**1. Ranking Employees by Department**

**Scenario**: You work in HR analytics. Your manager wants to see the top 3 highest-paid employees per department.

**Task**:  
Write a query to return the top 3 earners in each department, including their rank and total department salary.

**Table**:  
employees(emp\_id, name, department, salary)

**2. Missing Customers Follow-up**

**Scenario**: The sales team wants to reach out to potential customers who haven't placed any orders in the last year.

**Task**:  
Return the list of customers who have **never placed an order** in the past 365 days.

**Tables**:

* customers(customer\_id, name, registered\_on)
* orders(order\_id, customer\_id, order\_date)

**3. Update or Insert Promotions**

**Scenario**: Marketing has sent a new list of customer discount codes. You need to insert new codes or update existing ones.

**Task**:  
Write a MERGE statement to upsert rows from promotions\_new into promotions.

**Tables**:

* promotions(customer\_id, discount\_code)
* promotions\_new(customer\_id, discount\_code)

**4. Cumulative Sales Trend**

**Scenario**: Management wants to see month-over-month cumulative revenue.

**Task**:  
Write a query to show for each month the monthly\_total and cumulative\_total sales.

**Table**:  
sales(sale\_id, sale\_date, amount)

**5. Identify Salary Reductions**

**Scenario**: A compensation audit needs a list of employees whose salary was reduced.

**Task**:  
Use a **trigger** to log any salary reduction into a separate table named salary\_audit.

**Table**:  
employees(emp\_id, name, salary)

**6. Show Salary Change Over Time**

**Scenario**: You need to create a **view** showing the difference in salary for each employee between two time periods.

**Task**:  
Create a view salary\_change that shows:  
emp\_id, name, salary\_jan\_2024, salary\_jan\_2025, delta.

**Table**:  
salaries(emp\_id, salary, effective\_date)

**7. Find Phantom Reads**

**Scenario**: You're testing a new reporting tool and want to simulate phantom reads.

**Task**:  
Demonstrate phantom reads using two sessions and show how **isolation levels** like REPEATABLE READ and SERIALIZABLE affect results.

**8. Deduplicate Recent Payments**

**Scenario**: Some customers accidentally paid twice within a minute.

**Task**:  
Write a query to find all **duplicate payments** made by the same user within **1 minute** of each other.

**Table**:  
payments(payment\_id, user\_id, amount, paid\_at)

**9. Product Activity Report**

**Scenario**: Your warehouse team wants to see the total number of orders per product and the date of the last order.

**Task**:  
Create a **materialized view** product\_order\_summary with:  
product\_id, total\_orders, last\_order\_date

**Tables**:

* orders(order\_id, order\_date)
* order\_items(order\_id, product\_id, quantity)

**10. Identify Lead to Conversion Funnel Drop**

**Scenario**: You want to know which leads reached the proposal stage but didn’t convert.

**Task**:  
Find lead\_ids that exist in the proposals table but not in the sales table.

**Tables**:

* leads(lead\_id, name)
* proposals(lead\_id)
* sales(lead\_id)