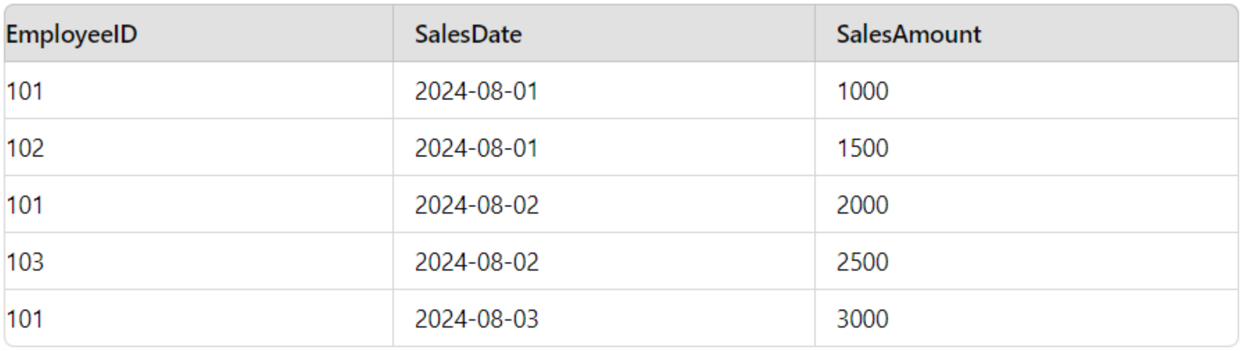
# IMPORTANT SQL INTERVIEW QUESTIONS

**Order of execution in an SQL query:-**

1. **FROM /Join**
2. **WHERE**
3. **GROUP BY**
4. **HAVING**
5. **SELECT**
6. **DISTINCT**
7. **ORDER BY**
8. **LIMIT / OFFSET**

**Question 1:** Write a SQL query to calculate the cumulative sum of sales for each employee. The query should return the EmployeeID, SalesDate, and CumulativeSales columns, with the final output ordered by EmployeeID.



| EmployeeID | SalesDate | SalesAmount |
|---|---|---|
| 101 | 2024-08-01 | 1000 |
| 102 | 2024-08-01 | 1500 |
| 101 | 2024-08-02 | 2000 |
| 103 | 2024-08-02 | 2500 |
| 101 | 2024-08-03 | 3000 |

**Solution -**

```
SELECT
   EmployeeID,
   SalesDate,
   SUM(SalesAmount) OVER (PARTITION BY EmployeeID
ORDER BY SalesDate) AS CumulativeSales
```

```
FROM Employee
ORDER BY
   EmployeeID;
```

Solution Explanation by Execution steps:-

Step 1 -> **FROM - Employee Table**

| EmployeeID | SalesDate | SalesAmount |
|---|---|---|
| 101 | 2024-08-01 | 1000 |
| 102 | 2024-08-01 | 1500 |
| 101 | 2024-08-02 | 2000 |
| 103 | 2024-08-02 | 2500 |
| 101 | 2024-08-03 | 3000 |

Step 2 -> **PARTITION BY EmployeeID and ORDER BY SalesDate**

- Partition for EmployeeID = 101 (Ordered by SalesDate):

| EmployeeID | SalesDate | SalesAmount |
|---|---|---|
| 101 | 2024-08-01 | 1000 |
| 101 | 2024-08-02 | 2000 |
| 101 | 2024-08-03 | 3000 |

- Partition for EmployeeID = 102 (Ordered by SalesDate):

| EmployeeID | SalesDate | SalesAmount |
|---|---|---|
| 102 | 2024-08-01 | 1500 |

- Partition for EmployeeID = 103 (Ordered by SalesDate):

| EmployeeID | SalesDate | SalesAmount |
|---|---|---|
| 103 | 2024-08-02 | 2500 |

## Step 3: **Cumulative Sum Calculation (SUM() OVER) As New Column (CumulativeSales)-**

- Partition for EmployeeID = 101:

| EmployeeID | SalesDate | SalesAmount | CumulativeSales |
|---|---|---|---|
| 101 | 2024-08-01 | 1000 | 1000 |
| 101 | 2024-08-02 | 2000 | 3000 |
| 101 | 2024-08-03 | 3000 | 6000 |

- Partition for EmployeeID = 102:

| EmployeeID | SalesDate | SalesAmount | CumulativeSales |
|---|---|---|---|
| 102 | 2024-08-01 | 1500 | 1500 |

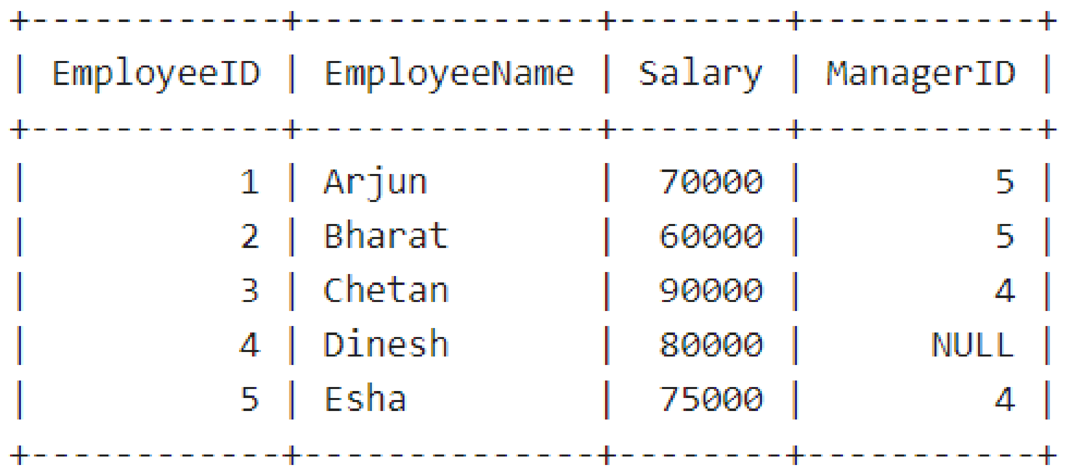
- Partition for EmployeeID = 103:

| EmployeeID | SalesDate | SalesAmount | CumulativeSales |
|---|---|---|---|
| 103 | 2024-08-02 | 2500 | 2500 |

**Final Output Ordered by EmployeeID and By Only Selecting Required 3 columns (**EmployeeID, SalesDate, CumulativeSales**):-**

| EmployeeID | SalesDate | CumulativeSales |
|---|---|---|
| 101 | 2024-08-01 | 1000 |
| 101 | 2024-08-02 | 3000 |
| 101 | 2024-08-03 | 6000 |
| 102 | 2024-08-01 | 1500 |
| 103 | 2024-08-02 | 2500 |

**Question 2:** Write a SQL query to find employees who have a salary greater than their manager's salary from the **`Employee`** table.



```
+------------+--------------+--------+-----------+
| EmployeeID | EmployeeName | Salary | ManagerID |
+------------+--------------+--------+-----------+
|          1 | Arjun        |  70000 |         5 |
|          2 | Bharat       |  60000 |         5 |
|          3 | Chetan       |  90000 |         4 |
|          4 | Dinesh       |  80000 |      NULL |
|          5 | Esha         |  75000 |         4 |
+------------+--------------+--------+-----------+
```

**Solution -**

```
SELECT
   e1.EmployeeID AS e1_EmployeeID,
   e1.EmployeeName AS e1_EmployeeName,
   e1.Salary AS e1_Salary
FROM
   Employee e1
JOIN
   Employee e2
ON
   e1.ManagerID = e2.EmployeeID
WHERE
   e1.Salary > e2.Salary;
```

Solution Explanation by Execution steps:-

**Step 1 -> FROM  - Employee Table**

```
+------------+--------------+--------+-----------+
| EmployeeID | EmployeeName | Salary | ManagerID |
+------------+--------------+--------+-----------+
|          1 | Arjun        |  70000 |         5 |
|          2 | Bharat       |  60000 |         5 |
|          3 | Chetan       |  90000 |         4 |
|          4 | Dinesh       |  80000 |      NULL |
|          5 | Esha         |  75000 |         4 |
+------------+--------------+--------+-----------+
```

Step 2 -> **JOIN Clause -  e1.ManagerID = e2.EmployeeID**

The **`JOIN`** clause links the **`Employee`** table (as **`e1`**) with itself (as `e2`) based on the **`ManagerID`**. This means for each employee in **`e1`**, we find the corresponding manager in **`e2`**.

```
+---------------+-----------------+-----------+--------------+---------------+-----------------+-----------+--------------+
| e1_EmployeeID | e1_EmployeeName | e1_Salary | e1_ManagerID | e2_EmployeeID | e2_EmployeeName | e2_Salary | e2_ManagerID |
+---------------+-----------------+-----------+--------------+---------------+-----------------+-----------+--------------+
|             5 | Esha            |     75000 |            4 |             4 | Dinesh          |     80000 |         NULL |
|             3 | Chetan          |     90000 |            4 |             4 | Dinesh          |     80000 |         NULL |
|             2 | Bharat          |     60000 |            5 |             5 | Esha            |     75000 |            4 |
|             1 | Arjun           |     70000 |            5 |             5 | Esha            |     75000 |            4 |
+---------------+-----------------+-----------+--------------+---------------+-----------------+-----------+--------------+
```

**Step 3: WHERE Clause - e1.Salary > e2.Salary**

The **WHERE** clause filters the rows where the employee's salary (**e1.Salary**) is greater than their manager's salary (**e2.Salary**).

```
+--------------+----------------+-----------+--------------+--------------+----------------+-----------+--------------+
| e1_EmployeeID | e1_EmployeeName | e1_Salary | e1_ManagerID | e2_EmployeeID | e2_EmployeeName | e2_Salary | e2_ManagerID |
+--------------+----------------+-----------+--------------+--------------+----------------+-----------+--------------+
|            3 | Chetan         |     90000 |            4 |            4 | Dinesh         |     80000 |         NULL |
+--------------+----------------+-----------+--------------+--------------+----------------+-----------+--------------+
```

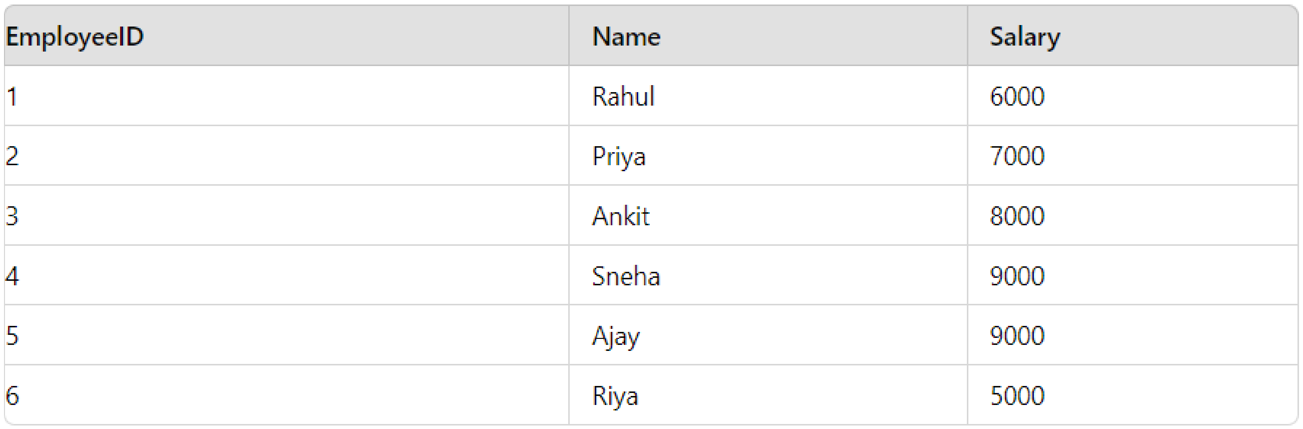
**Step 4: SELECT Clause - SELECT** e1.EmployeeID **AS** e1_EmployeeID, e1.EmployeeName **AS** e1_EmployeeName, e1.Salary **AS** e1_Salary

The **SELECT** clause retrieves the **EmployeeID**, **EmployeeName**, and **Salary** columns for employees who meet the condition.

**Final Output:-**

```
+---------------+-----------------+-----------+
| e1_EmployeeID | e1_EmployeeName | e1_Salary |
+---------------+-----------------+-----------+
|             3 | Chetan          |     90000 |
+---------------+-----------------+-----------+
```

**Question 3:** Given a table **Employees**, write a query to find the third highest salary.

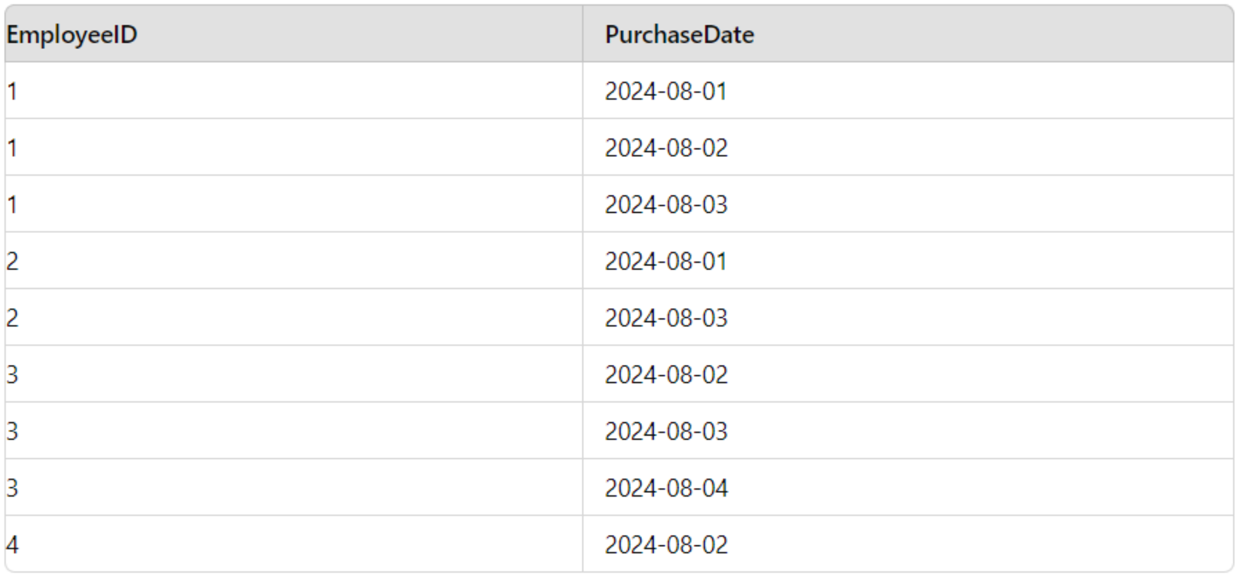


| EmployeeID | Name | Salary |
|---|---|---|
| 1 | Rahul | 6000 |
| 2 | Priya | 7000 |
| 3 | Ankit | 8000 |
| 4 | Sneha | 9000 |
| 5 | Ajay | 9000 |
| 6 | Riya | 5000 |

## Solution -

```
WITH SalaryRank AS (
   SELECT Salary,
          DENSE_RANK() OVER (ORDER BY Salary DESC) AS SalaryRank
   FROM Employees
)
SELECT Salary
FROM SalaryRank
WHERE SalaryRank = 3;
```

**Question 4:** Given a table **Purchases**, write a query to find employees who bought a product for at least 3 consecutive days.



| EmployeeID | PurchaseDate |
|---|---|
| 1 | 2024-08-01 |
| 1 | 2024-08-02 |
| 1 | 2024-08-03 |
| 2 | 2024-08-01 |
| 2 | 2024-08-03 |
| 3 | 2024-08-02 |
| 3 | 2024-08-03 |
| 3 | 2024-08-04 |
| 4 | 2024-08-02 |

## Solution -

```
SELECT DISTINCT p1.EmployeeID
FROM Purchases p1
JOIN Purchases p2 ON p1.EmployeeID = p2.EmployeeID
   AND DATE_ADD(p1.PurchaseDate, INTERVAL 1 DAY) = p2.PurchaseDate
JOIN Purchases p3 ON p2.EmployeeID = p3.EmployeeID
   AND DATE_ADD(p2.PurchaseDate, INTERVAL 1 DAY) = p3.PurchaseDate;
```