	the table ‘Emp’, Change the datatype of ‘salary’ attribute to float. • Drop the attribute ‘depttname’ from the table ‘emp’. • Delete the entries from the table ‘Emp’ where the salary is less than 70,000.		
5	To study the aggregate functions (sum, max, min, group by) and execute the following queries using these commands: • Find the sum of salaries of all employees in computer science department. • Find the number of all employees in company ‘TCS’ • Find the maximum and the minimum salary in the HR department. • Find number of employees in each department where number of employees is greater than 5.	6 - 8	
6	Execute the set difference between two tables	8	
7	To study the commands for joins (cross join, inner join, outer join) and execute the following queries using these 23 commands: • Retrieve the complete record of an employee and its company from both the table using joins. • List all the employees working in the company ‘TCS’.	8 - 9	
8	Consider a table to execute nested queries on these columns. • Write a query to find higher order customers •	9 - 11	

	Find the Country of customers who have placed at least one order on or after 2024-10-10.		

Database Management System

1. Introduction to SQL.

SQL (Structured Query Language) is a standard programming language used for managing and manipulating relational databases. It allows users to interact with a database to perform various operations such as:

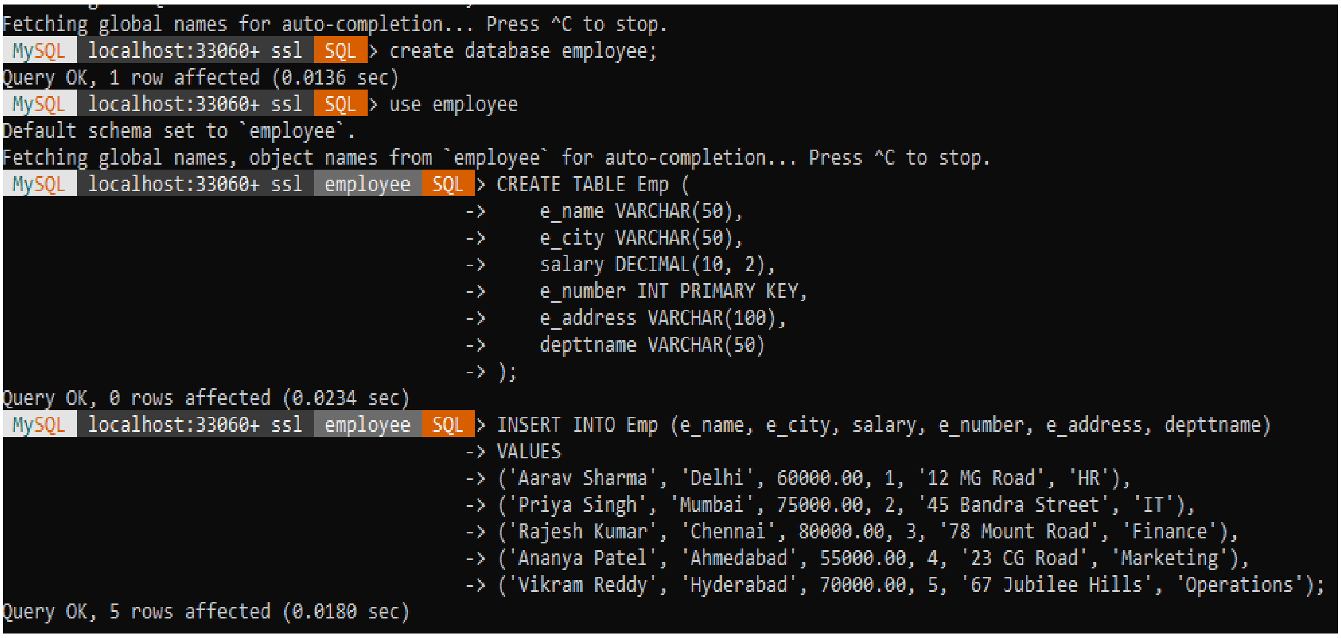
1. Querying data: Retrieving data from one or more tables using commands like SELECT.
2. Inserting data: Adding new records to tables with the INSERT statement.
3. Updating data: Modifying existing records in tables with the UPDATE statement.
4. Deleting data: Removing records from tables using the DELETE statement.
5. Defining data: Creating, altering, and deleting database structures (e.g., tables, indexes) using CREATE, ALTER, and DROP statements.
6. Controlling access: Managing permissions and user access with commands like GRANT and REVOKE.

Common SQL Commands

- SELECT: Retrieve data from a database.
- INSERT INTO: Add new data to a table.
- UPDATE: Modify existing data in a table.
- DELETE: Remove data from a table.
- CREATE TABLE: Define a new table structure.
- ALTER TABLE: Modify an existing table.
- DROP TABLE: Delete a table and its data.
- JOIN: Combine data from multiple tables based on a relationship.

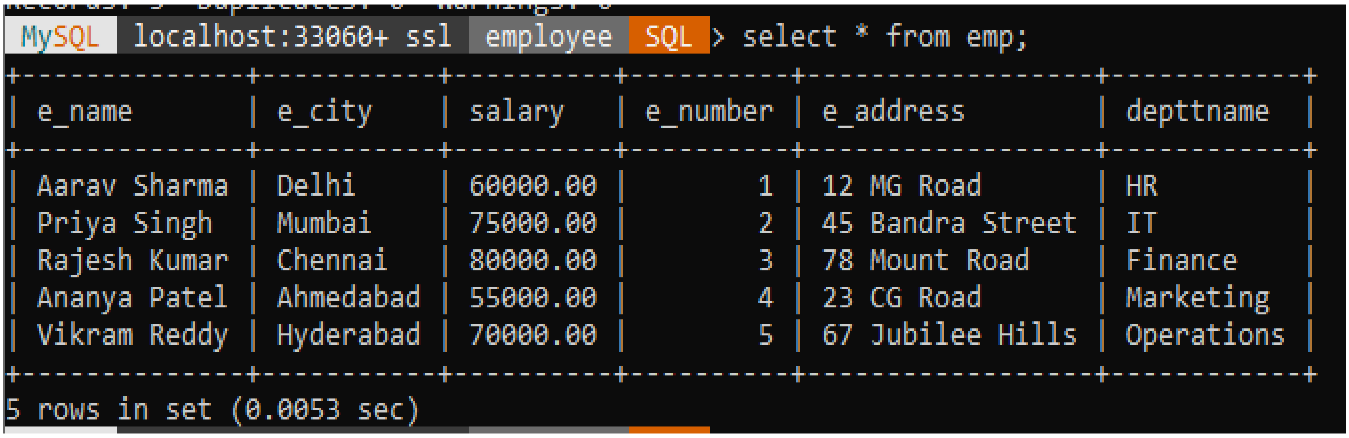
2. **Basic SQL commands(create database, create table,use drop,insert) and execute the following queries using these commands: • Create a database named ‘Employee’ • Use the database ‘Employee’ and create a table ‘Emp’ with attributes‘ename’, ‘e_city’, ‘salary’,‘e_number’, ‘e_address’, ‘depttname’ • Inserting values in table.**

Queries :



```
Fetching global names for auto-completion... Press ^C to stop.
 MySQL  localhost:33060+ ssl  SQL > create database employee;
Query OK, 1 row affected (0.0136 sec)
 MySQL  localhost:33060+ ssl  SQL > use employee
Default schema set to `employee`.
Fetching global names, object names from `employee` for auto-completion... Press ^C to stop.
 MySQL  localhost:33060+ ssl  employee  SQL > CREATE TABLE Emp (
                                           ->     e_name VARCHAR(50),
                                           ->     e_city VARCHAR(50),
                                           ->     salary DECIMAL(10, 2),
                                           ->     e_number INT PRIMARY KEY,
                                           ->     e_address VARCHAR(100),
                                           ->     depttname VARCHAR(50)
                                           -> );
Query OK, 0 rows affected (0.0234 sec)
 MySQL  localhost:33060+ ssl  employee  SQL > INSERT INTO Emp (e_name, e_city, salary, e_number, e_address, depttname)
                                           -> VALUES
                                           -> ('Aarav Sharma', 'Delhi', 60000.00, 1, '12 MG Road', 'HR'),
                                           -> ('Priya Singh', 'Mumbai', 75000.00, 2, '45 Bandra Street', 'IT'),
                                           -> ('Rajesh Kumar', 'Chennai', 80000.00, 3, '78 Mount Road', 'Finance'),
                                           -> ('Ananya Patel', 'Ahmedabad', 55000.00, 4, '23 CG Road', 'Marketing'),
                                           -> ('Vikram Reddy', 'Hyderabad', 70000.00, 5, '67 Jubilee Hills', 'Operations');
Query OK, 5 rows affected (0.0180 sec)
```

Employee Table :

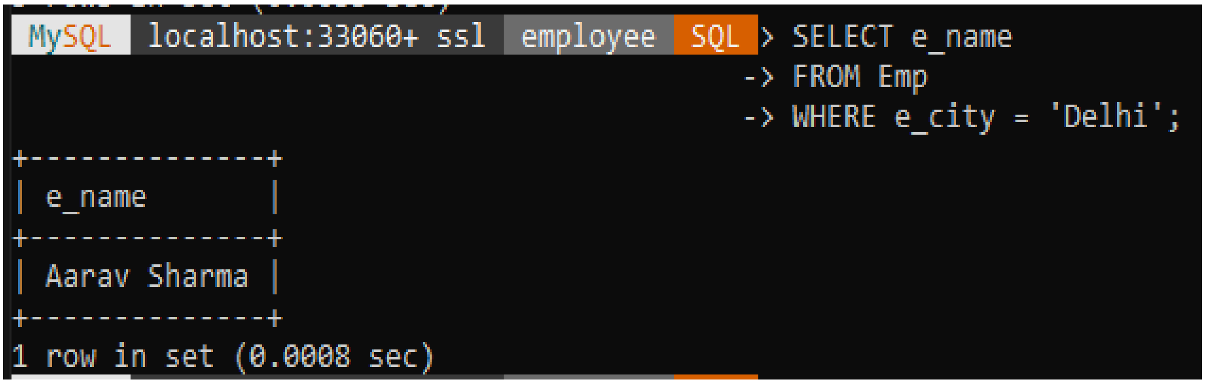


```
 MySQL  localhost:33060+ ssl  employee  SQL > select * from emp;
+--------------+-----------+----------+----------+------------------+------------+
| e_name       | e_city    | salary   | e_number | e_address        | depttname  |
+--------------+-----------+----------+----------+------------------+------------+
| Aarav Sharma | Delhi     | 60000.00 |        1 | 12 MG Road       | HR         |
| Priya Singh  | Mumbai    | 75000.00 |        2 | 45 Bandra Street | IT         |
| Rajesh Kumar | Chennai   | 80000.00 |        3 | 78 Mount Road    | Finance    |
| Ananya Patel | Ahmedabad | 55000.00 |        4 | 23 CG Road       | Marketing  |
| Vikram Reddy | Hyderabad | 70000.00 |        5 | 67 Jubilee Hills | Operations |
+--------------+-----------+----------+----------+------------------+------------+
5 rows in set (0.0053 sec)
```

3. **To study the viewing commands (select, update) and execute the following queries using these commands: • Find the names of all employees who live in Delhi • Increase the salary of all employees by Rs. 5,000 • Find the company names where the number of employees is greater than 10,000.**

• Find the names of all employees who live in Delhi.

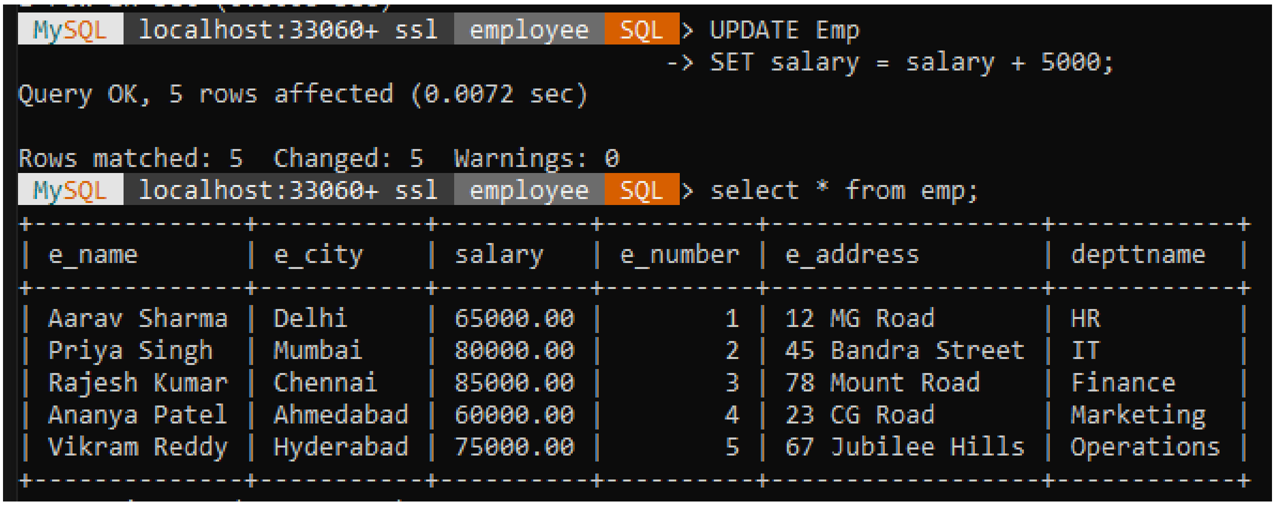
Query with Output :



```
 MySQL  localhost:33060+ ssl  employee  SQL > SELECT e_name
                                          -> FROM Emp
                                          -> WHERE e_city = 'Delhi';
+--------------+
| e_name       |
+--------------+
| Aarav Sharma |
+--------------+
1 row in set (0.0008 sec)
```

• Increase the salary of all employees by Rs. 5,000

Query with Output :

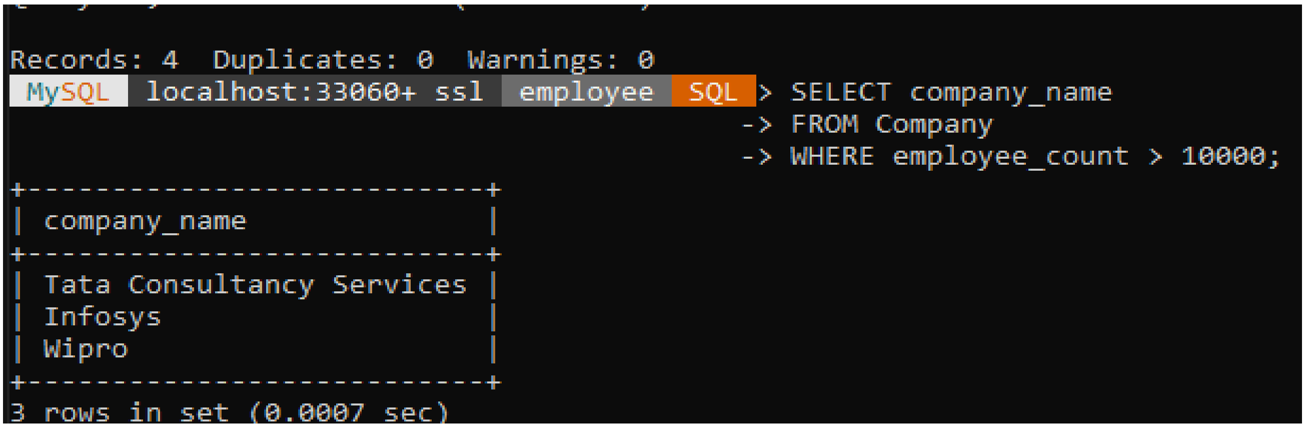


```
 MySQL  localhost:33060+ ssl  employee  SQL > UPDATE Emp
                                          -> SET salary = salary + 5000;
Query OK, 5 rows affected (0.0072 sec)

Rows matched: 5  Changed: 5  Warnings: 0
 MySQL  localhost:33060+ ssl  employee  SQL > select * from emp;
+--------------+-----------+----------+----------+------------------+------------+
| e_name       | e_city    | salary   | e_number | e_address        | depttname  |
+--------------+-----------+----------+----------+------------------+------------+
| Aarav Sharma | Delhi     | 65000.00 |        1 | 12 MG Road       | HR         |
| Priya Singh  | Mumbai    | 80000.00 |        2 | 45 Bandra Street | IT         |
| Rajesh Kumar | Chennai   | 85000.00 |        3 | 78 Mount Road    | Finance    |
| Ananya Patel | Ahmedabad | 60000.00 |        4 | 23 CG Road       | Marketing  |
| Vikram Reddy | Hyderabad | 75000.00 |        5 | 67 Jubilee Hills | Operations |
+--------------+-----------+----------+----------+------------------+------------+
```

• Find the company names where the number of employees is greater than 10,000.

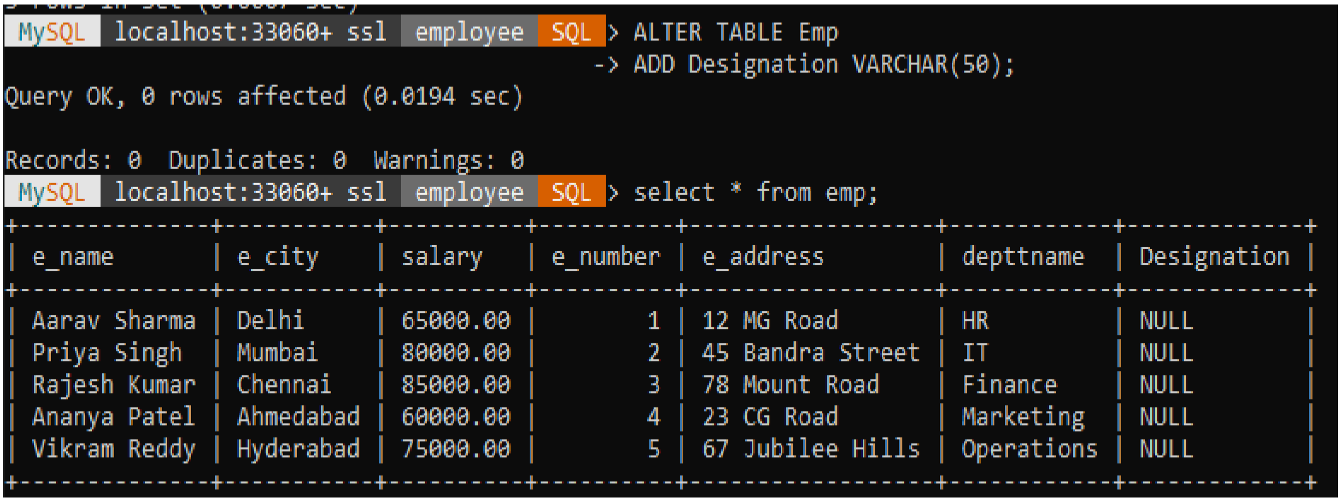
Query with Output :



```
Records: 4  Duplicates: 0  Warnings: 0
 MySQL  localhost:33060+ ssl  employee  SQL > SELECT company_name
                                          -> FROM Company
                                          -> WHERE employee_count > 10000;
+----------------------------+
| company_name               |
+----------------------------+
| Tata Consultancy Services  |
| Infosys                    |
| Wipro                      |
+----------------------------+
3 rows in set (0.0007 sec)
```

4. **To study the commands to modify the structure of table (alter, delete) and execute the following queries using these commands:**
   - **Add an attribute named ‘Designation’ to the table ‘Emp’.**

Query with Output :

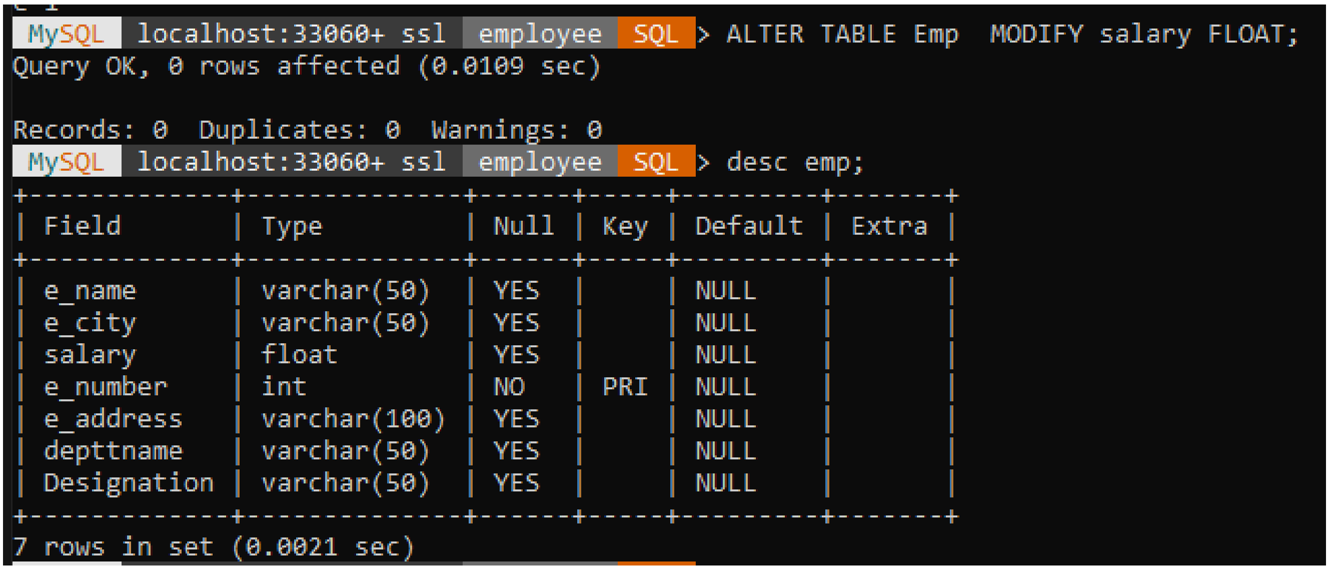


```
3 rows in set (0.0007 sec)
 MySQL  localhost:33060+ ssl  employee  SQL > ALTER TABLE Emp
                                          -> ADD Designation VARCHAR(50);
Query OK, 0 rows affected (0.0194 sec)

Records: 0  Duplicates: 0  Warnings: 0
 MySQL  localhost:33060+ ssl  employee  SQL > select * from emp;
+--------------+-----------+----------+----------+------------------+------------+-------------+
| e_name       | e_city    | salary   | e_number | e_address        | depttname  | Designation |
+--------------+-----------+----------+----------+------------------+------------+-------------+
| Aarav Sharma | Delhi     | 65000.00 |        1 | 12 MG Road       | HR         | NULL        |
| Priya Singh  | Mumbai    | 80000.00 |        2 | 45 Bandra Street | IT         | NULL        |
| Rajesh Kumar | Chennai   | 85000.00 |        3 | 78 Mount Road    | Finance    | NULL        |
| Ananya Patel | Ahmedabad | 60000.00 |        4 | 23 CG Road       | Marketing  | NULL        |
| Vikram Reddy | Hyderabad | 75000.00 |        5 | 67 Jubilee Hills | Operations | NULL        |
+--------------+-----------+----------+----------+------------------+------------+-------------+
```

- **Modify the table ‘Emp’, Change the datatype of ‘salary’ attribute to float.**

Query With Output :

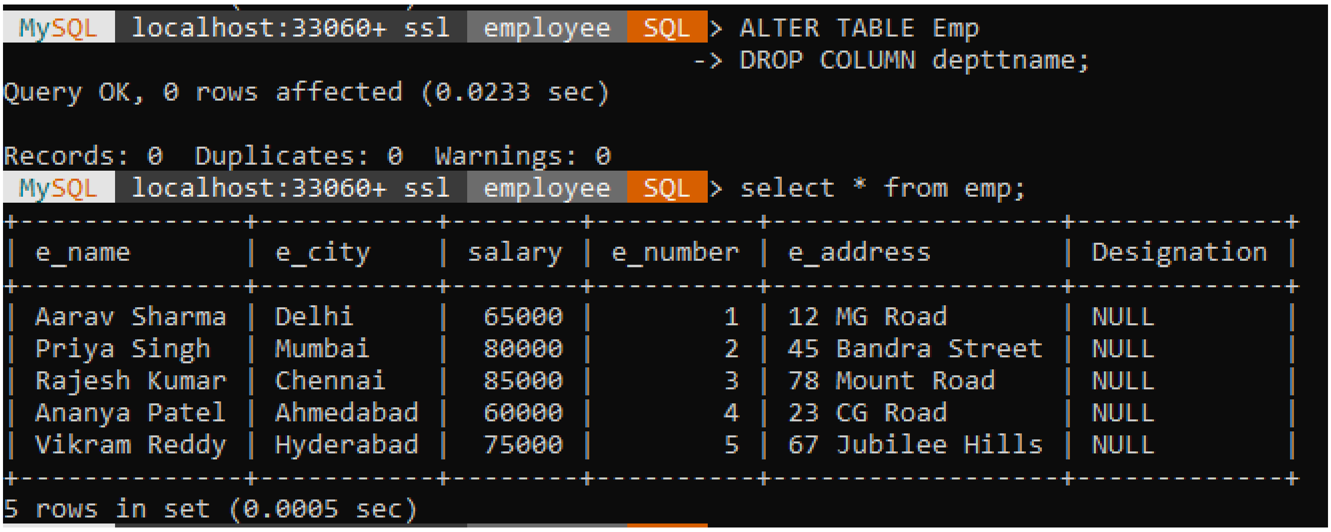


```
 MySQL  localhost:33060+ ssl  employee  SQL > ALTER TABLE Emp  MODIFY salary FLOAT;
Query OK, 0 rows affected (0.0109 sec)

Records: 0  Duplicates: 0  Warnings: 0
 MySQL  localhost:33060+ ssl  employee  SQL > desc emp;
+-------------+--------------+------+-----+---------+-------+
| Field       | Type         | Null | Key | Default | Extra |
+-------------+--------------+------+-----+---------+-------+
| e_name      | varchar(50)  | YES  |     | NULL    |       |
| e_city      | varchar(50)  | YES  |     | NULL    |       |
| salary      | float        | YES  |     | NULL    |       |
| e_number    | int          | NO   | PRI | NULL    |       |
| e_address   | varchar(100) | YES  |     | NULL    |       |
| depttname   | varchar(50)  | YES  |     | NULL    |       |
| Designation | varchar(50)  | YES  |     | NULL    |       |
+-------------+--------------+------+-----+---------+-------+
7 rows in set (0.0021 sec)
```

- **Drop the attribute ‘depttname’ from the table ‘emp’.**

Query With Output :

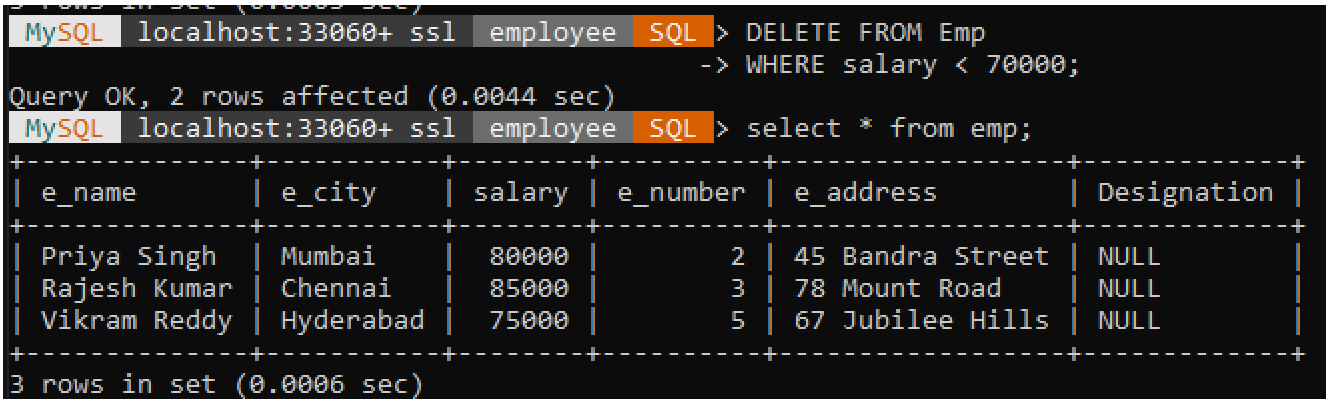


```
 MySQL  localhost:33060+ ssl  employee  SQL > ALTER TABLE Emp
                                          -> DROP COLUMN depttname;
Query OK, 0 rows affected (0.0233 sec)

Records: 0  Duplicates: 0  Warnings: 0
 MySQL  localhost:33060+ ssl  employee  SQL > select * from emp;
+--------------+-----------+--------+----------+-------------------+-------------+
| e_name       | e_city    | salary | e_number | e_address         | Designation |
+--------------+-----------+--------+----------+-------------------+-------------+
| Aarav Sharma | Delhi     |  65000 |        1 | 12 MG Road        | NULL        |
| Priya Singh  | Mumbai    |  80000 |        2 | 45 Bandra Street  | NULL        |
| Rajesh Kumar | Chennai   |  85000 |        3 | 78 Mount Road     | NULL        |
| Ananya Patel | Ahmedabad |  60000 |        4 | 23 CG Road        | NULL        |
| Vikram Reddy | Hyderabad |  75000 |        5 | 67 Jubilee Hills  | NULL        |
+--------------+-----------+--------+----------+-------------------+-------------+
5 rows in set (0.0005 sec)
```

- **Delete the entries from the table ‘ Emp’ where the salary is less than 70,000.**

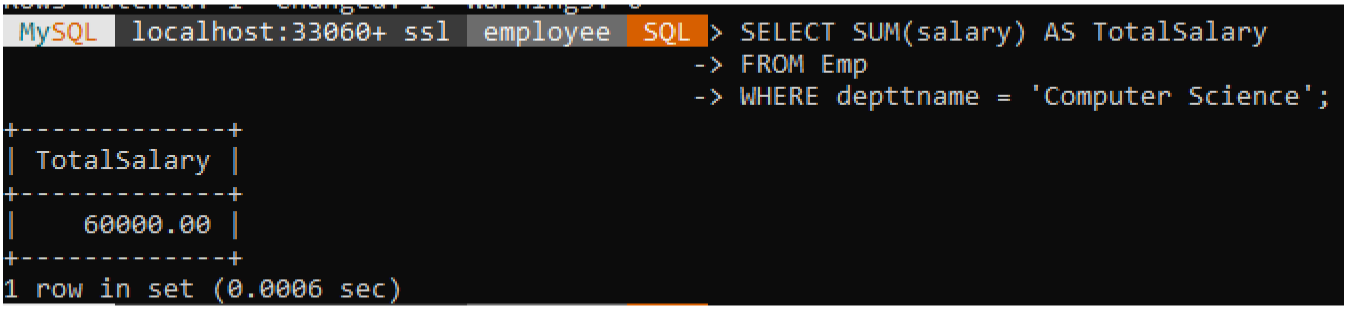
Query With Output :



```
 MySQL  localhost:33060+ ssl  employee  SQL > DELETE FROM Emp
                                          -> WHERE salary < 70000;
Query OK, 2 rows affected (0.0044 sec)
 MySQL  localhost:33060+ ssl  employee  SQL > select * from emp;
+-------------+-----------+--------+----------+------------------+-------------+
| e_name      | e_city    | salary | e_number | e_address        | Designation |
+-------------+-----------+--------+----------+------------------+-------------+
| Priya Singh | Mumbai    |  80000 |        2 | 45 Bandra Street | NULL        |
| Rajesh Kumar| Chennai   |  85000 |        3 | 78 Mount Road    | NULL        |
| Vikram Reddy| Hyderabad |  75000 |        5 | 67 Jubilee Hills | NULL        |
+-------------+-----------+--------+----------+------------------+-------------+
3 rows in set (0.0006 sec)
```

5. **To study the aggregate functions (sum, max, min, group by) and execute the following queries using these commands:**

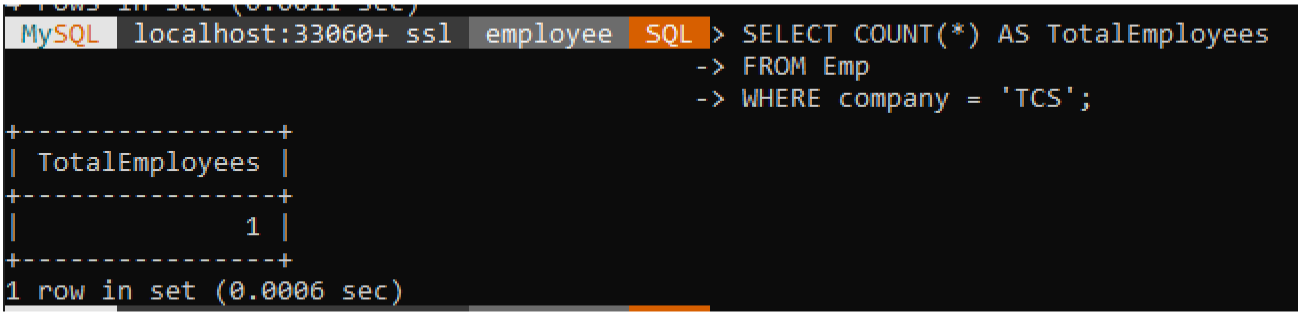
Output With Query :



```
 MySQL  localhost:33060+ ssl  employee  SQL > SELECT SUM(salary) AS TotalSalary
                                          -> FROM Emp
                                          -> WHERE depttname = 'Computer Science';
+-------------+
| TotalSalary |
+-------------+
|    60000.00 |
+-------------+
1 row in set (0.0006 sec)
```

- **Find the number of all employees in company ‘TCS’**

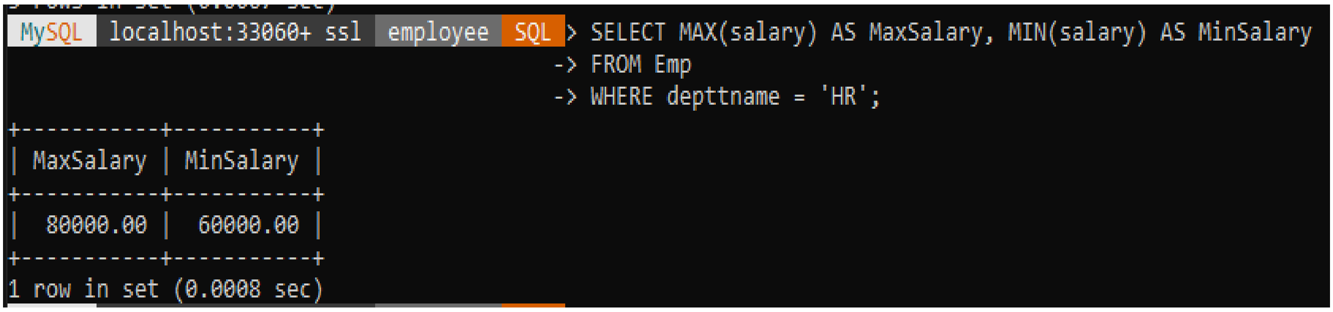
Query with Output :



```
 MySQL  localhost:33060+ ssl  employee  SQL > SELECT COUNT(*) AS TotalEmployees
                                          -> FROM Emp
                                          -> WHERE company = 'TCS';
+----------------+
| TotalEmployees |
+----------------+
|              1 |
+----------------+
1 row in set (0.0006 sec)
```

- **Find the maximum and the minimum salary in the HR department.**

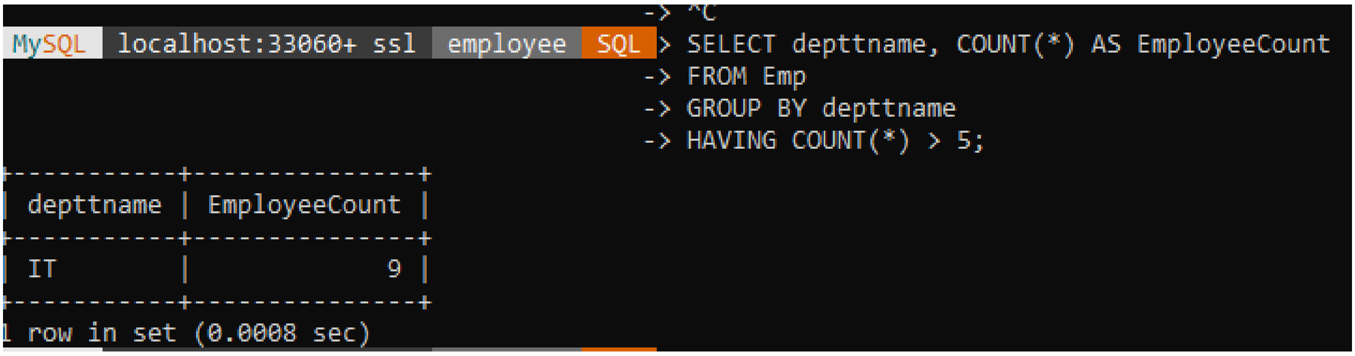
Output with Query :



```
 MySQL  localhost:33060+ ssl  employee  SQL > SELECT MAX(salary) AS MaxSalary, MIN(salary) AS MinSalary
                                          -> FROM Emp
                                          -> WHERE depttname = 'HR';
+-----------+-----------+
| MaxSalary | MinSalary |
+-----------+-----------+
|  80000.00 |  60000.00 |
+-----------+-----------+
1 row in set (0.0008 sec)
```

- **Find number of employees in each department where number of employees is greater than 5.**

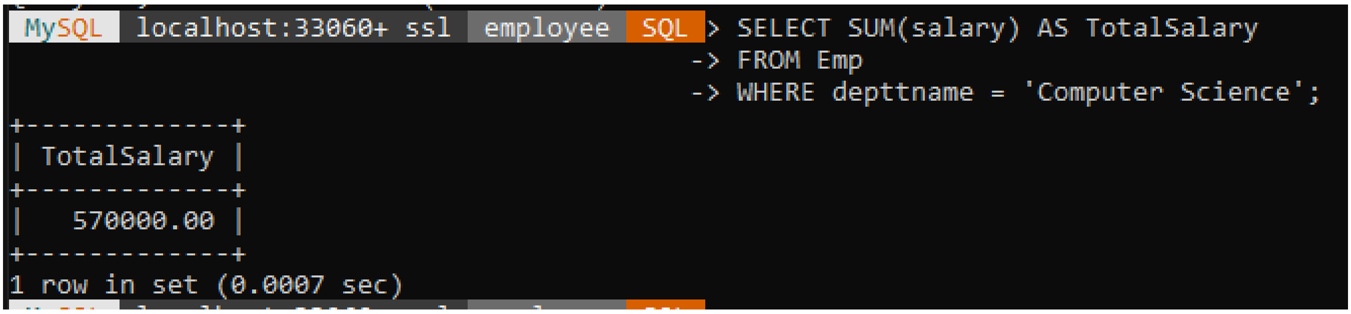
Output with Query :



```
                                          -> ^C
 MySQL  localhost:33060+ ssl  employee  SQL > SELECT depttname, COUNT(*) AS EmployeeCount
                                          -> FROM Emp
                                          -> GROUP BY depttname
                                          -> HAVING COUNT(*) > 5;
+-----------+---------------+
| depttname | EmployeeCount |
+-----------+---------------+
| IT        |             9 |
+-----------+---------------+
1 row in set (0.0008 sec)
```

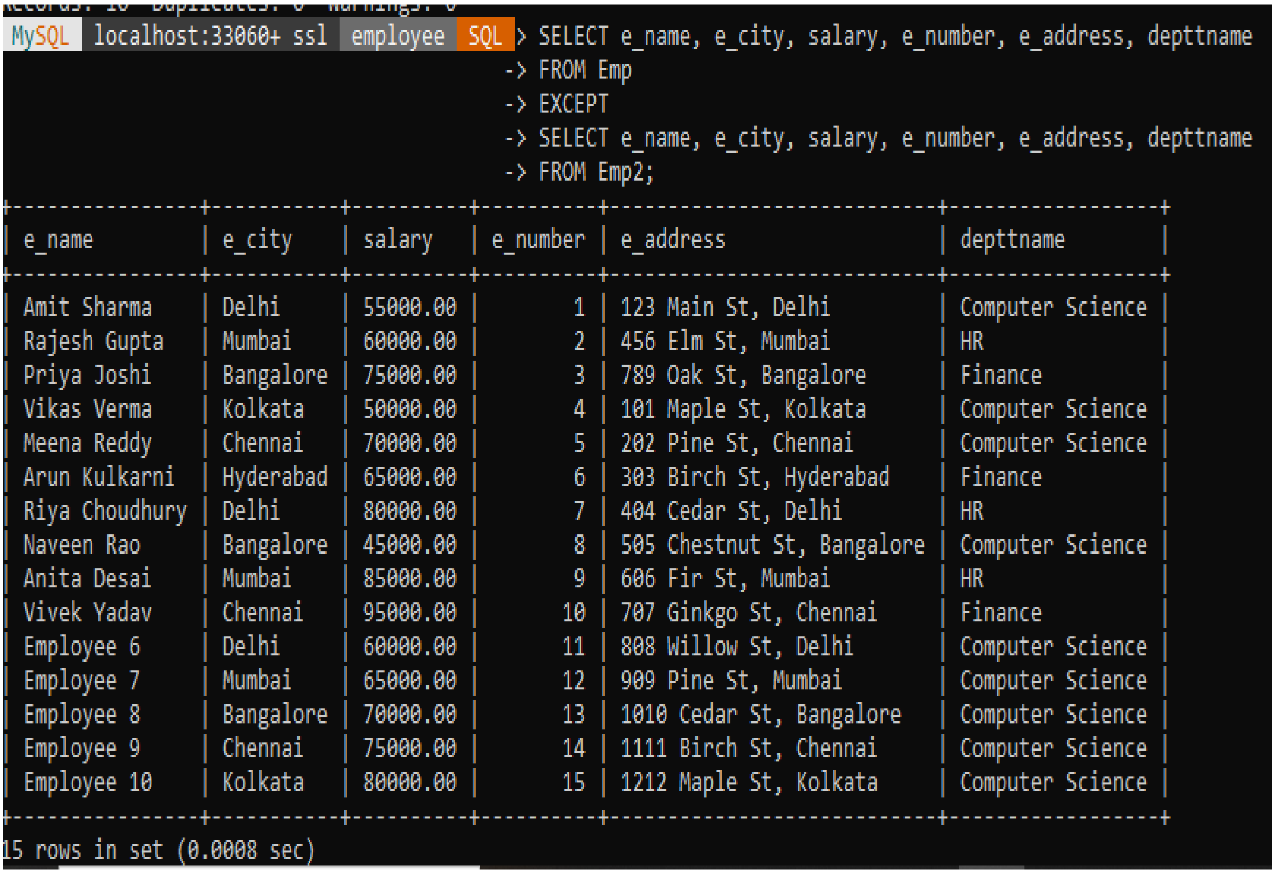
- **Find the sum of salaries of all employees in computer science department.**

Query with Output :



```
MySQL  localhost:33060+ ssl  employee  SQL > SELECT SUM(salary) AS TotalSalary
                                          -> FROM Emp
                                          -> WHERE depttname = 'Computer Science';
+-------------+
| TotalSalary |
+-------------+
|   570000.00 |
+-------------+
1 row in set (0.0007 sec)
```

6. **Execute the set difference between two tables.**

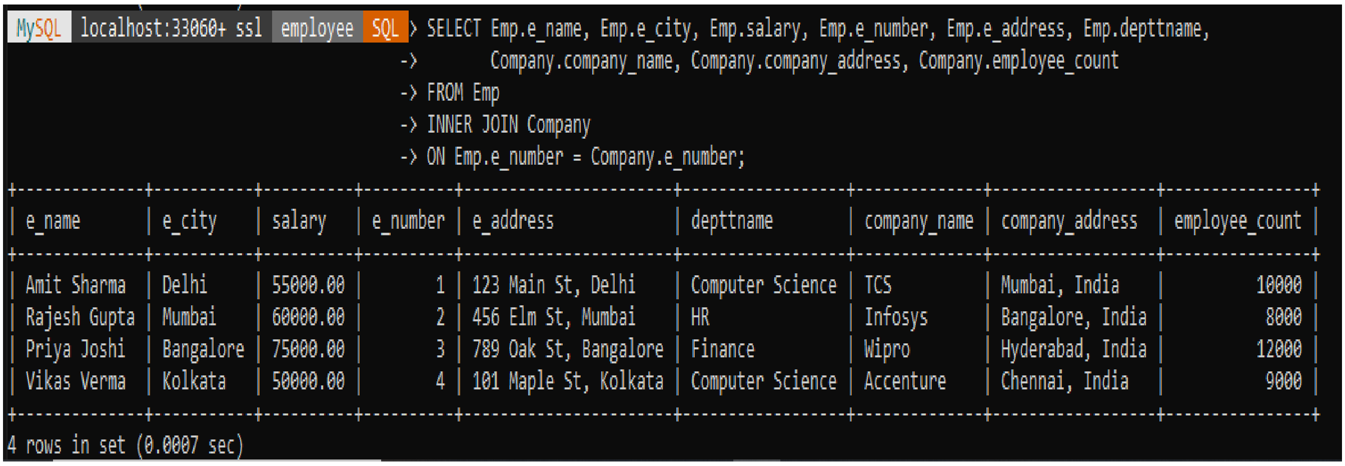


```
Records: 10  Duplicates: 0  Warnings: 0
MySQL  localhost:33060+ ssl  employee  SQL > SELECT e_name, e_city, salary, e_number, e_address, depttname
                                          -> FROM Emp
                                          -> EXCEPT
                                          -> SELECT e_name, e_city, salary, e_number, e_address, depttname
                                          -> FROM Emp2;
+----------------+-----------+----------+----------+-------------------------+------------------+
| e_name         | e_city    | salary   | e_number | e_address               | depttname        |
+----------------+-----------+----------+----------+-------------------------+------------------+
| Amit Sharma    | Delhi     | 55000.00 |        1 | 123 Main St, Delhi      | Computer Science |
| Rajesh Gupta   | Mumbai    | 60000.00 |        2 | 456 Elm St, Mumbai      | HR               |
| Priya Joshi    | Bangalore | 75000.00 |        3 | 789 Oak St, Bangalore   | Finance          |
| Vikas Verma    | Kolkata   | 50000.00 |        4 | 101 Maple St, Kolkata   | Computer Science |
| Meena Reddy    | Chennai   | 70000.00 |        5 | 202 Pine St, Chennai    | Computer Science |
| Arun Kulkarni  | Hyderabad | 65000.00 |        6 | 303 Birch St, Hyderabad | Finance          |
| Riya Choudhury | Delhi     | 80000.00 |        7 | 404 Cedar St, Delhi     | HR               |
| Naveen Rao     | Bangalore | 45000.00 |        8 | 505 Chestnut St, Bangalore | Computer Science |
| Anita Desai    | Mumbai    | 85000.00 |        9 | 606 Fir St, Mumbai      | HR               |
| Vivek Yadav    | Chennai   | 95000.00 |       10 | 707 Ginkgo St, Chennai  | Finance          |
| Employee 6     | Delhi     | 60000.00 |       11 | 808 Willow St, Delhi    | Computer Science |
| Employee 7     | Mumbai    | 65000.00 |       12 | 909 Pine St, Mumbai     | Computer Science |
| Employee 8     | Bangalore | 70000.00 |       13 | 1010 Cedar St, Bangalore | Computer Science |
| Employee 9     | Chennai   | 75000.00 |       14 | 1111 Birch St, Chennai  | Computer Science |
| Employee 10    | Kolkata   | 80000.00 |       15 | 1212 Maple St, Kolkata  | Computer Science |
+----------------+-----------+----------+----------+-------------------------+------------------+
15 rows in set (0.0008 sec)
```

7. **To study the commands for joins (cross join, inner join, outer join) and execute the following queries using these commands:**

• Retrieve the complete record of an employee and its company from both the table using joins.

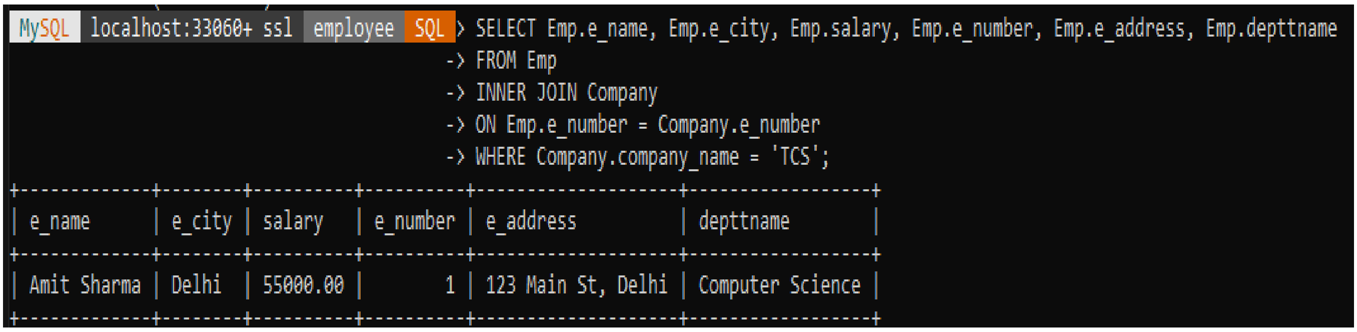
Query with Output :



```
MySQL  localhost:33060+ ssl  employee  SQL > SELECT Emp.e_name, Emp.e_city, Emp.salary, Emp.e_number, Emp.e_address, Emp.depttname,
                                          ->        Company.company_name, Company.company_address, Company.employee_count
                                          -> FROM Emp
                                          -> INNER JOIN Company
                                          -> ON Emp.e_number = Company.e_number;
+-------------+-----------+----------+----------+---------------------+------------------+--------------+-------------------+----------------+
| e_name      | e_city    | salary   | e_number | e_address           | depttname        | company_name | company_address   | employee_count |
+-------------+-----------+----------+----------+---------------------+------------------+--------------+-------------------+----------------+
| Amit Sharma | Delhi     | 55000.00 |        1 | 123 Main St, Delhi  | Computer Science | TCS          | Mumbai, India     |          10000 |
| Rajesh Gupta | Mumbai   | 60000.00 |        2 | 456 Elm St, Mumbai  | HR               | Infosys      | Bangalore, India  |           8000 |
| Priya Joshi | Bangalore | 75000.00 |        3 | 789 Oak St, Bangalore | Finance        | Wipro        | Hyderabad, India  |          12000 |
| Vikas Verma | Kolkata   | 50000.00 |        4 | 101 Maple St, Kolkata | Computer Science | Accenture  | Chennai, India    |           9000 |
+-------------+-----------+----------+----------+---------------------+------------------+--------------+-------------------+----------------+
4 rows in set (0.0007 sec)
```

- **List all the employees working in the company ‘TCS’.**

Query with Output :

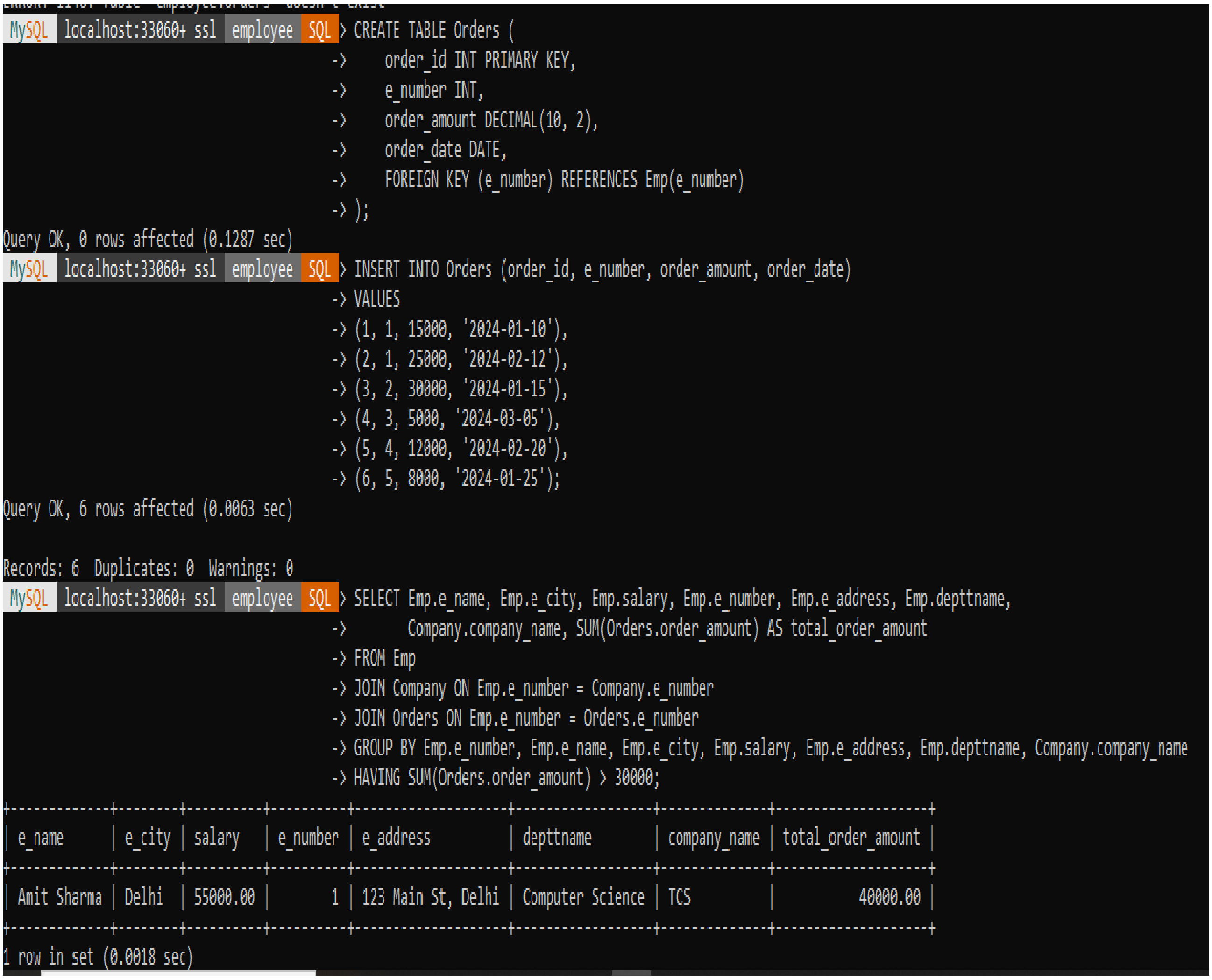


```
MySQL  localhost:33060+ ssl  employee  SQL > SELECT Emp.e_name, Emp.e_city, Emp.salary, Emp.e_number, Emp.e_address, Emp.depttname
                                          -> FROM Emp
                                          -> INNER JOIN Company
                                          -> ON Emp.e_number = Company.e_number
                                          -> WHERE Company.company_name = 'TCS';
+-------------+--------+----------+----------+--------------------+------------------+
| e_name      | e_city | salary   | e_number | e_address          | depttname        |
+-------------+--------+----------+----------+--------------------+------------------+
| Amit Sharma | Delhi  | 55000.00 |        1 | 123 Main St, Delhi | Computer Science |
+-------------+--------+----------+----------+--------------------+------------------+
```

8. Consider a table to execute nested queries on these columns.

- **Write a query to find higher order customers.**

Query With Output :

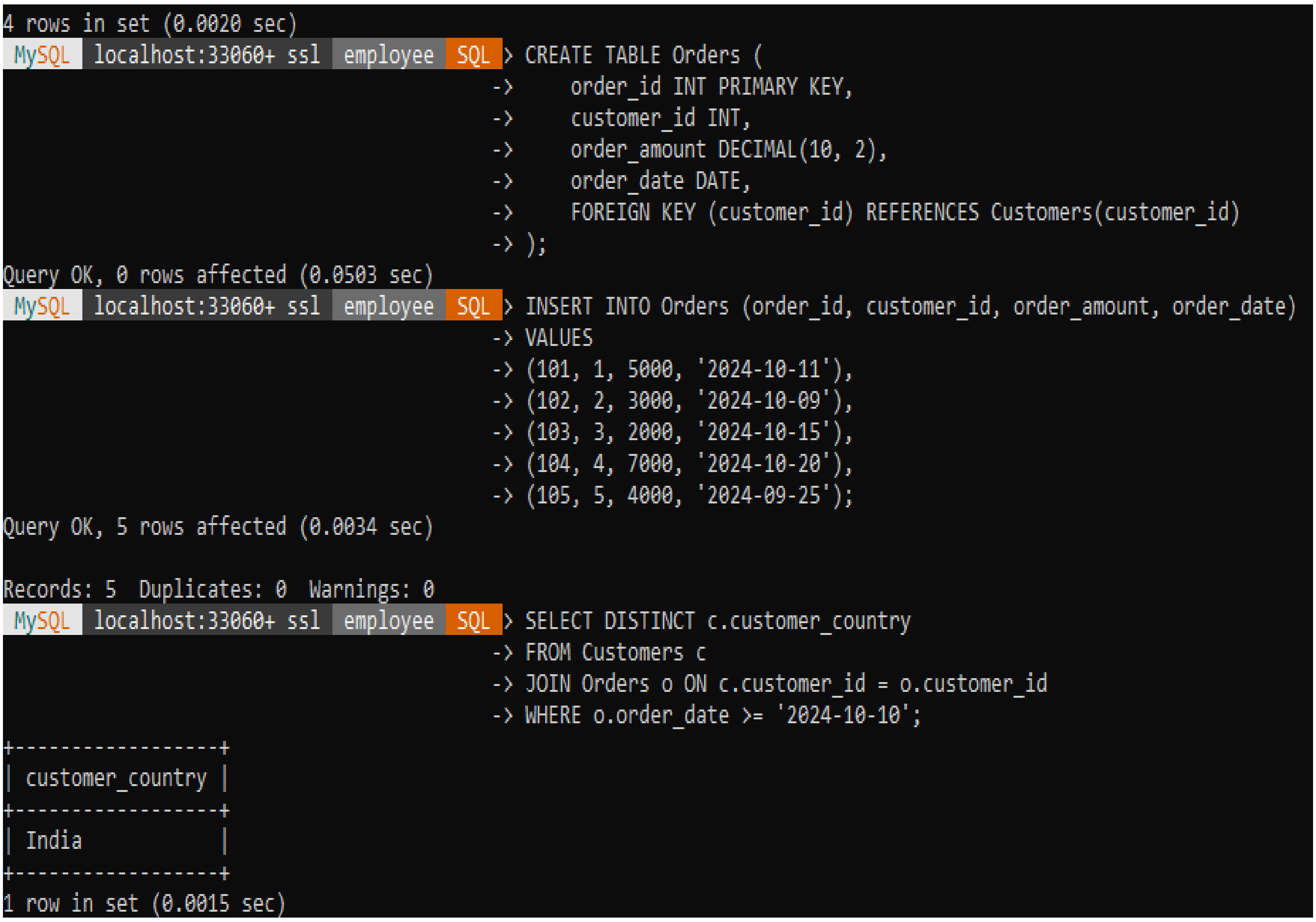


```
 MySQL  localhost:33060+ ssl  employee  SQL > CREATE TABLE Orders (
                                          ->     order_id INT PRIMARY KEY,
                                          ->     e_number INT,
                                          ->     order_amount DECIMAL(10, 2),
                                          ->     order_date DATE,
                                          ->     FOREIGN KEY (e_number) REFERENCES Emp(e_number)
                                          -> );
Query OK, 0 rows affected (0.1287 sec)
 MySQL  localhost:33060+ ssl  employee  SQL > INSERT INTO Orders (order_id, e_number, order_amount, order_date)
                                          -> VALUES
                                          -> (1, 1, 15000, '2024-01-10'),
                                          -> (2, 1, 25000, '2024-02-12'),
                                          -> (3, 2, 30000, '2024-01-15'),
                                          -> (4, 3, 5000, '2024-03-05'),
                                          -> (5, 4, 12000, '2024-02-20'),
                                          -> (6, 5, 8000, '2024-01-25');
Query OK, 6 rows affected (0.0063 sec)

Records: 6  Duplicates: 0  Warnings: 0
 MySQL  localhost:33060+ ssl  employee  SQL > SELECT Emp.e_name, Emp.e_city, Emp.salary, Emp.e_number, Emp.e_address, Emp.depttname,
                                          ->        Company.company_name, SUM(Orders.order_amount) AS total_order_amount
                                          -> FROM Emp
                                          -> JOIN Company ON Emp.e_number = Company.e_number
                                          -> JOIN Orders ON Emp.e_number = Orders.e_number
                                          -> GROUP BY Emp.e_number, Emp.e_name, Emp.e_city, Emp.salary, Emp.e_address, Emp.depttname, Company.company_name
                                          -> HAVING SUM(Orders.order_amount) > 30000;
+------------+-------+----------+----------+------------------+------------------+--------------+--------------------+
| e_name     | e_city | salary  | e_number | e_address        | depttname        | company_name | total_order_amount |
+------------+-------+----------+----------+------------------+------------------+--------------+--------------------+
| Amit Sharma | Delhi | 55000.00 |        1 | 123 Main St, Delhi | Computer Science | TCS          |           40000.00 |
+------------+-------+----------+----------+------------------+------------------+--------------+--------------------+
1 row in set (0.0018 sec)
```

• Find the Country of customers who have placed at least one order on or after 2024-10-10.

Output with Query



```
4 rows in set (0.0020 sec)
 MySQL  localhost:33060+ ssl  employee  SQL > CREATE TABLE Orders (
                                           ->     order_id INT PRIMARY KEY,
                                           ->     customer_id INT,
                                           ->     order_amount DECIMAL(10, 2),
                                           ->     order_date DATE,
                                           ->     FOREIGN KEY (customer_id) REFERENCES Customers(customer_id)
                                           -> );
Query OK, 0 rows affected (0.0503 sec)
 MySQL  localhost:33060+ ssl  employee  SQL > INSERT INTO Orders (order_id, customer_id, order_amount, order_date)
                                           -> VALUES
                                           -> (101, 1, 5000, '2024-10-11'),
                                           -> (102, 2, 3000, '2024-10-09'),
                                           -> (103, 3, 2000, '2024-10-15'),
                                           -> (104, 4, 7000, '2024-10-20'),
                                           -> (105, 5, 4000, '2024-09-25');
Query OK, 5 rows affected (0.0034 sec)

Records: 5  Duplicates: 0  Warnings: 0
 MySQL  localhost:33060+ ssl  employee  SQL > SELECT DISTINCT c.customer_country
                                           -> FROM Customers c
                                           -> JOIN Orders o ON c.customer_id = o.customer_id
                                           -> WHERE o.order_date >= '2024-10-10';
+------------------+
| customer_country |
+------------------+
| India            |
+------------------+
1 row in set (0.0015 sec)
```