Problem 3716: Find Churn Risk Customers

Problem Information

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

Problem Description

Table:

subscription_events

+------------------+---------+ | Column Name | Type | +------------------+---------+ | event_id | int | | user_id | int | | event_date | date | | event_type | varchar | | plan_name | varchar | | monthly_amount | decimal | +------------------+---------+ event_id is the unique identifier for this table. event_type can be start, upgrade, downgrade, or cancel. plan_name can be basic, standard, premium, or NULL (when event_type is cancel). monthly_amount represents the monthly subscription cost after this event. For cancel events, monthly_amount is 0.

Write a solution to

Find Churn Risk Customers

- users who show warning signs before churning. A user is considered

churn risk customer

if they meet ALL the following criteria:

Currently have an

active subscription

(their last event is not cancel).

Have performed

at least one

downgrade in their subscription history.

Their

current plan revenue

is less than

50%

of their historical maximum plan revenue.

Have been a subscriber for

at least

60

days.

Return

the result table ordered by

days_as_subscriber

in

descending

order, then by

user_id

in

ascending

order

.

The result format is in the following example.

Example:

Input:

subscription_events table:

+----------+---------+------------+------------+-----------+----------------+ | event_id | user_id | event_date | event_type | plan_name | monthly_amount | +----------+---------+------------+------------+-----------+----------------+ | 1 | 501 | 2024-01-01 | start | premium | 29.99 | | 2 | 501 | 2024-02-15 | downgrade | standard | 19.99 | | 3 | 501 | 2024-03-20 | downgrade | basic | 9.99 | | 4 | 502 | 2024-01-05 | start | standard | 19.99 | | 5 | 502 | 2024-02-10 | upgrade | premium | 29.99 | | 6 | 502 | 2024-03-15 | downgrade | basic | 9.99 | | 7 | 503 | 2024-01-10 | start | basic | 9.99 | | 8 | 503 | 2024-02-20 | upgrade | standard | 19.99 | | 9 | 503 | 2024-03-25 | upgrade | premium | 29.99 | | 10 | 504 | 2024-01-15 | start | premium | 29.99 | | 11 | 504 | 2024-03-01 | downgrade | standard | 19.99 | | 12 | 504 | 2024-03-30 | cancel | NULL | 0.00 | | 13 | 505 | 2024-02-01 | start | basic | 9.99 | | 14 | 505 | 2024-02-28 | upgrade | standard | 19.99 | | 15 | 506 | 2024-01-20 | start | premium | 29.99 | | 16 | 506 | 2024-03-10 | downgrade | basic | 9.99 | +----------+---------+------------+------------+-----------+----------------+

Output:

+----------+--------------+-----------------------+----------------------+--------------------+ | user_id | current_plan | current_monthly_amount | max_historical_amount | days_as_subscriber | +----------+--------------+-----------------------+----------------------+--------------------+ | 501 | basic | 9.99 | 29.99 | 79 | | 502 | basic | 9.99 | 29.99 | 69 | +----------+--------------+-----------------------+----------------------+--------------------+

Explanation:

User 501

:

Currently active: Last event is downgrade to basic (not cancelled)

Has downgrades: Yes, 2 downgrades in history

Current revenue (9.99) vs max (29.99): 9.99/29.99 = 33.3% (less than 50%)

Days as subscriber: Jan 1 to Mar 20 = 79 days (at least 60)

Result:

Churn Risk Customer

User 502

:

Currently active: Last event is downgrade to basic (not cancelled)

Has downgrades: Yes, 1 downgrade in history

Current revenue (9.99) vs max (29.99): 9.99/29.99 = 33.3% (less than 50%)

Days as subscriber: Jan 5 to Mar 15 = 70 days (at least 60)

Result:

Churn Risk Customer

User 503

:

Currently active: Last event is upgrade to premium (not cancelled)

Has downgrades: No downgrades in history

Result:

Not at-risk

(no downgrade history)

User 504

:

Currently active: Last event is cancel

Result:

Not at-risk

(subscription cancelled)

User 505

:

Currently active: Last event is 'upgrade' to standard (not cancelled)

Has downgrades: No downgrades in history

Result:

Not at-risk

(no downgrade history)

User 506

:

Currently active: Last event is downgrade to basic (not cancelled)

Has downgrades: Yes, 1 downgrade in history

Current revenue (9.99) vs max (29.99): 9.99/29.99 = 33.3% (less than 50%)

Days as subscriber: Jan 20 to Mar 10 = 50 days (less than 60)

Result:

Not at-risk

(insufficient subscription duration)

Result table is ordered by days_as_subscriber DESC, then user_id ASC.

Note:

days_as_subscriber is calculated from the first event date to the last event date for each user.

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_churn_risk_customers(subscription_events: pd.DataFrame) ->
pd.DataFrame:
```

Solutions

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