Problem 3156: Employee Task Duration and Concurrent Tasks

Problem Information

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

Problem Description

Table:

Tasks

+---------------+----------+ | Column Name | Type | +---------------+----------+ | task_id | int | | employee_id | int | | start_time | datetime | | end_time | datetime | +---------------+----------+ (task_id, employee_id) is the primary key for this table. Each row in this table contains the task identifier, the employee identifier, and the start and end times of each task.

Write a solution to find the

total duration

of tasks for

each

employee and the

maximum number of concurrent tasks

an employee handled at

any point in time

. The total duration should be

rounded down

to the nearest number of

full hours

.

Return

the result table ordered by

employee_id

ascending

order

.

The result format is in the following example.

Example:

Input:

Tasks table:

```
+---------+-------------+---------------------+---------------------+
| task_id | employee_id | start_time          | end_time            |
+---------+-------------+---------------------+---------------------+
| 1       | 1001        | 2023-05-01 08:00:00 | 2023-05-01 09:00:00 |
| 2       | 1001        | 2023-05-01 08:30:00 | 2023-05-01 10:30:00 |
| 3       | 1001        | 2023-05-01 11:00:00 | 2023-05-01 12:00:00 |
| 7       | 1001        | 2023-05-01 13:00:00 | 2023-05-01 15:30:00 |
| 4       | 1002        | 2023-05-01 09:00:00 | 2023-05-01 10:00:00 |
| 5       | 1002        | 2023-05-01 09:30:00 | 2023-05-01 11:30:00 |
| 6       | 1003        | 2023-05-01 14:00:00 | 2023-05-01 16:00:00 |
+---------+-------------+---------------------+---------------------+
```

Output:

employee_id	total_task_hours	max_concurrent_tasks
1001	6	2
1002	2	2
1003	2	1

Explanation:

For employee ID 1001:

Task 1 and Task 2 overlap from 08:30 to 09:00 (30 minutes).

Task 7 has a duration of 150 minutes (2 hours and 30 minutes).

Total task time: 60 (Task 1) + 120 (Task 2) + 60 (Task 3) + 150 (Task 7) - 30 (overlap) = 360 minutes = 6 hours.

Maximum concurrent tasks: 2 (during the overlap period).

For employee ID 1002:

Task 4 and Task 5 overlap from 09:30 to 10:00 (30 minutes).

Total task time: 60 (Task 4) + 120 (Task 5) - 30 (overlap) = 150 minutes = 2 hours and 30 minutes.

Total task hours (rounded down): 2 hours.

Maximum concurrent tasks: 2 (during the overlap period).

For employee ID 1003:

No overlapping tasks.

Total task time: 120 minutes = 2 hours.

Maximum concurrent tasks: 1.

Note:

Output table is ordered by employee_id 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 find_total_duration(tasks: pd.DataFrame) -> pd.DataFrame:
```

Solutions

MySQL Solution:

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Oracle Solution:

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/* Write your PL/SQL query statement below */
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Pandas Solution:

```python
import pandas as pd

def find_total_duration(tasks: pd.DataFrame) -> pd.DataFrame:
```