Problem 3601: Find Drivers with Improved Fuel Efficiency

Problem Information

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

Problem Description

Table:

drivers

```
+-------------+---------+
| Column Name | Type    |
+-------------+---------+
| driver_id   | int     |
| driver_name | varchar |
+-------------+---------+
```
driver_id is the unique identifier for this table. Each row contains information about a driver.

Table:

trips

```
+---------------+---------+
| Column Name   | Type    |
+---------------+---------+
| trip_id       | int     |
| driver_id     | int     |
| trip_date     | date    |
| distance_km   | decimal |
| fuel_consumed | decimal |
+---------------+---------+
```
trip_id is the unique identifier for this table. Each row represents a trip made by a driver, including the distance traveled and fuel consumed for that trip.

Write a solution to find drivers whose

fuel efficiency has improved

by

comparing

their average fuel efficiency in the

first half

of the year with the

second half

of the year.

Calculate

fuel efficiency

as

distance_km / fuel_consumed

for

each

trip

First half

: January to June,

Second half

: July to December

Only include drivers who have trips in

both halves

of the year

Calculate the

efficiency improvement

as (

second_half_avg - first_half_avg

)

Round

all

results

to

2

decimal

places

Return

the result table ordered by efficiency improvement in

descending

order, then by driver name in

ascending

order

.

The result format is in the following example.

Example:

Input:

drivers table:

+----------+---------------+ | driver_id | driver_name | +----------+---------------+ | 1 | Alice Johnson | | 2 | Bob Smith | | 3 | Carol Davis | | 4 | David Wilson | | 5 | Emma Brown | +----------+---------------+

trips table:

+---------+-----------+-----------+------------+---------------+ | trip_id | driver_id | trip_date | distance_km | fuel_consumed | +---------+-----------+-----------+------------+---------------+ | 1 | 1 | 2023-02-15 | 120.5 | 10.2 | | 2 | 1 | 2023-03-20 | 200.0 | 16.5 | | 3 | 1 | 2023-08-10 | 150.0 | 11.0 | | 4 | 1 | 2023-09-25 | 180.0 | 12.5 | | 5 | 2 | 2023-01-10 | 100.0 | 9.0 | | 6 | 2 | 2023-04-15 | 250.0 | 22.0 | | 7 | 2 | 2023-10-05 | 200.0 | 15.0 | | 8 | 3 | 2023-03-12 | 80.0 | 8.5 | | 9 | 3 | 2023-05-18 | 90.0 | 9.2 | | 10 | 4 | 2023-07-22 | 160.0 | 12.8 | | 11 | 4 | 2023-11-30 | 140.0 | 11.0 | | 12 | 5 | 2023-02-28 | 110.0 | 11.5 | +---------+-----------+-----------+------------+---------------+

Output:

+----------+---------------+----------------+----------------+-----------------------+ | driver_id | driver_name | first_half_avg | second_half_avg | efficiency_improvement | +----------+---------------+----------------+----------------+-----------------------+ | 2 | Bob Smith | 11.24 | 13.33 | 2.10 | | 1 | Alice Johnson | 11.97 | 14.02 | 2.05 | +----------+---------------+----------------+----------------+-----------------------+

Explanation:

Alice Johnson (driver_id = 1):

First half trips (Jan-Jun): Feb 15 (120.5/10.2 = 11.81), Mar 20 (200.0/16.5 = 12.12)

First half average efficiency: (11.81 + 12.12) / 2 = 11.97

Second half trips (Jul-Dec): Aug 10 (150.0/11.0 = 13.64), Sep 25 (180.0/12.5 = 14.40)

Second half average efficiency: (13.64 + 14.40) / 2 = 14.02

Efficiency improvement: 14.02 - 11.97 = 2.05

Bob Smith (driver_id = 2):

First half trips: Jan 10 (100.0/9.0 = 11.11), Apr 15 (250.0/22.0 = 11.36)

First half average efficiency: (11.11 + 11.36) / 2 = 11.24

Second half trips: Oct 5 (200.0/15.0 = 13.33)

Second half average efficiency: 13.33

Efficiency improvement: 13.33 - 11.24 = 2.10 (rounded to 2 decimal places)

Drivers not included:

Carol Davis (driver_id = 3): Only has trips in first half (Mar, May)

David Wilson (driver_id = 4): Only has trips in second half (Jul, Nov)

Emma Brown (driver_id = 5): Only has trips in first half (Feb)

The output table is ordered by efficiency improvement 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:

```python
import pandas as pd

def find_improved_efficiency_drivers(drivers: pd.DataFrame, trips:
pd.DataFrame) -> pd.DataFrame:
```

Solutions

MySQL Solution:

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```

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