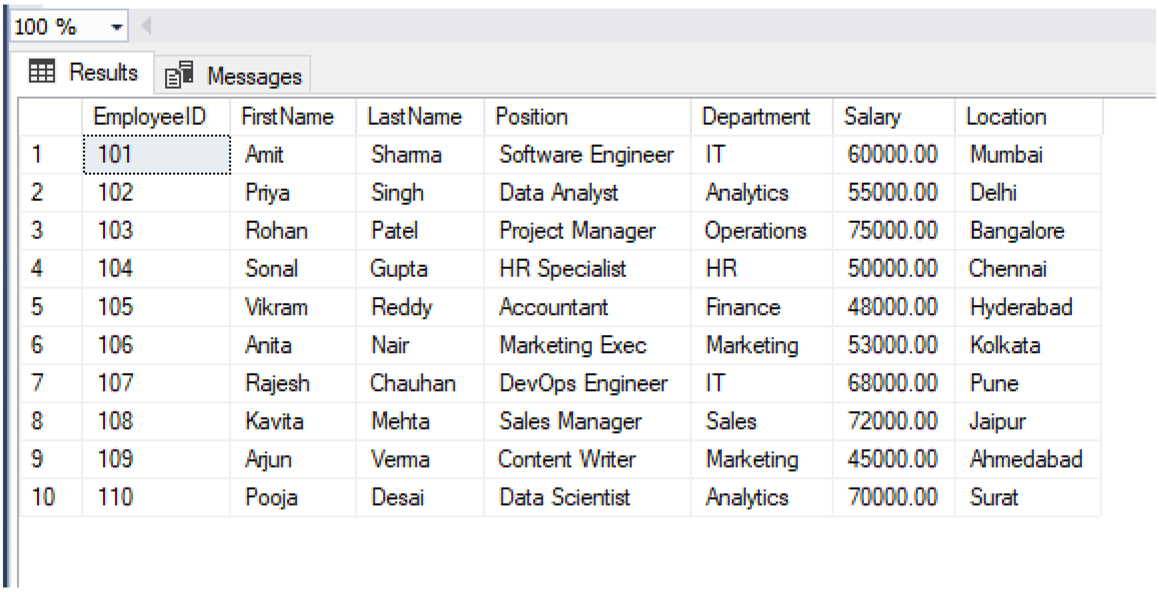
SQL-Coding Challenge

Submitted By-

Subrat Shukla, DE Batch1

Creating an 'Employee' database.

```
create database Employee;
use Employee;

--creating employee table
CREATE TABLE Employee (
    EmployeeID INT PRIMARY KEY,
    FirstName VARCHAR(50),
    LastName VARCHAR(50),
    Position VARCHAR(50),
    Department VARCHAR(50),
    Salary DECIMAL(10, 2),
    Location VARCHAR(50)
);

--inserting data values in employee table
INSERT INTO Employee (EmployeeID, FirstName, LastName, Position, Department, Salary,
Location)
VALUES
(101, 'Amit', 'Sharma', 'Software Engineer', 'IT', 60000.00, 'Mumbai'),
(102, 'Priya', 'Singh', 'Data Analyst', 'Analytics', 55000.00, 'Delhi'),
(103, 'Rohan', 'Patel', 'Project Manager', 'Operations', 75000.00, 'Bangalore'),
(104, 'Sonal', 'Gupta', 'HR Specialist', 'HR', 50000.00, 'Chennai'),
(105, 'Vikram', 'Reddy', 'Accountant', 'Finance', 48000.00, 'Hyderabad'),
(106, 'Anita', 'Nair', 'Marketing Exec', 'Marketing', 53000.00, 'Kolkata'),
(107, 'Rajesh', 'Chauhan', 'DevOps Engineer', 'IT', 68000.00, 'Pune'),
(108, 'Kavita', 'Mehta', 'Sales Manager', 'Sales', 72000.00, 'Jaipur'),
(109, 'Arjun', 'Verma', 'Content Writer', 'Marketing', 45000.00, 'Ahmedabad'),
(110, 'Pooja', 'Desai', 'Data Scientist', 'Analytics', 70000.00, 'Surat');

select *from Employee;
```



	EmployeeID	FirstName	LastName	Position	Department	Salary	Location
1	101	Amit	Sharma	Software Engineer	IT	60000.00	Mumbai
2	102	Priya	Singh	Data Analyst	Analytics	55000.00	Delhi
3	103	Rohan	Patel	Project Manager	Operations	75000.00	Bangalore
4	104	Sonal	Gupta	HR Specialist	HR	50000.00	Chennai
5	105	Vikram	Reddy	Accountant	Finance	48000.00	Hyderabad
6	106	Anita	Nair	Marketing Exec	Marketing	53000.00	Kolkata
7	107	Rajesh	Chauhan	DevOps Engineer	IT	68000.00	Pune
8	108	Kavita	Mehta	Sales Manager	Sales	72000.00	Jaipur
9	109	Arjun	Verma	Content Writer	Marketing	45000.00	Ahmedabad
10	110	Pooja	Desai	Data Scientist	Analytics	70000.00	Surat

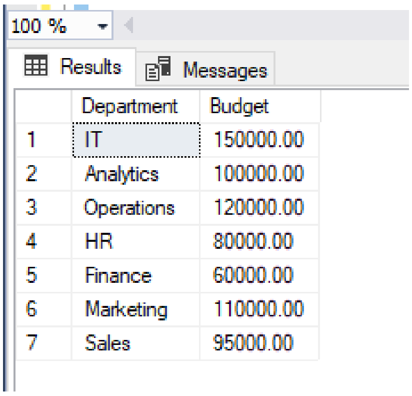
1. Querying Data by Using Joins and Subqueries

- **Join :** A JOIN in SQL combines rows from two or more tables based on a related column, allowing you to retrieve data from multiple tables in a single query. Different types of joins, like INNER JOIN, LEFT JOIN, and RIGHT JOIN, control how the tables are merged based on matching or non-matching rows.
- **Subquery :** A Subquery is a query nested within another query, which can be used to perform operations like comparisons, calculations, or filters. Subqueries are often used to retrieve data that will be used in the main query for further filtering or aggregation.
- **Subtotal :** A Subtotal is a calculated summary of a subset of data, typically grouped by a specific field, like a department's total salary or the count of employees in each location. Subtotals help in breaking down large datasets to show summaries for distinct groups within the data.

We have two tables:

- Employee (already defined) and
- DepartmentBudget, which contains the department budgets for each department.

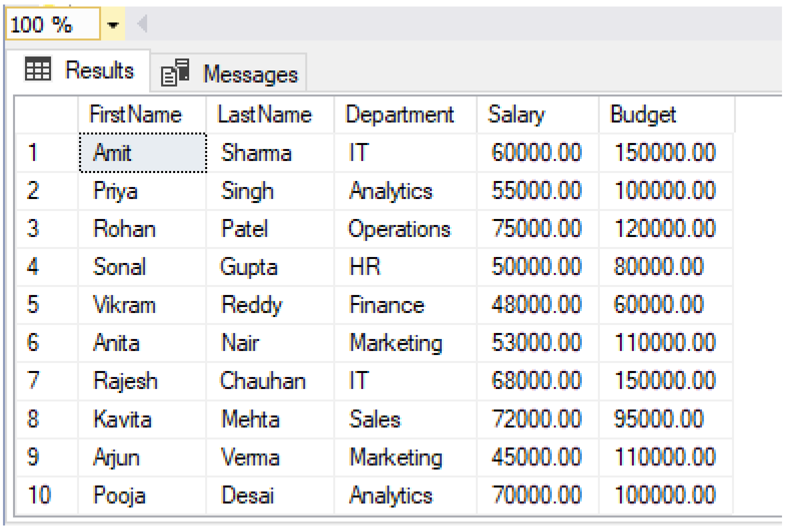
```
-- creating a table departmentbudget
CREATE TABLE DepartmentBudget (
    Department VARCHAR(50),
    Budget DECIMAL(10, 2)
);

--inserting data values into it
INSERT INTO DepartmentBudget (Department, Budget)
VALUES
('IT', 150000.00),
('Analytics', 100000.00),
('Operations', 120000.00),
('HR', 80000.00),
('Finance', 60000.00),
('Marketing', 110000.00),
('Sales', 95000.00);

select *from DepartmentBudget;
```



	Department	Budget
1	IT	150000.00
2	Analytics	100000.00
3	Operations	120000.00
4	HR	80000.00
5	Finance	60000.00
6	Marketing	110000.00
7	Sales	95000.00

Query 1.1: Display each employee’s name, department, salary, and the department budget (using a JOIN).

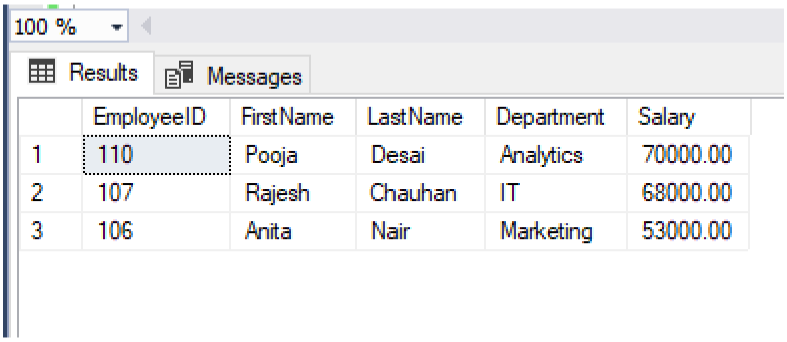
```
SELECT e.FirstName, e.LastName, e.Department, e.Salary, d.Budget
FROM Employee e
INNER JOIN DepartmentBudget d ON e.Department = d.Department;
```



	FirstName	LastName	Department	Salary	Budget
1	Amit	Sharma	IT	60000.00	150000.00
2	Priya	Singh	Analytics	55000.00	100000.00
3	Rohan	Patel	Operations	75000.00	120000.00
4	Sonal	Gupta	HR	50000.00	80000.00
5	Vikram	Reddy	Finance	48000.00	60000.00
6	Anita	Nair	Marketing	53000.00	110000.00
7	Rajesh	Chauhan	IT	68000.00	150000.00
8	Kavita	Mehta	Sales	72000.00	95000.00
9	Arjun	Verma	Marketing	45000.00	110000.00
10	Pooja	Desai	Analytics	70000.00	100000.00

Query 1.2: List employees whose salary is greater than the average salary of all employees in their department (using a subquery).

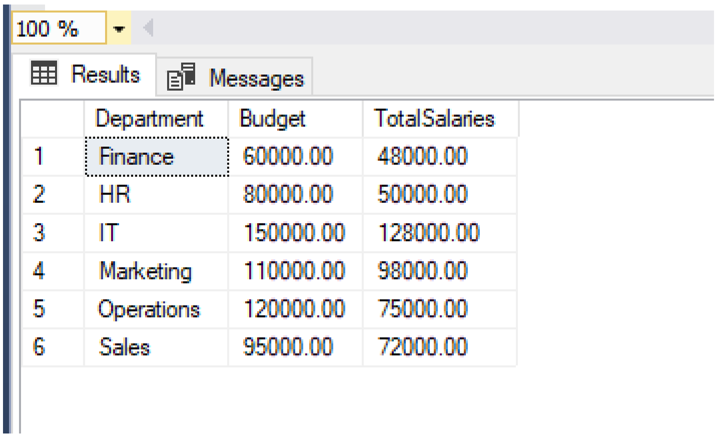
```
SELECT EmployeeID, FirstName, LastName, Department, Salary
FROM Employee e
WHERE Salary > (SELECT AVG(Salary) FROM Employee WHERE Department = e.Department);
```



	EmployeeID	FirstName	LastName	Department	Salary
1	110	Pooja	Desai	Analytics	70000.00
2	107	Rajesh	Chauhan	IT	68000.00
3	106	Anita	Nair	Marketing	53000.00

Query 1.3: Find departments where the total salary of employees is less than the department budget (using a JOIN and GROUP BY).

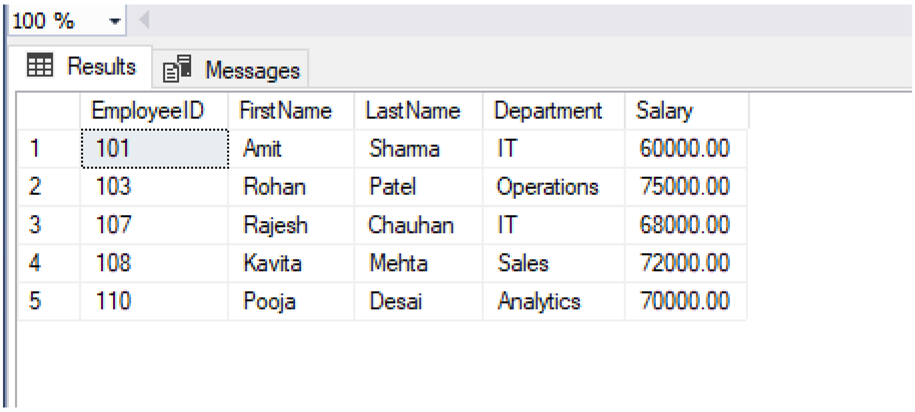
```
SELECT e.Department, d.Budget, SUM(e.Salary) AS TotalSalaries
FROM Employee e
INNER JOIN DepartmentBudget d ON e.Department = d.Department
GROUP BY e.Department, d.Budget
HAVING SUM(e.Salary) < d.Budget;
```



	Department	Budget	TotalSalaries
1	Finance	60000.00	48000.00
2	HR	80000.00	50000.00
3	IT	150000.00	128000.00
4	Marketing	110000.00	98000.00
5	Operations	120000.00	75000.00
6	Sales	95000.00	72000.00

Query 1.4: Show employees with salaries higher than the average salary of all employees (using a subquery).

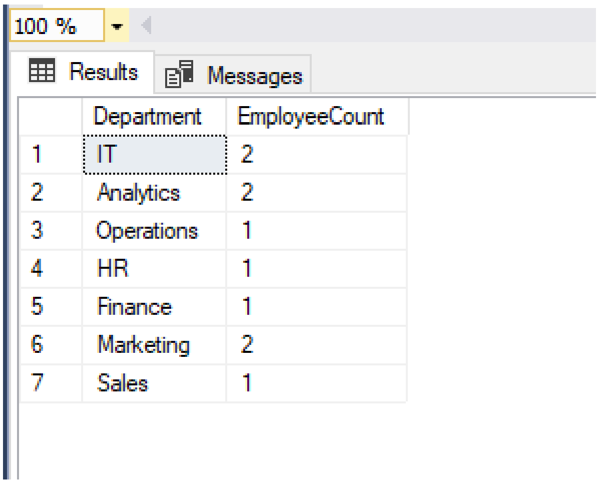
```
SELECT EmployeeID, FirstName, LastName, Department, Salary
FROM Employee
WHERE Salary > (SELECT AVG(Salary) FROM Employee);
```



	EmployeeID	FirstName	LastName	Department	Salary
1	101	Amit	Sharma	IT	60000.00
2	103	Rohan	Patel	Operations	75000.00
3	107	Rajesh	Chauhan	IT	68000.00
4	108	Kavita	Mehta	Sales	72000.00
5	110	Pooja	Desai	Analytics	70000.00

Query 1.5: Display each department's name and the number of employees in it (using a subquery to get the count).

```
SELECT d.Department, (SELECT COUNT(*) FROM Employee e
WHERE e.Department = d.Department) AS EmployeeCount
FROM DepartmentBudget d;
```



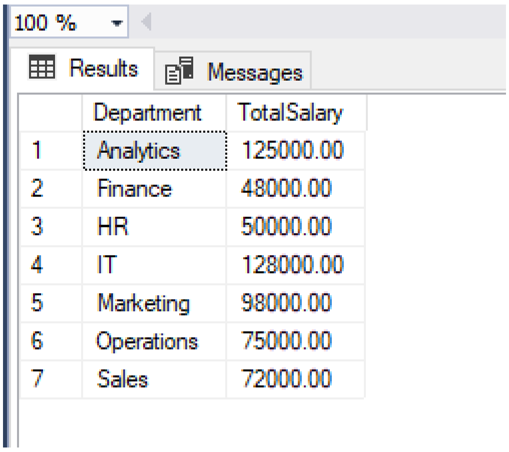
	Department	EmployeeCount
1	IT	2
2	Analytics	2
3	Operations	1
4	HR	1
5	Finance	1
6	Marketing	2
7	Sales	1

2. Manipulating Data by Using GROUP BY and HAVING Clauses

- **GroupBy :** The GROUP BY clause in SQL is used to arrange identical data into groups based on one or more columns, enabling aggregate functions like SUM, COUNT, or AVG to be applied to each group individually. This is particularly useful for generating summaries and reports that categorize data by specific attributes.
- **Having :** The HAVING clause is used in conjunction with GROUP BY to filter groups based on a specified condition, allowing you to include only those groups that meet certain criteria. Unlike the WHERE clause, which filters rows before grouping, HAVING filters groups after the aggregation has been performed.

Query 2.1: Calculate the total salary expense by department.

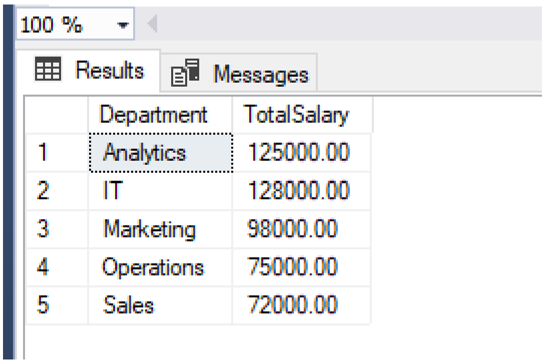
```sql
SELECT Department, SUM(Salary) AS TotalSalary
FROM Employee
GROUP BY Department;
```



	Department	TotalSalary
1	Analytics	125000.00
2	Finance	48000.00
3	HR	50000.00
4	IT	128000.00
5	Marketing	98000.00
6	Operations	75000.00
7	Sales	72000.00

Query 2.2: Find departments with a total salary expense greater than 70,000.

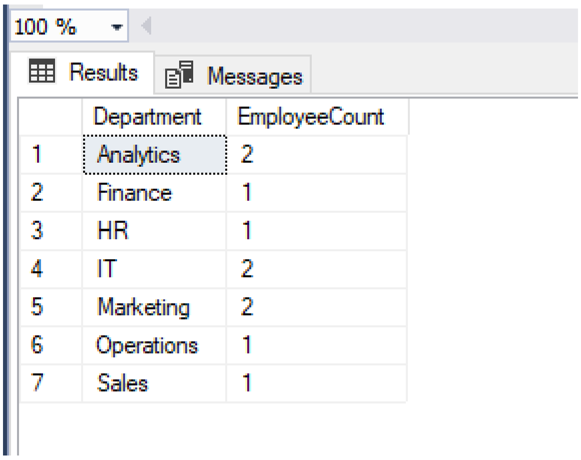
```sql
SELECT Department, SUM(Salary) AS TotalSalary
FROM Employee
GROUP BY Department
HAVING SUM(Salary) > 70000;
```



	Department	TotalSalary
1	Analytics	125000.00
2	IT	128000.00
3	Marketing	98000.00
4	Operations	75000.00
5	Sales	72000.00

Query 2.3: Count the number of employees in each department.

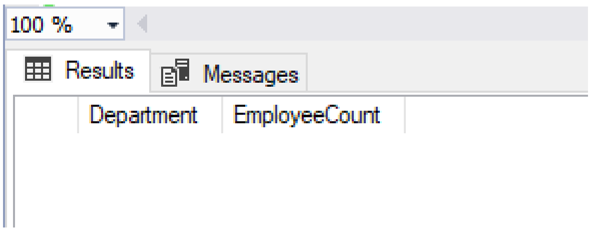
```
SELECT Department, COUNT(EmployeeID) AS EmployeeCount
FROM Employee
GROUP BY Department;
```



	Department	EmployeeCount
1	Analytics	2
2	Finance	1
3	HR	1
4	IT	2
5	Marketing	2
6	Operations	1
7	Sales	1

Query 2.4: Find departments with more than 2 employees.

```
SELECT Department, COUNT(EmployeeID) AS EmployeeCount
FROM Employee
GROUP BY Department
HAVING COUNT(EmployeeID) > 2;
```

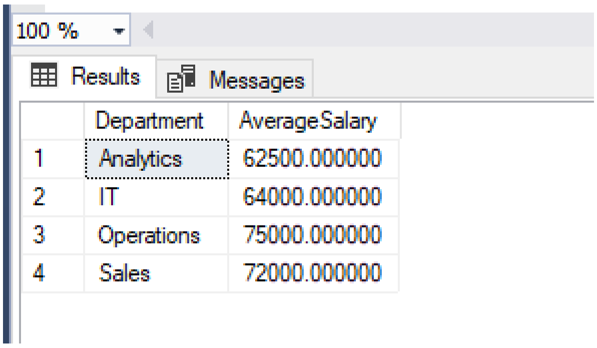


	Department	EmployeeCount

showing null, because every department has maximum 2 employees.

Query 2.5: Find the average salary for each department and display only those with an average salary above 50,000.

```
SELECT Department, AVG(Salary) AS AverageSalary
FROM Employee
GROUP BY Department
HAVING AVG(Salary) > 50000;
```



	Department	AverageSalary
1	Analytics	62500.000000
2	IT	64000.000000
3	Operations	75000.000000
4	Sales	72000.000000