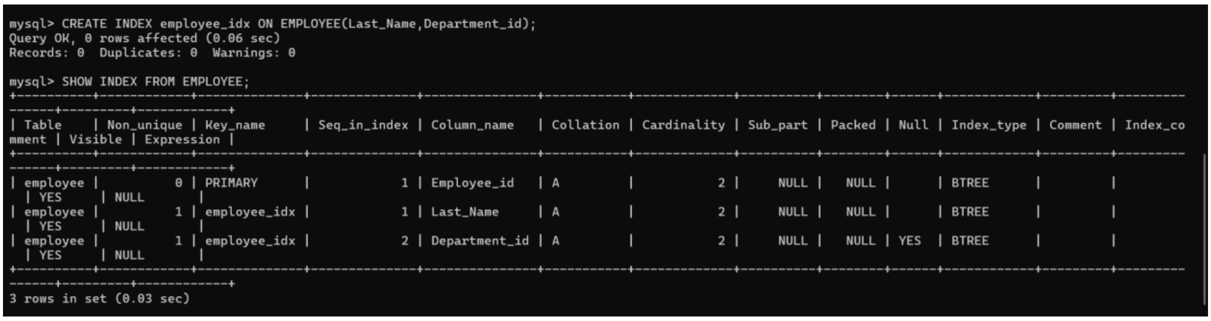
Column Name	Data Type	Width	Attributes
Employee_id	Character	10	PK
First_Name	Character	30	NN
Last_Name	Character	30	NN
DOB	Date		
Salary	Number	25	NN
Department_id	Character	10	



```
mysql> CREATE TABLE EMPLOYEE(
    -> Employee_id CHAR(10) PRIMARY KEY,
    -> First_Name CHAR(30) NOT NULL,
    -> Last_Name CHAR(30) NOT NULL,
    -> DOB DATE,
    -> Salary INT(25) NOT NULL,
    -> Department_id CHAR(10));
Query OK, 0 rows affected, 1 warning (0.07 sec)

mysql> INSERT INTO EMPLOYEE(Employee_id, First_Name, Last_Name, DOB, Salary, Dep
artment_id) VALUES
    -> ("E001","Happy","Singh","1985-05-14",50000,"D001");
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO EMPLOYEE(Employee_id,First_Name,Last_Name,DOB,Salary,Department_id) VALUES ("E002","Jacob","Anderson","1990-08-11",52000,"D002");
Query OK, 1 row affected (0.01 sec)
```

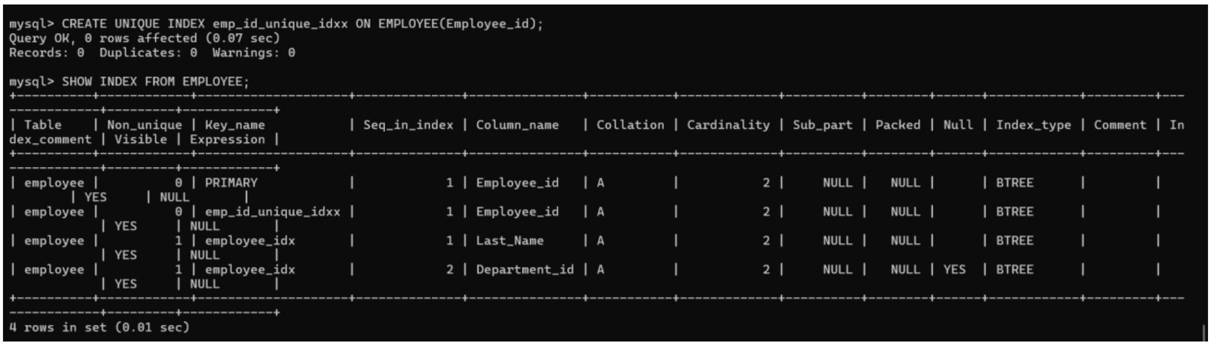
1. Execute the following index related queries:

1. **Create an index of name employee_idx on EMPLOYEES with column Last_Name, Department_id**



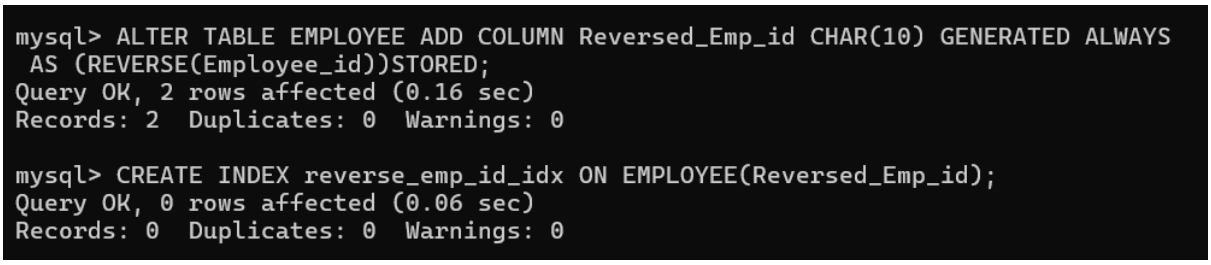
```
mysql> CREATE INDEX employee_idx ON EMPLOYEE(Last_Name,Department_id);
Query OK, 0 rows affected (0.06 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> SHOW INDEX FROM EMPLOYEE;
+----------+------------+--------------+--------------+---------------+-----------+-------------+----------+--------+------+------------+---------+---------
------+---------+------------+
| Table    | Non_unique | Key_name     | Seq_in_index | Column_name   | Collation | Cardinality | Sub_part | Packed | Null | Index_type | Comment | Index_co
mment | Visible | Expression |
+----------+------------+--------------+--------------+---------------+-----------+-------------+----------+--------+------+------------+---------+---------
------+---------+------------+
| employee |          0 | PRIMARY      |            1 | Employee_id   | A         |           2 |     NULL |   NULL |      | BTREE      |         |
  | YES     | NULL       |
| employee |          1 | employee_idx |            1 | Last_Name     | A         |           2 |     NULL |   NULL |      | BTREE      |         |
  | YES     | NULL       |
| employee |          1 | employee_idx |            2 | Department_id | A         |           2 |     NULL |   NULL | YES  | BTREE      |         |
  | YES     | NULL       |
+----------+------------+--------------+--------------+---------------+-----------+-------------+----------+--------+------+------------+---------+---------
------+---------+------------+
3 rows in set (0.03 sec)
```

2. **Find the ROWID for the above table and create a unique index on employee_id column of the EMPLOYEES.**

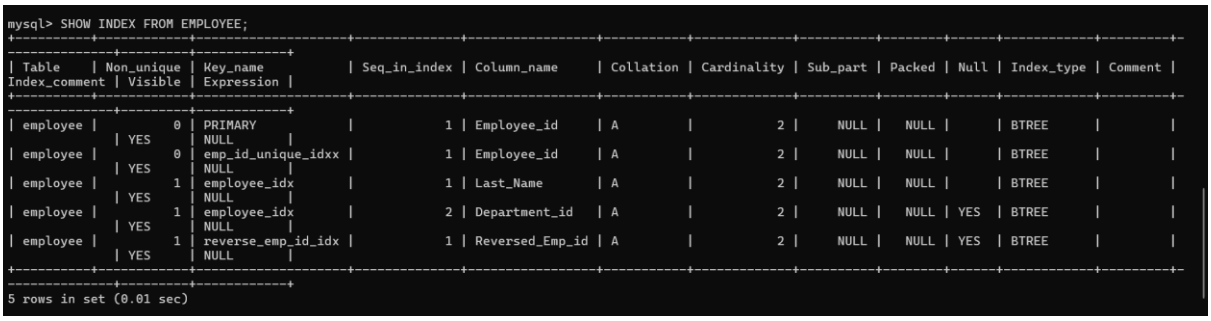


```
mysql> CREATE UNIQUE INDEX emp_id_unique_idxx ON EMPLOYEE(Employee_id);
Query OK, 0 rows affected (0.07 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> SHOW INDEX FROM EMPLOYEE;
+----------+------------+--------------------+--------------+--------------+-----------+-------------+----------+--------+------+------------+---------+---
-----------+---------+------------+
| Table    | Non_unique | Key_name           | Seq_in_index | Column_name   | Collation | Cardinality | Sub_part | Packed | Null | Index_type | Comment | In
dex_comment | Visible | Expression |
+----------+------------+--------------------+--------------+--------------+-----------+-------------+----------+--------+------+------------+---------+---
-----------+---------+------------+
| employee |          0 | PRIMARY            |            1 | Employee_id   | A         |           2 |     NULL |   NULL |      | BTREE      |         |
        | YES     | NULL       |
| employee |          0 | emp_id_unique_idxx |            1 | Employee_id   | A         |           2 |     NULL |   NULL |      | BTREE      |         |
           | YES     | NULL       |
| employee |          1 | employee_idx       |            1 | Last_Name     | A         |           2 |     NULL |   NULL |      | BTREE      |         |
           | YES     | NULL       |
| employee |          1 | employee_idx       |            2 | Department_id | A         |           2 |     NULL |   NULL | YES  | BTREE      |         |
           | YES     | NULL       |
+----------+------------+--------------------+--------------+--------------+-----------+-------------+----------+--------+------+------------+---------+---
-----------+---------+------------+
4 rows in set (0.01 sec)
```

3. **Create a reverse index on employee_id column of the EMPLOYEES.**

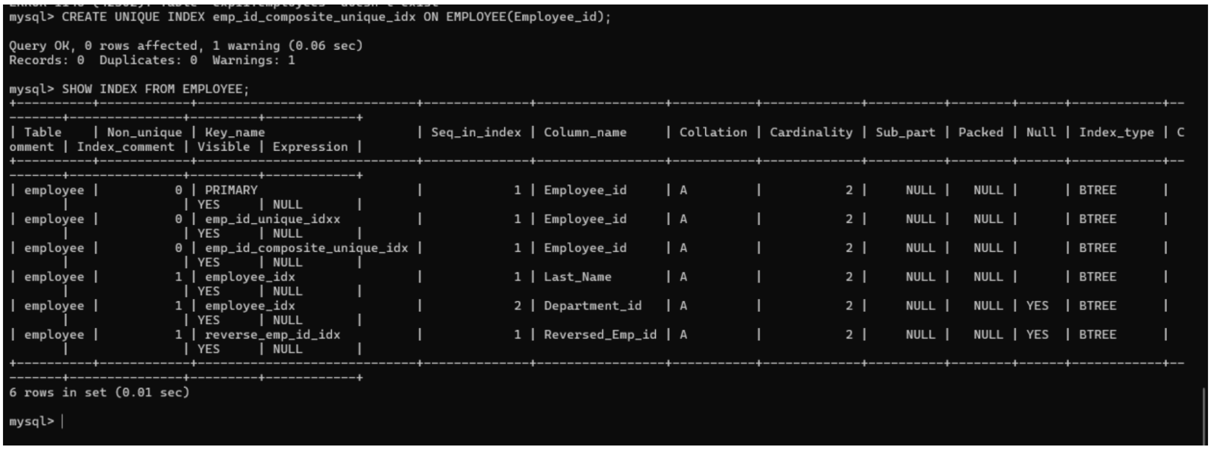


```
mysql> ALTER TABLE EMPLOYEE ADD COLUMN Reversed_Emp_id CHAR(10) GENERATED ALWAYS
 AS (REVERSE(Employee_id))STORED;
Query OK, 2 rows affected (0.16 sec)
Records: 2  Duplicates: 0  Warnings: 0

mysql> CREATE INDEX reverse_emp_id_idx ON EMPLOYEE(Reversed_Emp_id);
Query OK, 0 rows affected (0.06 sec)
Records: 0  Duplicates: 0  Warnings: 0
```



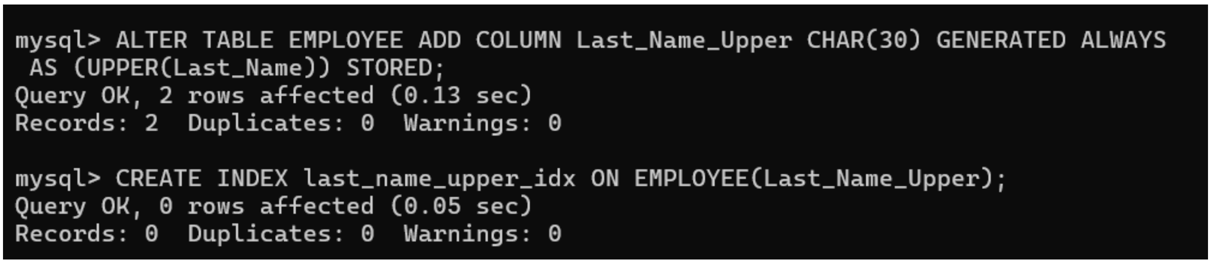
```
mysql> SHOW INDEX FROM EMPLOYEE;
+----------+------------+--------------------+--------------+-----------------+-----------+-------------+----------+--------+------+------------+---------+-
--------------+---------+------------+
| Table    | Non_unique | Key_name           | Seq_in_index | Column_name     | Collation | Cardinality | Sub_part | Packed | Null | Index_type | Comment |
Index_comment | Visible | Expression |
+----------+------------+--------------------+--------------+-----------------+-----------+-------------+----------+--------+------+------------+---------+-
--------------+---------+------------+
| employee |          0 | PRIMARY            |            1 | Employee_id     | A         |           2 |     NULL |   NULL |      | BTREE      |         |
              | YES     | NULL       |
| employee |          0 | emp_id_unique_idxx |            1 | Employee_id     | A         |           2 |     NULL |   NULL |      | BTREE      |         |
              | YES     | NULL       |
| employee |          1 | employee_idx       |            1 | Last_Name       | A         |           2 |     NULL |   NULL |      | BTREE      |         |
              | YES     | NULL       |
| employee |          1 | employee_idx       |            2 | Department_id   | A         |           2 |     NULL |   NULL | YES  | BTREE      |         |
              | YES     | NULL       |
| employee |          1 | reverse_emp_id_idx |            1 | Reversed_Emp_id | A         |           2 |     NULL |   NULL | YES  | BTREE      |         |
              | YES     | NULL       |
+----------+------------+--------------------+--------------+-----------------+-----------+-------------+----------+--------+------+------------+---------+-
--------------+---------+------------+
5 rows in set (0.01 sec)
```

4. **Create a unique and composite index on employee_id and check whether there is duplicity of tuples or not.**

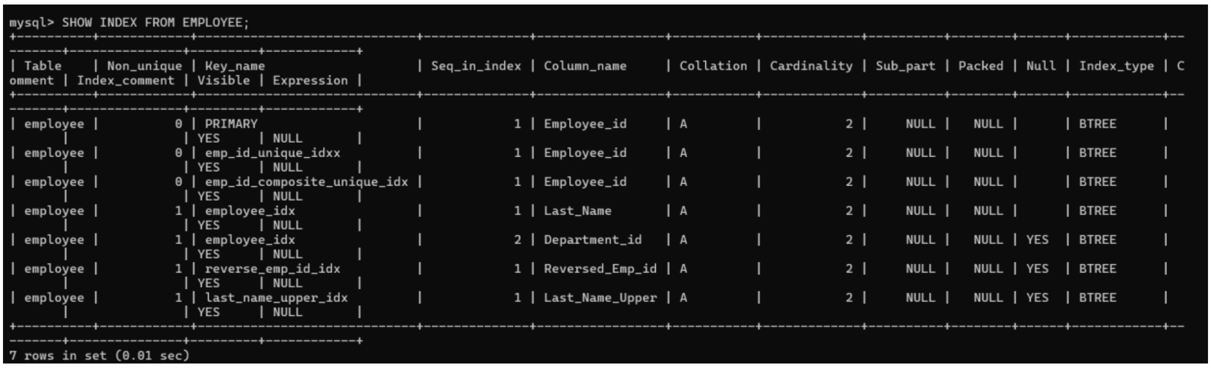


```
mysql> CREATE UNIQUE INDEX emp_id_composite_unique_idx ON EMPLOYEE(Employee_id);

Query OK, 0 rows affected, 1 warning (0.06 sec)
Records: 0  Duplicates: 0  Warnings: 1

mysql> SHOW INDEX FROM EMPLOYEE;
+----------+------------+-----------------------------+--------------+-----------------+-----------+-------------+----------+--------+------+------------+--
-------+---------------+---------+------------+
| Table    | Non_unique | Key_name                    | Seq_in_index | Column_name     | Collation | Cardinality | Sub_part | Packed | Null | Index_type | C
omment | Index_comment | Visible | Expression |
+----------+------------+-----------------------------+--------------+-----------------+-----------+-------------+----------+--------+------+------------+--
-------+---------------+---------+------------+
| employee |          0 | PRIMARY                     |            1 | Employee_id     | A         |           2 |     NULL |   NULL |      | BTREE      |
       |               | YES     | NULL       |
| employee |          0 | emp_id_unique_idxx          |            1 | Employee_id     | A         |           2 |     NULL |   NULL |      | BTREE      |
       |               | YES     | NULL       |
| employee |          0 | emp_id_composite_unique_idx |            1 | Employee_id     | A         |           2 |     NULL |   NULL |      | BTREE      |
       |               | YES     | NULL       |
| employee |          1 | employee_idx                |            1 | Last_Name       | A         |           2 |     NULL |   NULL |      | BTREE      |
       |               | YES     | NULL       |
| employee |          1 | employee_idx                |            2 | Department_id   | A         |           2 |     NULL |   NULL | YES  | BTREE      |
       |               | YES     | NULL       |
| employee |          1 | reverse_emp_id_idx          |            1 | Reversed_Emp_id | A         |           2 |     NULL |   NULL | YES  | BTREE      |
       |               | YES     | NULL       |
+----------+------------+-----------------------------+--------------+-----------------+-----------+-------------+----------+--------+------+------------+--
-------+---------------+---------+------------+
6 rows in set (0.01 sec)

mysql> |
```

5. **Create Function-based indexes defined on the SQL functions UPPER(column_name) or LOWER(column_name) to facilitate case-insensitive searches(on column Last_Name).**

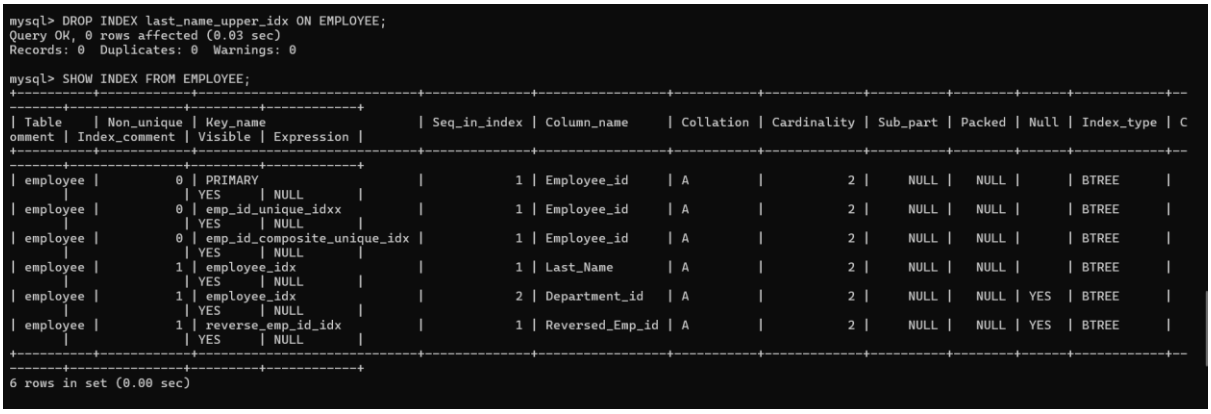


```
mysql> ALTER TABLE EMPLOYEE ADD COLUMN Last_Name_Upper CHAR(30) GENERATED ALWAYS
 AS (UPPER(Last_Name)) STORED;
Query OK, 2 rows affected (0.13 sec)
Records: 2  Duplicates: 0  Warnings: 0

mysql> CREATE INDEX last_name_upper_idx ON EMPLOYEE(Last_Name_Upper);
Query OK, 0 rows affected (0.05 sec)
Records: 0  Duplicates: 0  Warnings: 0
```



```
mysql> SHOW INDEX FROM EMPLOYEE;
+----------+------------+-----------------------------+--------------+-----------------+-----------+-------------+----------+--------+------+------------+--
-------+---------------+---------+------------+
| Table    | Non_unique | Key_name                    | Seq_in_index | Column_name     | Collation | Cardinality | Sub_part | Packed | Null | Index_type | C
omment | Index_comment | Visible | Expression |
+----------+------------+-----------------------------+--------------+-----------------+-----------+-------------+----------+--------+------+------------+--
-------+---------------+---------+------------+
| employee |          0 | PRIMARY                     |            1 | Employee_id     | A         |           2 |     NULL |   NULL |      | BTREE      |
       |               | YES     | NULL       |
| employee |          0 | emp_id_unique_idxx          |            1 | Employee_id     | A         |           2 |     NULL |   NULL |      | BTREE      |
       |               | YES     | NULL       |
| employee |          0 | emp_id_composite_unique_idx |            1 | Employee_id     | A         |           2 |     NULL |   NULL |      | BTREE      |
       |               | YES     | NULL       |
| employee |          1 | employee_idx                |            1 | Last_Name       | A         |           2 |     NULL |   NULL |      | BTREE      |
       |               | YES     | NULL       |
| employee |          1 | employee_idx                |            2 | Department_id   | A         |           2 |     NULL |   NULL | YES  | BTREE      |
       |               | YES     | NULL       |
| employee |          1 | reverse_emp_id_idx          |            1 | Reversed_Emp_id | A         |           2 |     NULL |   NULL | YES  | BTREE      |
       |               | YES     | NULL       |
| employee |          1 | last_name_upper_idx         |            1 | Last_Name_Upper | A         |           2 |     NULL |   NULL | YES  | BTREE      |
       |               | YES     | NULL       |
+----------+------------+-----------------------------+--------------+-----------------+-----------+-------------+----------+--------+------+------------+--
-------+---------------+---------+------------+
7 rows in set (0.01 sec)
```

6. **Drop the function based index on column Last_Name.**



```
mysql> DROP INDEX last_name_upper_idx ON EMPLOYEE;
Query OK, 0 rows affected (0.03 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> SHOW INDEX FROM EMPLOYEE;
+----------+------------+-----------------------------+--------------+-----------------+-----------+-------------+----------+--------+------+------------+--
-------+---------------+---------+------------+
| Table    | Non_unique | Key_name                    | Seq_in_index | Column_name     | Collation | Cardinality | Sub_part | Packed | Null | Index_type | C
omment | Index_comment | Visible | Expression |
+----------+------------+-----------------------------+--------------+-----------------+-----------+-------------+----------+--------+------+------------+--
-------+---------------+---------+------------+
| employee |          0 | PRIMARY                     |            1 | Employee_id     | A         |           2 |     NULL |   NULL |      | BTREE      |
       |               | YES     | NULL       |
| employee |          0 | emp_id_unique_idxx          |            1 | Employee_id     | A         |           2 |     NULL |   NULL |      | BTREE      |
       |               | YES     | NULL       |
| employee |          0 | emp_id_composite_unique_idx |            1 | Employee_id     | A         |           2 |     NULL |   NULL |      | BTREE      |
       |               | YES     | NULL       |
| employee |          1 | employee_idx                |            1 | Last_Name       | A         |           2 |     NULL |   NULL |      | BTREE      |
       |               | YES     | NULL       |
| employee |          1 | employee_idx                |            2 | Department_id   | A         |           2 |     NULL |   NULL | YES  | BTREE      |
       |               | YES     | NULL       |
| employee |          1 | reverse_emp_id_idx          |            1 | Reversed_Emp_id | A         |           2 |     NULL |   NULL | YES  | BTREE      |
       |               | YES     | NULL       |
+----------+------------+-----------------------------+--------------+-----------------+-----------+-------------+----------+--------+------+------------+--
-------+---------------+---------+------------+
6 rows in set (0.00 sec)
```