

# Problem 3617: Find Students with Study Spiral Pattern

## Problem Information

Difficulty: **Hard**

Acceptance Rate: 25.34%

Paid Only: No

## Problem Description

Table: `students`

Column Name	Type
student_id	int
student_name	varchar
major	varchar

student\_id is the unique identifier for this table. Each row contains information about a student and their academic major.

Table: `study\_sessions`

Column Name	Type
session_id	int
student_id	int
subject	varchar
session_date	date
hours_studied	decimal

session\_id is the unique identifier for this table. Each row represents a study session by a student for a specific subject.

Write a solution to find students who follow the **Study Spiral Pattern** \- students who consistently study multiple subjects in a rotating cycle.

\* A Study Spiral Pattern means a student studies at least **3** different subjects in a repeating sequence \* The pattern must repeat for **at least 2** complete cycles (minimum **6** study sessions) \* Sessions must be **consecutive dates** with no gaps longer than **2** days between sessions \* Calculate the **cycle length** (number of different subjects in the pattern) \* Calculate the **total study hours** across all sessions in the pattern \* Only include students with cycle length of **at least 3** subjects

Return the result table ordered by cycle length in **descending** order, then by total study hours in **descending** order.

The result format is in the following example.

**Example:**

**Input:**

students table:

student_id	student_name	major
1	Alice Chen	Computer Science
2	Bob Johnson	Mathematics
3	Carol Davis	Physics
4	David Wilson	Chemistry
5	Emma Brown	Biology

study\_sessions table:

session_id	student_id	subject	session_date	hours_studied
1	1	Math	2023-10-01	2.5
2	1	Physics	2023-10-02	3.0
3	1	Chemistry	2023-10-03	2.0
4	1	Math	2023-10-04	2.5
5	1	Physics	2023-10-05	3.0
6	1	Chemistry	2023-10-06	2.0
7	2	Algebra	2023-10-01	4.0
8	2	Calculus	2023-10-02	3.5
9	2	Statistics	2023-10-03	2.5
10	2	Geometry	2023-10-04	3.0
11	2	Algebra	2023-10-05	4.0
12	2	Calculus	2023-10-06	3.5
13	2	Statistics	2023-10-07	2.5
14	2	Geometry	2023-10-08	3.0
15	3	Biology	2023-10-01	2.0
16	3	Chemistry	2023-10-02	2.5
17	3	Biology	2023-10-03	2.0
18	3	Chemistry	2023-10-04	2.5
19	4	Organic	2023-10-01	3.0
20	4	Physical	2023-10-05	2.5

**Output:**

student_id	student_name	major	cycle_length	total_study_hours
2	Bob Johnson	Mathematics	4	26.0
1	Alice Chen	Computer Science	3	15.0

**Explanation:**

\* \*\*Alice Chen (student\_id = 1):\*\* \* Study sequence: Math -> Physics -> Chemistry -> Math -> Physics -> Chemistry \* Pattern: 3 subjects (Math, Physics, Chemistry) repeating for 2 complete cycles \* Consecutive dates: Oct 1-6 with no gaps > 2 days \* Cycle length: 3 subjects

\* Total hours:  $2.5 + 3.0 + 2.0 + 2.5 + 3.0 + 2.0 = 15.0$  hours \* \*\*Bob Johnson (student\_id = 2):\*\* \* Study sequence: Algebra -> Calculus -> Statistics -> Geometry -> Algebra -> Calculus -> Statistics -> Geometry \* Pattern: 4 subjects (Algebra, Calculus, Statistics, Geometry) repeating for 2 complete cycles \* Consecutive dates: Oct 1-8 with no gaps > 2 days \* Cycle length: 4 subjects \* Total hours:  $4.0 + 3.5 + 2.5 + 3.0 + 4.0 + 3.5 + 2.5 + 3.0 = 26.0$  hours \* \*\*Students not included:\*\* \* Carol Davis (student\_id = 3): Only 2 subjects (Biology, Chemistry) - doesn't meet minimum 3 subjects requirement \* David Wilson (student\_id = 4): Only 2 study sessions with a 4-day gap - doesn't meet consecutive dates requirement \* Emma Brown (student\_id = 5): No study sessions recorded

The result table is ordered by cycle\_length in descending order, then by total\_study\_hours in descending 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
```