Problem 3482: Analyze Organization Hierarchy

Problem Information

Difficulty: Hard
Acceptance Rate: 0.00%
Paid Only: No

Problem Description

Table:

Employees

+----------------+---------+ | Column Name | Type | +----------------+---------+ | employee_id | int | | employee_name | varchar | | manager_id | int | | salary | int | | department | varchar | +----------------+----------+ employee_id is the unique key for this table. Each row contains information about an employee, including their ID, name, their manager's ID, salary, and department. manager_id is null for the top-level manager (CEO).

Write a solution to analyze the organizational hierarchy and answer the following:

Hierarchy Levels:

For each employee, determine their level in the organization (CEO is level

1

, employees reporting directly to the CEO are level

2

, and so on).

Team Size:

For each employee who is a manager, count the total number of employees under them (direct and indirect reports).

Salary Budget:

For each manager, calculate the total salary budget they control (sum of salaries of all employees under them, including indirect reports, plus their own salary).

Return

the result table ordered by

the result ordered by

level

in

ascending

order, then by

budget

in

descending

order, and finally by

employee_name

in

ascending

order

.

The result format is in the following example.

Example:

Input:

Employees table:

+-------------+---------------+------------+--------+-------------+ | employee_id | employee_name | manager_id | salary | department | +-------------+---------------+------------+--------+-------------+ | 1 | Alice | null | 12000 | Executive | | 2 | Bob | 1 | 10000 | Sales | | 3 | Charlie | 1 | 10000 | Engineering | | 4 | David | 2 | 7500 | Sales | | 5 | Eva | 2 | 7500 | Sales | | 6 | Frank | 3 | 9000 | Engineering | | 7 | Grace | 3 | 8500 | Engineering | | 8 | Hank | 4 | 6000 | Sales | | 9 | Ivy | 6 | 7000 | Engineering | | 10 | Judy | 6 | 7000 | Engineering | +-------------+---------------+------------+--------+-------------+

Output:

+-------------+---------------+-------+-----------+--------+ | employee_id | employee_name | level | team_size | budget | +-------------+---------------+-------+-----------+--------+ | 1 | Alice | 1 | 9 | 84500 | | 3 | Charlie | 2 | 4 | 41500 | | 2 | Bob | 2 | 3 | 31000 | | 6 | Frank | 3 | 2 | 23000 | | 4 | David | 3 | 1 | 13500 | | 7 | Grace | 3 | 0 | 8500 | | 5 | Eva | 3 | 0 | 7500 | | 9 | Ivy | 4 | 0 | 7000 | | 10 | Judy | 4 | 0 | 7000 | | 8 | Hank | 4 | 0 | 6000 | +-------------+---------------+-------+-----------+--------+

Explanation:

Organization Structure:

Alice (ID: 1) is the CEO (level 1) with no manager

Bob (ID: 2) and Charlie (ID: 3) report directly to Alice (level 2)

David (ID: 4), Eva (ID: 5) report to Bob, while Frank (ID: 6) and Grace (ID: 7) report to Charlie (level 3)

Hank (ID: 8) reports to David, and Ivy (ID: 9) and Judy (ID: 10) report to Frank (level 4)

Level Calculation:

The CEO (Alice) is at level 1

Each subsequent level of management adds 1 to the level

Team Size Calculation:

Alice has 9 employees under her (the entire company except herself)

Bob has 3 employees (David, Eva, and Hank)

Charlie has 4 employees (Frank, Grace, Ivy, and Judy)

David has 1 employee (Hank)

Frank has 2 employees (Ivy and Judy)

Eva, Grace, Hank, Ivy, and Judy have no direct reports (team_size = 0)

Budget Calculation:

Alice's budget: Her salary (12000) + all employees' salaries (72500) = 84500

Charlie's budget: His salary (10000) + Frank's budget (23000) + Grace's salary (8500) = 41500

Bob's budget: His salary (10000) + David's budget (13500) + Eva's salary (7500) = 31000

Frank's budget: His salary (9000) + Ivy's salary (7000) + Judy's salary (7000) = 23000

David's budget: His salary (7500) + Hank's salary (6000) = 13500

Employees with no direct reports have budgets equal to their own salary

Note:

The result is ordered first by level in ascending order

Within the same level, employees are ordered by budget in descending order then by name in ascending order

Code Snippets

MySQL:

```
# Write your MySQL query statement below
```

MS SQL Server:

```
/* Write your T-SQL query statement below */
```

PostgreSQL:

```
-- Write your PostgreSQL query statement below
```

Oracle:

```
/* Write your PL/SQL query statement below */
```

Pandas:

```
import pandas as pd

def analyze_organization_hierarchy(employees: pd.DataFrame) -> pd.DataFrame:
```

Solutions

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