Task 2 Summary Report: Advanced SQL Analysis

CodTech SQL Internship

Objective

The objective of this task is to use **advanced SQL features** such as **Window Functions**, **Subqueries**, and **CTEs (Common Table Expressions)** to perform meaningful data analysis and discover trends or patterns.

Tools Used

- MySQL Workbench – to write and run queries

Dataset Used

A table named `EmployeeSalaries` was created with the following columns:

- `emp_id` – Employee ID
- `emp_name` – Name of the employee
- `dept` – Department name
- `salary` – Monthly salary
- `joining_year` – Year of joining

Sample Data

```
(1, 'Alice', 'HR', 45000, 2020)
(2, 'Bob', 'Engineering', 70000, 2021)
(3, 'Charlie', 'Engineering', 60000, 2020)
(4, 'David', 'Marketing', 50000, 2022)
(5, 'Eve', 'HR', 48000, 2021)
(6, 'Frank', 'Engineering', 72000, 2022)
```

Queries Performed and Output Summary

1. Window Function – Rank by Salary Within Department

Query:

```
SELECT emp_name, dept, salary,
       RANK() OVER (PARTITION BY dept ORDER BY salary DESC) AS dept_rank
FROM EmployeeSalaries;
```

Explanation: This query ranks employees based on salary within each department using the RANK() window function.

Output: A list of employees with their department and rank in salary order.

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2. Subquery – Employees Earning More Than Department Average

Query:

```
SELECT emp_name, salary, dept
FROM EmployeeSalaries e
WHERE salary > (
    SELECT AVG(salary)
    FROM EmployeeSalaries
    WHERE dept = e.dept
);
```

Explanation: This query returns employees whose salary is greater than the average salary in their department.

Output: Only high earners per department are shown.

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3. CTE – Top 3 Highest Paid Employees

Query:

```
WITH RankedSalaries AS (
    SELECT emp_name, dept, salary,
           DENSE_RANK() OVER (ORDER BY salary DESC) AS sal_rank
    FROM EmployeeSalaries
)
SELECT * FROM RankedSalaries
WHERE sal_rank <= 3;
```

Explanation: This Common Table Expression first ranks employees by salary. Then it selects the top 3 earners.

Output: Top 3 highest salaried employees.

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Verification

I ran all queries in MySQL Workbench and verified the results. The output correctly matched expected patterns like:

- Salary rank within department
- Filtering above-average earners
- Getting top 3 earners using CTE and DENSE_RANK

Submitted Files

- `advanced_queries.sql` – SQL file with all queries
- `This pdf` – This report
- `output_screenshots/` – Screenshots of query outputs

Conclusion

This task helped me practice important SQL concepts like:

- **Window functions** for ranking
- **Subqueries** for conditional analysis
- **CTEs** for breaking complex queries into simple blocks

It improved my data analysis skills using SQL.

Status: Task Completed Successfully.