Note: *in case of any duplicate questions kindly skip that question.*

Q 101.

Table: UserActivity

Column Name	Type
username	varchar
activity	varchar
startDate	Date
endDate	Date

There is no primary key for this table. It may contain duplicates.
This table contains information about the activity performed by each user in a period of time.
A person with a username performed an activity from startDate to endDate.

Write an SQL query to show the second most recent activity of each user.
If the user only has one activity, return that one. A user cannot perform more than one activity at the same time.
Return the result table in any order.
The query result format is in the following example.

Input:
UserActivity table:

username	activity	startDate	endDate
Alice	Travel	2020-02-12	2020-02-20
Alice	Dancing	2020-02-21	2020-02-23
Alice	Travel	2020-02-24	2020-02-28
Bob	Travel	2020-02-11	2020-02-18

Output:

username	activity	startDate	endDate
Alice	Dancing	2020-02-21	2020-02-23
Bob	Travel	2020-02-11	2020-02-18

Explanation:
The most recent activity of Alice is Travel from 2020-02-24 to 2020-02-28, before that she was dancing from 2020-02-21 to 2020-02-23.
Bob only has one record, we just take that one.

Query:

```
with cte as(
select *,
row_number() over(partition by username order by startDate desc) row_num,
count(1) over(partition by username) total_activites
from UserActivity
)
Select username,activity,startDate,endDate
from cte where row_num=2 or total_activites=1;
```

Q102.

Table: UserActivity

Column Name	Type
username	varchar
activity	varchar
startDate	Date
endDate	Date

There is no primary key for this table. It may contain duplicates.
This table contains information about the activity performed by each user in a period of time.
A person with a username performed an activity from startDate to endDate.

Write an SQL query to show the second most recent activity of each user.
If the user only has one activity, return that one. A user cannot perform more than one activity at the same time.
Return the result table in any order.
The query result format is in the following example.

Input:
UserActivity table:

username	activity	startDate	endDate
Alice	Travel	2020-02-12	2020-02-20
Alice	Dancing	2020-02-21	2020-02-23
Alice	Travel	2020-02-24	2020-02-28
Bob	Travel	2020-02-11	2020-02-18

Output:

username	activity	startDate	endDate
Alice	Dancing	2020-02-21	2020-02-23
Bob	Travel	2020-02-11	2020-02-18

Explanation:
The most recent activity of Alice is Travel from 2020-02-24 to 2020-02-28, before that she was dancing from 2020-02-21 to 2020-02-23.
Bob only has one record, we just take that one.

Q103.
Query the Name of any student in STUDENTS who scored higher than 75 Marks. Order your output by the last three characters of each name. If two or more students both have names ending in the same last three characters (i.e.: Bobby, Robby, etc.), secondary sort them by ascending ID.

Input Format

The STUDENTS table is described as follows:

Column	Type
ID	Integer
Name	String
Marks	Integer

The Name column only contains uppercase (A-Z) and lowercase (a-z) letters.
Sample Input

ID	Name	Marks
1	Ashley	81
2	Samantha	75
4	Julia	76
3	Belvet	84

Sample
Output Ashley
Julia
Belvet

Explanation
Only Ashley, Julia, and Belvet have Marks > 75 . If you look at the last three characters of each of their names, there are no duplicates and 'ley' < 'lia' < 'vet'.

Query:

```
SELECT NAME FROM STUDENTS WHERE MARKS > 75 ORDER BY RIGHT(NAME,3), ID ASC
```

Q104.
Write a query that prints a list of employee names (i.e.: the name attribute) from the Employee table in alphabetical order.

Input Format
The Employee table containing employee data for a company is described as follows:

Column	Type
employee_id	Integer
name	String
months	Integer
salary	Integer

where employee_id is an employee's ID number, name is their name, months is the total number of months they've been working for the company, and salary is their monthly salary.

Sample Input

employee_id	name	months	salary
12228	Rose	15	1968
33645	Angela	1	3443
45692	Frank	17	1608
56118	Patrick	7	1345
59725	Lisa	11	2330
74197	Kimberly	16	4372
78454	Bonnie	8	1771
83565	Michael	6	2017
98607	Todd	5	3396
99989	Joe	9	3573

Sample
Output Angela
Bonnie
Frank
Joe
Kimberly
Lisa
Michael
Patrick
Rose
Todd

Query:
Select name from Employee order by name;

Q105.

Write a query that prints a list of employee names (i.e.: the name attribute) for employees in Employee having a salary greater than $2000 per month who have been employees for less than 10 months. Sort your result by ascending employee_id.

Input Format
The Employee table containing employee data for a company is described as follows:

Column	Type
employee_id	Integer
name	String
months	Integer
salary	Integer

where employee_id is an employee's ID number, name is their name, months is the total number of months they've been working for the company, and salary is the their monthly salary.
Sample Input

employee_id	name	months	salary
12228	Rose	15	1968
33645	Angela	1	3443
45692	Frank	17	1608
56118	Patrick	7	1345
59725	Lisa	11	2330
74197	Kimberly	16	4372
78454	Bonnie	8	1771
83565	Michael	6	2017
98607	Todd	5	3396
99989	Joe	9	3573

Sample
Output Angela
Michael
Todd
Joe
Explanation
Angela has been an employee for 1 month and earns $3443 per month.
Michael has been an employee for 6 months and earns $2017 per month.
Todd has been an employee for 5 months and earns $3396 per month.
Joe has been an employee for 9 months and earns $3573 per month.
We order our output by ascending employee_id.

Select name from Employee where months<10 and salary>2000;

Q106

Write a query identifying the type of each record in the TRIANGLES table using its three side lengths. Output one of the following statements for each record in the table:

- Equilateral: It's a triangle with sides of equal length.
- Isosceles: It's a triangle with sides of equal length.
- Scalene: It's a triangle with sides of differing lengths.
- Not A Triangle: The given values of A, B, and C don't form a triangle.

Input Format
The TRIANGLES table is described as follows:

Column	Type
A	Integer
B	Integer
C	Integer

Each row in the table denotes the lengths of each of a triangle's three sides.
Sample Input

A	B	C
20	20	23
20	20	20
20	21	22
13	14	30

Sample
Output
Isosceles
Equilateral
Scalene
Not A Triangle

Explanation
Values in the tuple(20,20,23) form an Isosceles triangle, because A ≡ B.
Values in the tuple(20,20,20) form an Equilateral triangle, because A ≡ B ≡ C . Values in the tuple(20,21,22) form a Scalene triangle, because A ≠ B ≠C .
Values in the tuple (13,14,30) cannot form a triangle because the combined value of sides A and B is not larger than that of side C .

Query:

```
SELECT CASE
WHEN A + B <= C OR A + C <= B OR B + C <= A THEN 'Not A Triangle'
WHEN A = B AND B = C THEN 'Equilateral'
WHEN A = B OR B = C OR A = C THEN 'Isosceles'
ELSE 'Scalene'
END
FROM TRIANGLES;
```

Q107.

Samantha was tasked with calculating the average monthly salaries for all employees in the EMPLOYEES table, but did not realise her keyboard's 0 key was broken until after completing the calculation. She wants your help finding the difference between her miscalculation (using salaries with any zeros removed), and the actual average salary.
Write a query calculating the amount of error (i.e.: actual - miscalculated average monthly salaries), and round it up to the next integer.Input Format
The EMPLOYEES table is described as follows:

Column	Type
ID	Integer
Name	String
Salary	Integer

Note: Salary is per month. Constraints 1000<salary < 10^5 Sample Input

ID	Name	Salary
1	Kristeen	1420
2	Ashley	2006
3	Julia	2210
4	Maria	3000

Sample Output 2061

Explanation
The table below shows the salaries without zeros as they were entered by Samantha:

ID	Name	Salary
1	Kristeen	142
2	Ashley	26
3	Julia	221
4	Maria	3

Samantha computes an average salary of 98.00 . The actual average salary is 2159.00.
The resulting error between the two calculations is 2159.00-98.00 = 2061.00. Since it is equal to the

integer 2061, it does not get rounded up.
Query:
select cast(ceiling(avg(cast(salary as float)) - avg(cast(replace(salary, '0', '') as float))) as int)
from employees

Q108.
We define an employee's total earnings to be their monthly salary * months worked, and the maximum total earnings to be the maximum total earnings for any employee in the Employee table. Write a query to find the maximum total earnings for all employees as well as the total number of employees who have maximum total earnings. Then print these values as 2 space-separated integers.
Level - Easy
Hint - Use Aggregation functions
Input Format
The Employee table containing employee data for a company is described as follows:

Column	Type
employee_id	Integer
name	String
months	Integer
salary	Integer

where employee_id is an employee's ID number, name is their name, months is the total number of months they've been working for the company, and salary is the their monthly salary.
Sample Input

employee_id	name	months	salary
12228	Rose	15	1968
33645	Angela	1	3443
45692	Frank	17	1608
56118	Patrick	7	1345
59725	Lisa	11	2330
74197	Kimberly	16	4372
78454	Bonnie	8	1771
83565	Michael	6	2017
98607	Todd	5	3396
99989	Joe	9	3573

Sample
Output 69952
1

Explanation:
The table and earnings data is depicted in the following diagram:

employee_id	name	months	salary	earnings
12228	Rose	15	1968	29520
33645	Angela	1	3443	3443
45692	Frank	17	1608	27336
56118	Patrick	7	1345	9415
59725	Lisa	11	2330	25630
74197	Kimberly	16	4372	69952
78454	Bonnie	8	1771	14168
83565	Michael	6	2017	12102
98607	Todd	5	3396	16980
99989	Joe	9	3573	32157

The maximum earnings value is 69952. The only employee with earnings= 69952 is Kimberly, so we print the maximum earnings value (69952) and a count of the number of employees who have earned $69952 (which is 1) as two space-separated values.

Query:
```
select max(months * salary), count(months * salary)
from Employee where (months * salary)
= (select max(months * salary) from Employee);
```

Q109.

Generate the following two result sets:

1. Query an alphabetically ordered list of all names in OCCUPATIONS, immediately followed by the first letter of each profession as a parenthetical (i.e.: enclosed in parentheses). For example: AnActorName(A), ADoctorName(D), AProfessorName(P), and ASingerName(S).

Query the number of occurrences of each occupation in OCCUPATIONS. Sort the occurrences in ascending order, and output them in the following format:
Level - Medium
There are a total of [occupation_count] [occupation]s.

2. where [occupation_count] is the number of occurrences of an occupation in OCCUPATIONS and [occupation] is the lowercase occupation name. If more than one Occupation has the same [occupation_count], they should be ordered alphabetically.

Note: There will be at least two entries in the table for each type of occupation.
Input Format
The OCCUPATIONS table is described as follows:

Column	Type
Name	String
Occupation	String

Occupation will only contain one of the following values: Doctor, Professor, Singer or Actor.
Sample Input
An OCCUPATIONS table that contains the following records:

Name	Occupation
Samantha	Doctor
Julia	Actor
Maria	Actor
Meera	Singer
Ashely	Professor
Ketty	Professor
Christeen	Professor
Jane	Actor
Jenny	Doctor
Priya	Singer

Sample
Output
Ashely(P)
Christeen(P)
Jane(A)
Jenny(D)
Julia(A)
Ketty(P)
Maria(A)
Meera(S)
Priya(S)
Samantha(D)
There are a total of 2 doctors.
There are a total of 2 singers.
There are a total of 3 actors.
There are a total of 3 professors.

Hint -
The results of the first query are formatted to the problem description's specifications.
The results of the second query are ascendingly ordered first by number of names corresponding to each profession (2<= 2<=3<=3), and then alphabetically by profession (doctor <= singer , and actor <= professor).

```
Select concat(Name,'(',left(Occupation,1),')') as col1 from occupations
order by 1;
Select concat('There are a total of ',cast(count(1) as varchar(10)),' ',lower(concat(Occupation,'s.'))) as col1
from occupations
group by occupation
order by count(1),occupation;
```

;**Q110** . Pivot the Occupation column in OCCUPATIONS so that each Name is sorted alphabetically and displayed underneath its corresponding Occupation. The output column headers should be Doctor, Professor, Singer, and Actor, respectively.
Note: Print NULL when there are no more names corresponding to an occupation.

Input Format
The OCCUPATIONS table is described as follows:

Column	Type
Name	String
Occupation	String

Occupation will only contain one of the following values: Doctor, Professor, Singer or Actor.
Sample Input

Name	Occupation
Samantha	Doctor
Julia	Actor
Maria	Actor
Meera	Singer
Ashely	Professor
Ketty	Professor
Christeen	Professor
Jane	Actor
Jenny	Doctor
Priya	Singer

Sample Output
Jenny Ashley Meera Jane
Samantha Christeen Priya Julia
NULL Ketty NULL Maria
Hint -
The first column is an alphabetically ordered list of Doctor names.
The second column is an alphabetically ordered list of Professor names.
The third column is an alphabetically ordered list of Singer names.
The fourth column is an alphabetically ordered list of Actor names.
The empty cell data for columns with less than the maximum number of names per occupation (in this case, the Professor and Actor columns) are filled with NULL values.

Query:

```
with DOCTOR AS (
SELECT  NAME , row_number()OVER(partition by occupation order by name) as rn
from OCCUPATIONS
WHERE OCCUPATION ='DOCTOR'
) ,
Professor AS (
SELECT NAME ,  row_number()OVER(partition by occupation order by name) as rn
from OCCUPATIONS
WHERE OCCUPATION ='Professor'
) ,
Singer AS (
SELECT NAME , row_number()OVER(partition by occupation order by name) as rn
from OCCUPATIONS
WHERE OCCUPATION ='Singer'
```

```
) ,
Actor AS (
SELECT NAME , row_number()OVER(partition by occupation order by name) as rn
from OCCUPATIONS
WHERE OCCUPATION ='Actor'
)
SELECT DOCTOR.NAME,PROFESSOR.NAME,SINGER.NAME,ACTOR.NAME
from doctor right join professor
on DOCTOR.RN=professor.rn
LEFT JOIN
SINGER
on professor.rn=SINGER.RN
LEFT JOIN
ACTOR
on ACTOR.rn=SINGER.RN
;
```

Q111.

You are given a table, BST, containing two columns: N and P, where N represents the value of a node in Binary Tree, and P is the parent of N.

Column	*Type*
N	*Integer*
P	*Integer*

Write a query to find the node type of Binary Tree ordered by the value of the node. Output one of the following for each node:

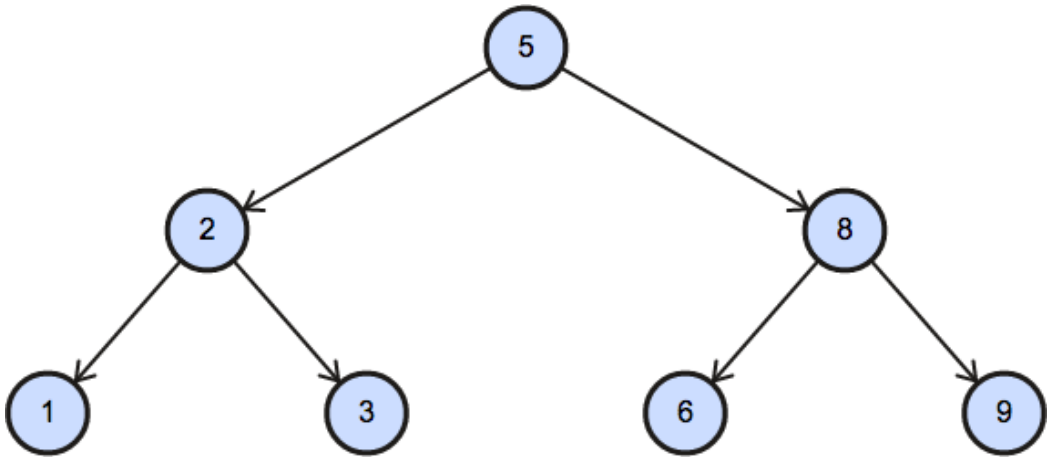
- Root: If node is root node.
- Leaf: If node is leaf node.
- Inner: If node is neither root nor leaf node.

Sample Input

N	*P*
1	*2*
3	*2*
6	*8*
9	*8*
2	*5*
8	*5*
5	*null*

Sample
Output 1 Leaf
2 Inner
3 Leaf
5 Root
6 Leaf
8 Inner
9 Leaf

Explanation
The Binary Tree below illustrates the sample:



Query:

```
Select N as Node,
case
        when P is null then 'Root'
        when N in (Select P from BST) then 'Inner'
        else 'Leaf'
end as node_type
from BST
order by N
```

Q112 .

Amber's conglomerate corporation just acquired some new companies. Each of the companies follows this hierarchy:

Founder
⇓
Lead Manager
⇓
Senior Manager
⇓
Manager
⇓
Employee

Given the table schemas below, write a query to print the company_code, founder name, total number of lead managers, total number of senior managers, total number of managers, and total number of employees. Order your output by ascending company_code.

Level -
Medium Note:

- The tables may contain duplicate records.
- The company_code is string, so the sorting should not be numeric. For example, if the company_codes are C_1, C_2, and C_10, then the ascending company_codes will be C_1, C_10, and C_2.Input Format

The following tables contain company data:

- Company: The company_code is the code of the company and founder is the founder of the company.

Column	Type
company_code	String
founder	String

- Lead_Manager: The lead_manager_code is the code of the lead manager, and the company_code is the code of the working company.

Column	Type
lead_manager_code	String
company_code	String

- Senior_Manager: The senior_manager_code is the code of the senior manager, the lead_manager_code is the code of its lead manager, and the company_code is the code of the working company.

Column	Type
senior_manager_code	String
lead_manager_code	String
company_code	String

- Manager: The manager_code is the code of the manager, the senior_manager_code is the code of its senior manager, the lead_manager_code is the code of its lead manager, and the company_code is the code of the working company.

Column	Type
manager_code	String
senior_manager_code	String
lead_manager_code	String
company_code	String

- Employee: The employee_code is the code of the employee, the manager_code is the code of its manager, the senior_manager_code is the code of its senior manager, the

lead_manager_code is the code of its lead manager, and the company_code is the code of the working company.

Column	Type
employee_code	String
manager_code	String
senior_manager_code	String
lead_manager_code	String
company_code	String

Sample Input

Company Table:

company_code	founder
C1	Monika
C2	Samantha

Lead_Manager Table:

lead_manager_code	company_code
LM1	C1
LM2	C2

Senior_Manager Table:

senior_manager_code	lead_manager_code	company_code
SM1	LM1	C1
SM2	LM1	C1
SM3	LM2	C2

Manager Table:

manager_code	senior_manager_code	lead_manager_code	company_code
M1	SM1	LM1	C1
M2	SM3	LM2	C2
M3	SM3	LM2	C2

Employee Table:

employee_code	manager_code	senior_manager_code	lead_manager_code	company_code
E1	M1	SM1	LM1	C1
E2	M1	SM1	LM1	C1
E3	M2	SM3	LM2	C2
E4	M3	SM3	LM2	C2

Sample Output
C1 Monika 1 2 1
2
C2 Samantha 1 1 2 2

Hint -
In company C1, the only lead manager is LM1. There are two senior managers, SM1 and SM2, under LM1. There is one manager, M1, under senior manager SM1. There are two employees, E1 and E2, under manager M1.
In company C2, the only lead manager is LM2. There is one senior manager, SM3, under LM2. There are two managers, M2 and M3, under senior manager SM3. There is one employee, E3, under manager M2, and another employee, E4, under manager, M3.

Query:

```
select c.company_code, c.founder,
        count(distinct l.lead_manager_code),
        count(distinct s.senior_manager_code),
        count(distinct m.manager_code),
        count(distinct e.employee_code)
from Company as c
join Lead_Manager as l
on c.company_code = l.company_code
join Senior_Manager as s
on l.lead_manager_code = s.lead_manager_code
join Manager as m
on m.senior_manager_code = s.senior_manager_code
join Employee as e
on e.manager_code = m.manager_code
group by c.company_code, c.founder
order by c.company_code;
```

Q113.

Write a query to print all prime numbers less than or equal to 1000. Print your result on a single line, and use the ampersand () character as your separator (instead of a space).
For example, the output for all prime numbers <=10 would be: 2&3&5&7

Hint - Firstly, select L Prime_Number from (select Level L from Dual connect Level ≤ 1000) and then do the same thing to create Level M, and then filter by M ≤ L and then group by L having count(case when L/M = truc(L/M) then 'Y' end) = 2 order by L

Q114.

P(R) represents a pattern drawn by Julia in R rows. The following pattern represents P(5):

```
*
* *
* * *
* * * *
* * * * *
```

Write a query to print the pattern P(20).
Level - Easy
Source - Hackerrank
Hint - Use SYS_CONNECT_BY_PATH(NULL, '* ') FROM DUAL

Q115.

P(R) represents a pattern drawn by Julia in R rows. The following pattern represents P(5):
* * * * *
* * * *
* * *
* *
*
Write a query to print the pattern P(20).
Level - Easy
Hint - Use SYS_CONNECT_BY_PATH(NULL, '* ') FROM DUAL

Q116. You are given a table, Functions, containing two columns: X and Y.

Column	Type
X	Integer
Y	Integer

Two pairs (X1, Y1) and (X2, Y2) are said to be symmetric pairs if X1 = Y2 and X2 = Y1.
Write a query to output all such symmetric pairs in ascending order by the value of X. List the rows such that X1 ≤ Y1.
.
Sample Input

X	Y
20	20
20	20
20	21
23	22
22	23
21	20

Sample
Output 20 20
20 21
22 23

Query:

```
with cte as(
Select *,row_number() over(order by x) rn from functions
)
Select f1.x,f1.y
from cte f1
join cte f2
on f1.rn < f2.rn and f1.x = f2.y and f1.y = f2.x and f1.x<=f1.y
order by f1.x
```

Q117.

Query the Name of any student in STUDENTS who scored higher than 75 Marks. Order your output by the last three characters of each name. If two or more students both have names ending in the same last three characters (i.e.: Bobby, Robby, etc.), secondary sort them by ascending ID.
Level - Easy
Hint - Use
Like Input
Format

Column	Type
ID	Integer
Name	String
Marks	Integer

The STUDENTS table is described as follows:
The Name column only contains uppercase (A-Z) and lowercase (a-z) letters.
Sample Input

ID	Name	Marks
1	Ashley	81
2	Samantha	75
4	Julia	76
3	Belvet	84

Sample
Output Ashley
Julia

Belvet

Explanation
Only Ashley, Julia, and Belvet have Marks > 75 . If you look at the last three characters of each of their names, there are no duplicates and 'ley' < 'lia' < 'vet'.

Query:
Select Name from students where marks>75
order by right(name,3),idQ118.

Write a query that prints a list of employee names (i.e.: the name attribute) from the Employee table in alphabetical order.
Level - Easy
Hint - Use ORDER
BY Input Format
The Employee table containing employee data for a company is described as follows:

Column	Type
employee_id	Integer
name	String
months	Integer
salary	Integer

where employee_id is an employee's ID number, name is their name, months is the total number of months they've been working for the company, and salary is their monthly salary.

Sample Input

employee_id	name	months	salary
12228	Rose	15	1968
33645	Angela	1	3443
45692	Frank	17	1608
56118	Patrick	7	1345
59725	Lisa	11	2330
74197	Kimberly	16	4372
78454	Bonnie	8	1771
83565	Michael	6	2017
98607	Todd	5	3396
99989	Joe	9	3573

Sample
Output Angela
Bonnie
Frank
Joe
Kimberly
Lisa
Michael
Patrick
Rose
Todd

Q119. Write a query that prints a list of employee names (i.e.: the name attribute) for employees in Employee having a salary greater than $2000 per month who have been employees for less than 10 months. Sort your result by ascending employee_id.
Level - Easy
Hint - Use Ascending
Input Format
The Employee table containing employee data for a company is described as follows:

Column	Type
employee_id	Integer
name	String
months	Integer
salary	Integer

where employee_id is an employee's ID number, name is their name, months is the total number of months they've been working for the company, and salary is the their monthly salary.
Sample Input

employee_id	name	months	salary
12228	Rose	15	1968
33645	Angela	1	3443
45692	Frank	17	1608
56118	Patrick	7	1345
59725	Lisa	11	2330
74197	Kimberly	16	4372
78454	Bonnie	8	1771
83565	Michael	6	2017
98607	Todd	5	3396
99989	Joe	9	3573

Sample
Output Angela
Michael
Todd
Joe
Explanation
Angela has been an employee for 1 month and earns $3443 per month.
Michael has been an employee for 6 months and earns $2017 per month.

Todd has been an employee for 5 months and earns $3396 per month.
Joe has been an employee for 9 months and earns $3573 per month.
We order our output by ascending employee_id.

Q120. Write a query identifying the type of each record in the TRIANGLES table using its three side lengths. Output one of the following statements for each record in the table:

- Equilateral: It's a triangle with sides of equal length.
- Isosceles: It's a triangle with sides of equal length.
- Scalene: It's a triangle with sides of differing lengths.
- Not A Triangle: The given values of A, B, and C don't form a triangle.

Level - Easy
Hint - Use predefine functions for calculation.

Input Format
The TRIANGLES table is described as follows:

Column	Type
A	Integer
B	Integer
C	Integer

Each row in the table denotes the lengths of each of a triangle's three sides.
Sample Input

A	B	C
20	20	23
20	20	20
20	21	22
13	14	30

Sample
Output
Isosceles
Equilateral
Scalene
Not A
Triangle
Explanation
Values in the tuple(20,20,23) form an Isosceles triangle, because A ≡ B.
Values in the tuple(20,20,20) form an Equilateral triangle, because A ≡ B ≡ C . Values in the tuple(20,21,22) form a Scalene triangle, because A ≠ B ≠C .
Values in the tuple (13,14,30) cannot form a triangle because the combined value of sides A and B is not larger than that of side C .

Q121. Assume you are given the table below containing information on user transactions for particular products. Write a query to obtain the year-on-year growth rate for the total spend of each product for each year.

Output the year (in ascending order) partitioned by product id, current year's spend, previous year's spend and year-on-year growth rate (percentage rounded to 2 decimal places).

Level - Hard
Hint - Use extract function

`user_transactions` Table:

Column Name	Type
transaction_id	integer
product_id	integer
spend	decimal
transaction_date	datetime

`user_transactions` Example Input:

transaction_id	product_id	spend	transaction_date
1341	123424	1500.60	12/31/2019 12:00:00
1423	123424	1000.20	12/31/2020 12:00:00
1623	123424	1246.44	12/31/2021 12:00:00
1322	123424	2145.32	12/31/2022 12:00:00

Example Output:

y	product_id	curr_year_spend	prev_year_spend	yoy_rate
2	123424	1500.60		
2	123424	1000.20	1500.60	-33.35
2	123424	1246.44	1000.20	24.62
2	123424	2145.32	1246.44	72.12

Query:

```
with cte as(
SELECT Extract(year from transaction_date) "year",product_id,sum(spend) spend
FROM user_transactions
group by Extract(year from transaction_date),product_id
)
select "year",product_id,spend curr_year_spend,
lag(spend,1) over(PARTITION BY product_id order by "year") prev_year_spend,
round(((spend-lag(spend,1) over(PARTITION BY product_id order by "year"))/
lag(spend,1) over(PARTITION BY product_id order by "year"))*100.0,2)
 yoy_rate
from cte
```

Q122. Amazon wants to maximise the number of items it can stock in a 500,000 square feet warehouse. It wants to stock as many prime items as possible, and afterwards use the remaining square footage to stock the most number of non-prime items.
Write a SQL query to find the number of prime and non-prime items that can be stored in the 500,000 square feet warehouse. Output the item type and number of items to be stocked.

Hint - create a table containing a summary of the necessary fields such as item type ('prime_eligible', 'not_prime'), SUM of square footage, and COUNT of items grouped by the item type.

`inventory` table:

Column Name	Type

item_id	integer
item_type	string
item_category	string

square_footage	decimal

inventory Example Input:

item_id	item_type	item_category	square_footage
1374	prime_eligible	mini refrigerator	68.00
4245	not_prime	standing lamp	26.40
2452	prime_eligible	television	85.00
3255	not_prime	side table	22.60
1672	prime_eligible	laptop	8.50

Example Output:

item_type	item_count
prime_eligible	9285
not_prime	6

Query:

```
WITH summary AS (
  SELECT
        item_type,
        SUM(square_footage) AS total_sqft,
        COUNT(*) AS item_count
  FROM inventory
  GROUP BY item_type
),
prime_items AS (
  SELECT
        DISTINCT item_type,
        total_sqft,
        TRUNC(500000/total_sqft,0) AS prime_item_combo,
        (TRUNC(500000/total_sqft,0) * item_count) AS prime_item_count
  FROM summary
  WHERE item_type = 'prime_eligible'
),
non_prime_items AS (
  SELECT
        DISTINCT item_type,
        total_sqft,
        TRUNC(
        (500000 - (SELECT prime_item_combo * total_sqft FROM prime_items))
        / total_sqft, 0) * item_count AS non_prime_item_count
  FROM summary
  WHERE item_type = 'not_prime')
```

```
SELECT
  item_type,
  prime_item_count AS item_count
FROM prime_items
UNION ALL
SELECT
  item_type,
  non_prime_item_count AS item_count
FROM non_prime_items;
```

Q123. Assume you have the table below containing information on Facebook user actions. Write a query to obtain the active user retention in July 2022. Output the month (in numerical format 1, 2, 3) and the number of monthly active users (MAUs).
Hint: An active user is a user who has user action ("sign-in", "like", or "comment") in the current month and last month.

Hint- Use generic correlated subquery

`user_actions` Table:

Column Name	Type
user_id	integer
event_id	integer
event_type	string ("sign-in, "like", "comment")
event_date	datetime

user_actionsExample Input:

user_id	event_id	event_type	event_date
445	7765	sign-in	05/31/2022 12:00:00
742	6458	sign-in	06/03/2022 12:00:00
445	3634	like	06/05/2022 12:00:00
742	1374	comment	06/05/2022 12:00:00
648	3124	like	06/18/2022 12:00:00

Example Output for June 2022:

month	monthly_active_users
6	1

Query:

```
SELECT
  EXTRACT(MONTH FROM curr_month.event_date) AS mth,
  COUNT(DISTINCT curr_month.user_id) AS monthly_active_users
FROM user_actions AS curr_month
WHERE EXISTS (
  SELECT last_month.user_id
  FROM user_actions AS last_month
  WHERE last_month.user_id = curr_month.user_id
        AND EXTRACT(MONTH FROM last_month.event_date) =
        EXTRACT(MONTH FROM curr_month.event_date - interval '1 month')
)
  AND EXTRACT(MONTH FROM curr_month.event_date) = 7
  AND EXTRACT(YEAR FROM curr_month.event_date) = 2022
GROUP BY EXTRACT(MONTH FROM curr_month.event_date);
```

Q124. Google's marketing team is making a Superbowl commercial and needs a simple statistic to put on their TV ad: the median number of searches a person made last year.
However, at Google scale, querying the 2 trillion searches is too costly. Luckily, you have access to the summary table which tells you the number of searches made last year and how many Google users fall into that bucket.

Write a query to report the median of searches made by a user. Round the median to one decimal point.

Hint- Write a subquery or common table expression (CTE) to generate a series of data (that's keyword for column) starting at the first search and ending at some point with an optional incremental value.

search_frequency Table:

Column Name	Type
searches	integer
num_users	integer

search_frequency Example Input:

searches	num_users
1	2
2	2
3	3
4	1

Example Output:

median
2.5

Q125. Write a query to update the Facebook advertiser's status using the daily_pay table. Advertiser is a two-column table containing the user id and their payment status based on the last payment and daily_pay table has current information about their payment. Only advertisers who paid will show up in this table.
Output the user id and current payment status sorted by the user id.

Hint- Query the daily_pay table and check through the advertisers in this table.

. advertiser Table:

Column Name	Type
user_id	string
status	string

advertiser Example Input:

user_id	status
bing	NEW
yahoo	NEW
alibaba	EXISTING

daily_pay Table:

Column Name	Type
user_id	string
paid	decimal

daily_pay Example Input:

user_id	paid
yahoo	45.00
alibaba	100.00
target	13.00

Definition of advertiser status:

- New: users registered and made their first payment.
- Existing: users who paid previously and recently made a current payment.
- Churn: users who paid previously, but have yet to make any recent payment.
- Resurrect: users who did not pay recently but may have made a previous payment and have made payment again recently.

Example Output:

user_id	new_status
bing	CHURN
yahoo	EXISTING
alibaba	EXISTING

Bing's updated status is CHURN because no payment was made in the daily_pay table whereas Yahoo which made a payment is updated as EXISTING.

The dataset you are querying against may have different input & output - this is just an example!

Read this before proceeding to solve the question

For better understanding of the advertiser's status, we're sharing with you a table of possible transitions based on the payment status.

#	Start	End	Condition
1	NEW	EXISTING	Paid on day T
2	NEW	CHURN	No pay on day T
3	EXISTING	EXISTING	Paid on day T
4	EXISTING	CHURN	No pay on day T
5	CHURN	RESURRECT	Paid on day T
6	CHURN	CHURN	No pay on day T
7	RESURRECT	EXISTING	Paid on day T
8	RESURRECT	CHURN	No pay on day T

1. Row 2, 4, 6, 8: As long as the user has not paid on day T, the end status is updated to CHURN regardless of the previous status.
2. Row 1, 3, 5, 7: When the user paid on day T, the end status is updated to either EXISTING or RESURRECT, depending on their previous state. RESURRECT is only possible when the previous state is CHURN. When the previous state is anything else, the status is updated to EXISTING.

Q126. Amazon Web Services (AWS) is powered by fleets of servers. Senior management has requested data-driven solutions to optimise server usage.

Write a query that calculates the total time that the fleet of servers was running. The output should be in units of full days.

Level -
Hard Hint-

1. Calculate individual uptimes

2. Sum those up to obtain the uptime of the whole fleet, keeping in mind that the result must be output in units of full days

Assumptions:

- Each server might start and stop several times.
- The total time in which the server fleet is running can be calculated as the sum of each server's uptime.

server_utilization Table:

Column Name	Type
server_id	integer
status_time	timestamp
session_status	string

server_utilization Example Input:

server_id	status_time	session_status
1	08/02/2022 10:00:00	start
1	08/04/2022 10:00:00	stop
2	08/17/2022 10:00:00	start
2	08/24/2022 10:00:00	stop

Example Output:

total_uptime_days
21

Q127. Sometimes, payment transactions are repeated by accident; it could be due to user error, API failure or a retry error that causes a credit card to be charged twice.
Using the transactions table, identify any payments made at the same merchant with the same credit card for the same amount within 10 minutes of each other. Count such repeated payments.

Level - Hard
Hint- Use Partition and order by

Assumptions:

- The first transaction of such payments should not be counted as a repeated payment. This means, if there are two transactions performed by a merchant with the same credit card and for the same amount within 10 minutes, there will only be 1 repeated payment.

transactions Table:

Column Name	Type
transaction_id	integer
merchant_id	integer
credit_card_id	integer
amount	integer
transaction_timestamp	datetime

transactions Example Input:

transaction_id	merchant_id	credit_card_id	amount	transaction_timestamp
1	101	1	100	09/25/2022 12:00:00
2	101	1	100	09/25/2022 12:08:00
3	101	1	100	09/25/2022 12:28:00
4	102	2	300	09/25/2022 12:00:00
6	102	2	400	09/25/2022 14:00:00

Example Output:

payment_count
1

Q128. DoorDash's Growth Team is trying to make sure new users (those who are making orders in their first 14 days) have a great experience on all their orders in their 2 weeks on the platform. Unfortunately, many deliveries are being messed up because:

- the orders are being completed incorrectly (missing items, wrong order, etc.)
- the orders aren't being received (wrong address, wrong drop off spot)
- the orders are being delivered late (the actual delivery time is 30 minutes later than when the order was placed). Note that the estimated_delivery_timestamp is automatically set to 30 minutes after the order_timestamp.

Hint- Use Where Clause and joins

Write a query to find the bad experience rate in the first 14 days for new users who signed up in June 2022. Output the percentage of bad experience rounded to 2 decimal places.

`orders` Table:

Column Name	Type
order_id	integer
customer_id	integer
trip_id	integer
status	string ('completed successfully', 'completed incorrectly', 'never received')
order_timestamp	timestamp

`orders` Example Input:

order_id	customer_id	trip_id	status	order_timestamp
727424	8472	100463	completed successfully	06/05/2022 09:12:00
242513	2341	100482	completed incorrectly	06/05/2022 14:40:00
141367	1314	100362	completed incorrectly	06/07/2022 15:03:00
582193	5421	100657	never_received	07/07/2022 15:22:00
253613	1314	100213	completed successfully	06/12/2022 13:43:00

`trips` Table:

Column Name	Type
dasher_id	integer
trip_id	integer
estimated_delivery_timestamp	timestamp
actual_delivery_timestamp	timestamp

`trips` Example Input:

dasher_id	trip_id	estimated_delivery_timestamp	actual_delivery_timestamp
101	100463	06/05/2022 09:42:00	06/05/2022 09:38:00
102	100482	06/05/2022 15:10:00	06/05/2022 15:46:00
101	100362	06/07/2022 15:33:00	06/07/2022 16:45:00
102	100657	07/07/2022 15:52:00	-
103	100213	06/12/2022 14:13:00	06/12/2022 14:10:00

`customers` Table:

Column Name	Type
customer_id	integer
signup_timestamp	timestamp

`customers` Example Input:

customer_id	signup_timestamp
8472	05/30/2022 00:00:00
2341	06/01/2022 00:00:00
1314	06/03/2022 00:00:00
1435	06/05/2022 00:00:00
5421	06/07/2022 00:00:00

Example Output:

bad_experience_pct
75.00

Q129.

Table: Scores

Column Name	Type
player_name	varchar
gender	varchar
day	date
score_points	int

(gender, day) is the primary key for this table.
A competition is held between the female team and the male team.
Each row of this table indicates that a player_name and with gender has scored score_point in someday.
Gender is 'F' if the player is in the female team and 'M' if the player is in the male team.

Write an SQL query to find the total score for each gender on each day.
Return the result table ordered by gender and day in ascending order.
The query result format is in the following example.

Input:
Scores
table:

player_name	gender	day	score_points
Aron	F	2020-01-01	17
Alice	F	2020-01-07	23
Bajrang	M	2020-01-07	7
Khali	M	2019-12-25	11
Slaman	M	2019-12-30	13
Joe	M	2019-12-31	3
Jose	M	2019-12-18	2
Priya	F	2019-12-31	23
Priyanka	F	2019-12-30	17

Output:

gender	day	total
F	2019-12-30	17
F	2019-12-31	40
F	2020-01-01	57
F	2020-01-07	80
M	2019-12-18	2
M	2019-12-25	13

M	2019-12-30	26
M	2019-12-31	29
M	2020-01-07	36

Explanation:

For the female team:
The first day is 2019-12-30, Priyanka scored 17 points and the total score for the team is 17. The second day is 2019-12-31, Priya scored 23 points and the total score for the team is 40. The third day is 2020-01-01, Aron scored 17 points and the total score for the team is 57.
The fourth day is 2020-01-07, Alice scored 23 points and the total score for the team is 80.

For the male team:
The first day is 2019-12-18, Jose scored 2 points and the total score for the team is 2.
The second day is 2019-12-25, Khali scored 11 points and the total score for the team is 13. The third day is 2019-12-30, Slaman scored 13 points and the total score for the team is 26. The fourth day is 2019-12-31, Joe scored 3 points and the total score for the team is 29.
The fifth day is 2020-01-07, Bajrang scored 7 points and the total score for the team is 36.

Q130.

Table Person:

Column Name	Type
id	int
name	varchar
phone_number	varchar

id is the primary key for this table.
Each row of this table contains the name of a person and their phone number.
Phone number will be in the form 'xxx-yyyyyyy' where xxx is the country code (3 characters) and yyyyyyy is the phone number (7 characters) where x and y are digits. Both can contain leading zeros.

Table Country:

Column Name	Type
name	varchar
country_code	varchar

country_code is the primary key for this table.
Each row of this table contains the country name and its code. country_code will be in the form 'xxx' where x is digits.

Table Calls:

Column Name	Type
caller_id	int
callee_id	int
duration	int

There is no primary key for this table, it may contain duplicates.
Each row of this table contains the caller id, callee id and the duration of the call in minutes. caller_id != callee_id

A telecommunications company wants to invest in new countries. The company intends to invest in the countries where the average call duration of the calls in this country is strictly greater than the global average call duration.
Write an SQL query to find the countries where this company can invest.
Return the result table in any order.
The query result format is in the following example.

Input:
Person
table:

id	name	phone_number
3	Jonathan	051-1234567
12	Elvis	051-7654321
1	Moncef	212-1234567
2	Maroua	212-6523651
7	Meir	972-1234567
9	Rachel	972-0011100

Country table:

name	country_code
Peru	51
Israel	972
Morocco	212
Germany	49
Ethiopia	251
Ethiopia	251

Calls table:

caller_id	callee_id	duration
1	9	33
2	9	4

1	2	59
3	12	102
3	12	330
12	3	5
7	9	13
7	1	3
9	7	1
1	7	7

Output:

country
P
er
u

Explanation:
The average call duration for Peru is (102 + 102 + 330 + 330 + 5 + 5) / 6 = 145.666667
The average call duration for Israel is (33 + 4 + 13 + 13 + 3 + 1 + 1 + 7) / 8 = 9.37500
The average call duration for Morocco is (33 + 4 + 59 + 59 + 3 + 7) / 6 = 27.5000
Global call duration average = (2 * (33 + 4 + 59 + 102 + 330 + 5 + 13 + 3 + 1 + 7)) / 20 = 55.70000
Since Peru is the only country where the average call duration is greater than the global average, it is the only recommended country.

Q131.

Table: Numbers

Column Name	Type
num	int
frequency	int

num is the primary key for this table.
Each row of this table shows the frequency of a number in the database.

The median is the value separating the higher half from the lower half of a data sample.
Write an SQL query to report the median of all the numbers in the database after decompressing the Numbers table. Round the median to one decimal point.
The query result format is in the following example.

Input:
Numbers
table:

num	frequency
0	7
1	1
2	3
3	1

Output:

median
0

Explanation:
If we decompose the Numbers table, we will get [0, 0, 0, 0, 0, 0, 0, 1, 2, 2, 2, 3], so the median is (0 + 0) / 2 = 0.

Query:

```
WITH searches_expanded AS (
SELECT searches
FROM search_frequency
GROUP BY
        searches,
        GENERATE_SERIES(1, num_users))
SELECT
 ROUND(PERCENTILE_CONT(0.50) WITHIN GROUP (
        ORDER BY searches)::DECIMAL, 1) AS  median
FROM searches_expanded;
```

Q132.

Table: Salary

Column Name	Type
id	int
employee_id	int
amount	int
pay_date	date

id is the primary key column for this table.
Each row of this table indicates the salary of an employee in one month.
employee_id is a foreign key from the Employee table.

Table: Employee

Column Name	Type
employee_id	int
department_id	int

employee_id is the primary key column for this table.
Each row of this table indicates the department of an employee.

Write an SQL query to report the comparison result (higher/lower/same) of the average salary of employees in a department to the company's average salary.
Return the result table in any order.
The query result format is in the following example.
Input:
Salary table:

id	employee_id	amount	pay_date
1	1	9000	2017/03/31
2	2	6000	2017/03/31
3	3	10000	2017/03/31
4	1	7000	2017/02/28
5	2	6000	2017/02/28
6	3	8000	2017/02/28

Employee table:

employee_id	department_id
1	1
2	2
3	2

Output:

pay_month	department_id	comparison
2017-02	1	same
2017-03	1	higher
2017-02	2	same
2017-03	2	lower

Explanation:
In March, the company's average salary is (9000+6000+10000)/3 = 8333.33...
The average salary for department '1' is 9000, which is the salary of employee_id '1' since there is only one employee in this department. So the comparison result is 'higher' since 9000 > 8333.33 obviously. The average salary of department '2' is (6000 + 10000)/2 = 8000, which is the average of employee_id '2' and '3'. So the comparison result is 'lower' since 8000 < 8333.33.

With the same formula for the average salary comparison in February, the result is 'same' since both the departments '1' and '2' have the same average salary with the company, which is 7000.

Query:

```
WITH company AS(
  SELECT
    date_format(pay_date, '%Y-%m') as month,
    AVG(amount) as company_avg_salary
  FROM salary
  GROUP BY 1
```

```
),
Department AS (
   SELECT
      date_format(pay_date, '%Y-%m') as month,
      e.department_id,
      AVG(s.amount) as dept_avg_salary
   FROM salary as s JOIN employee as e
   ON s.employee_id = e.employee_id
   GROUP BY 1, 2
)

SELECT
   d.month as pay_month,
   d.department_id,
   CASE WHEN d.dept_avg_salary > c.company_avg_salary THEN 'higher'
      WHEN d.dept_avg_salary < c.company_avg_salary THEN 'lower'
      ELSE 'same'
   END AS comparison
FROM Department as d LEFT JOIN company as c
ON d.month = c.month
ORDER BY 1 DESC
```

Q133.

Table: Activity

Column Name	Type
player_id	int
device_id	int
event_date	date
games_played	int

(player_id, event_date) is the primary key of this table.
This table shows the activity of players of some games.
Each row is a record of a player who logged in and played a number of games (possibly 0) before logging out on someday using some device.

The install date of a player is the first login day of that player.
We define day one retention of some date x to be the number of players whose install date is x and they logged back in on the day right after x, divided by the number of players whose install date is x, rounded to 2 decimal places.
Write an SQL query to report for each install date, the number of players that installed the game on that day, and the day one retention.
Return the result table in any order.
The query result format is in the following example.

Input:
Activity table:

player_id	device_id	event_date	games_played
1	2	2016-03-01	5
1	2	2016-03-02	6
2	3	2017-06-25	1

3	1	2016-03-01	0
3	4	2016-07-03	5

Output:

install_dt	installs	Day1_retention
2016-03-01	2	0.5
2017-06-25	1	0

Explanation:
Player 1 and 3 installed the game on 2016-03-01 but only player 1 logged back in on 2016-03-02 so the day 1 retention of 2016-03-01 is 1 / 2 = 0.50
Player 2 installed the game on 2017-06-25 but didn't log back in on 2017-06-26 so the day 1 retention of 2017-06-25 is 0 / 1 = 0.00

Query:

```
select a1.event_date as install_dt, count(a1.player_id) as installs, round(count(a3.player_id) /
count(a1.player_id), 2) as Day1_retention
   from Activity a1 left join Activity a2
   on a1.player_id = a2.player_id and a1.event_date > a2.event_date
   left join Activity a3
   on a1.player_id = a3.player_id and datediff(a3.event_date, a1.event_date) = 1
   where a2.event_date is null
   group by a1.event_date;
```

Q134.

Table: Players

Column Name	Type
player_id	int
group_id	int

player_id is the primary key of this table.
Each row of this table indicates the group of each player.

Table: Matches

Column Name	Type
match_id	int
first_player	int
second_player	int
first_score	int
second_score	int

match_id is the primary key of this table.
Each row is a record of a match, first_player and second_player contain the player_id of each match.
first_score and second_score contain the number of points of the first_player and second_player respectively.
You may assume that, in each match, players belong to the same group.

The winner in each group is the player who scored the maximum total points within the group. In the case of a tie, the lowest player_id wins.
Write an SQL query to find the winner in each group.
Return the result table in any order.
The query result format is in the following example.

Input:
Players
table:

player_id	group_id
15	1
25	1
30	1
45	1
10	2
35	2
50	2
20	3
40	3

Matches table:

match_id	first_player	second_player	first_score	second_score
1	15	45	3	0
2	30	25	1	2
3	30	15	2	0
4	40	20	5	2
5	35	50	1	1

Output:

group_id	player_id
1	15
2	35
3	40

Query:

```
select group_id,player_id
from (
  select sc.group_id group_id, sc.player_id player_id,
    rank() over (partition by sc.group_id order by sum(sc.score) desc, sc.player_id asc) as rnk
  from(
     select p.group_id group_id,
      p.player_id player_id ,
      sum(m.first_score) as score
     from players p
```

```
      inner join matches m
      on p.player_id = m.first_player
      group by p.group_id,p.player_id

      union all

      select p.group_id group_id,
       p.player_id player_id ,
      sum(second_score) as score
      from players p
      inner join matches m
      on p.player_id = m.second_player
      group by p.group_id,p.player_id
   ) sc
   group by sc.group_id,sc.player_id
) A
where rnk = 1
```

Q135.

Table: Student

Column Name	Type
student_id	int
student_name	varchar

student_id is the primary key for this table.
student_name is the name of the student.

Table: Exam

Column Name	Type
exam_id	int
student_id	int
score	int

(exam_id, student_id) is the primary key for this table.
Each row of this table indicates that the student with student_id had a score points in the exam with id exam_id.

A quiet student is the one who took at least one exam and did not score the high or the low score.

Write an SQL query to report the students (student_id, student_name) being quiet in all exams. Do not return the student who has never taken any exam.
Return the result table ordered by student_id.
The query result format is in the following example.

Input:
Student table:

student_id	student_name
1	Daniel
2	Jade
3	Stella
4	Jonathan
5	Will

Exam table:

exam_id	student_id	score
10	1	70
10	2	80
10	3	90
20	1	80
30	1	70
30	3	80
30	4	90
40	1	60
40	2	70
40	4	80

Output:

student_id	student_name
2	Jade

Explanation:
For exam 1: Student 1 and 3 hold the lowest and high scores respectively.
For exam 2: Student 1 holds both the highest and lowest score.
For exam 3 and 4: Student 1 and 4 hold the lowest and high scores respectively.
Students 2 and 5 have never got the highest or lowest in any of the exams.
Since student 5 is not taking any exam, he is excluded from the result.
So, we only return the information of Student 2.

Query:

```
WITH cte AS
    (SELECT student_id, score, exam_id,
        max(score) OVER (PARTITION BY exam_id) AS maxscore,
        min(score) OVER (PARTITION BY exam_id) AS minscore
     FROM Exam),
     cte1 AS
        (SELECT student_id
```

```
        FROM cte
        WHERE score = maxscore OR score = minscore
    )
SELECT DISTINCT Exam.student_id, Student.student_name
    FROM Exam JOIN Student
    ON Exam.student_id = Student.student_id
WHERE Exam.student_id NOT IN (SELECT student_id FROM cte1)
    ORDER BY Exam.student_id
```

Q136.

Table: Student

Column Name	Type
student_id	int
student_name	varchar

student_id is the primary key for this table.
student_name is the name of the student.

Table: Exam

Column Name	Type
exam_id	int
student_id	int
score	int

(exam_id, student_id) is the primary key for this table.
Each row of this table indicates that the student with student_id had a score points in the exam with id exam_id.

A quiet student is the one who took at least one exam and did not score the high or the low score.
Write an SQL query to report the students (student_id, student_name) being quiet in all exams. Do not return the student who has never taken any exam.
Return the result table ordered by student_id.
The query result format is in the following example.

Input:
Student
table:

student_id	student_name
1	Daniel
2	Jade
3	Stella
4	Jonathan
5	Will

Exam table:

exam_id	student_id	score

10	1	70
10	2	80
10	3	90
20	1	80

30	1	70
30	3	80
30	4	90
40	1	60
40	2	70
40	4	80

Output:

student_id	student_name
2	Jade

Explanation:
For exam 1: Student 1 and 3 hold the lowest and high scores respectively.
For exam 2: Student 1 holds both the highest and lowest score.
For exam 3 and 4: Student 1 and 4 hold the lowest and high scores respectively.
Students 2 and 5 have never got the highest or lowest in any of the exams.
Since student 5 is not taking any exam, he is excluded from the result.
So, we only return the information of Student 2.

Q137.

Table: UserActivity

Column Name	Type
username	varchar
activity	varchar
startDate	Date
endDate	Date

There is no primary key for this table. It may contain duplicates.
This table contains information about the activity performed by each user in a period of time.
A person with a username performed an activity from startDate to endDate.

Write an SQL query to show the second most recent activity of each user.
If the user only has one activity, return that one. A user cannot perform more than one activity at the same time.
Return the result table in any order.
The query result format is in the following example.

Input:
UserActivity
table:

username	activity	startDate	endDate
Alice	Travel	2020-02-12	2020-02-20
Alice	Dancing	2020-02-21	2020-02-23
Alice	Travel	2020-02-24	2020-02-28
Bob	Travel	2020-02-11	2020-02-18

Output:

username	activity	startDate	endDate
Alice	Dancing	2020-02-21	2020-02-23
Bob	Travel	2020-02-11	2020-02-18

Explanation:
The most recent activity of Alice is Travel from 2020-02-24 to 2020-02-28, before that she was dancing from 2020-02-21 to 2020-02-23.
Bob only has one record, we just take that one.

Q138.

Table: UserActivity

Column Name	Type
username	varchar
activity	varchar
startDate	Date
endDate	Date

There is no primary key for this table. It may contain duplicates.
This table contains information about the activity performed by each user in a period of time.
A person with a username performed an activity from startDate to endDate.

Write an SQL query to show the second most recent activity of each user.
If the user only has one activity, return that one. A user cannot perform more than one activity at the same time.
Return the result table in any order.
The query result format is in the following example.

Input:
UserActivity
table:

username	activity	startDate	endDate
Alice	Travel	2020-02-12	2020-02-20
Alice	Dancing	2020-02-21	2020-02-23
Alice	Travel	2020-02-24	2020-02-28
Bob	Travel	2020-02-11	2020-02-18

Output:

username	activity	startDate	endDate
Alice	Dancing	2020-02-21	2020-02-23
Bob	Travel	2020-02-11	2020-02-18

Explanation:
The most recent activity of Alice is Travel from 2020-02-24 to 2020-02-28, before that she was dancing from 2020-02-21 to 2020-02-23.
Bob only has one record, we just take that one.

Q139. Query the Name of any student in STUDENTS who scored higher than 75 Marks. Order your output by the last three characters of each name. If two or more students both have names ending in the same last three characters (i.e.: Bobby, Robby, etc.), secondary sort them by ascending ID.

Input Format

The STUDENTS table is described as follows:

Column	*Type*
ID	*Integer*
Name	*String*
Marks	*Integer*

The Name column only contains uppercase (A-Z) and lowercase (a-z) letters.
Sample Input

ID	*Name*	*Marks*
1	*Ashley*	*81*
2	*Samantha*	*75*
4	*Julia*	*76*
3	*Belvet*	*84*

Sample
Output Ashley
Julia
Belvet

Explanation
Only Ashley, Julia, and Belvet have Marks > 75 . If you look at the last three characters of each of their names, there are no duplicates and 'ley' < 'lia' < 'vet'.

Q140. Write a query that prints a list of employee names (i.e.: the name attribute) from the Employee table in alphabetical order.

Input Format
The Employee table containing employee data for a company is described as follows:

Column	Type
employee_id	Integer
name	String
months	Integer
salary	Integer

where employee_id is an employee's ID number, name is their name, months is the total number of months they've been working for the company, and salary is their monthly salary.

Sample Input

employee_id	name	months	salary
12228	Rose	15	1968
33645	Angela	1	3443
45692	Frank	17	1608
56118	Patrick	7	1345
59725	Lisa	11	2330
74197	Kimberly	16	4372
78454	Bonnie	8	1771
83565	Michael	6	2017
98607	Todd	5	3396
99989	Joe	9	3573

Sample
Output Angela
Bonnie
Frank
Joe
Kimberly
Lisa
Michael
Patrick
Rose
Todd

Q141. Write a query that prints a list of employee names (i.e.: the name attribute) for employees in Employee having a salary greater than $2000 per month who have been employees for less than 10 months. Sort your result by ascending employee_id.

Input Format
The Employee table containing employee data for a company is described as follows:

Column	Type
employee_id	Integer
name	String
months	Integer
salary	Integer

where employee_id is an employee's ID number, name is their name, months is the total number of months they've been working for the company, and salary is their monthly salary.
Sample Input

employee_id	name	months	salary
12228	Rose	15	1968
33645	Angela	1	3443
45692	Frank	17	1608
56118	Patrick	7	1345
59725	Lisa	11	2330
74197	Kimberly	16	4372
78454	Bonnie	8	1771
83565	Michael	6	2017
98607	Todd	5	3396
99989	Joe	9	3573

Sample
Output Angela
Michael
Todd
Joe
Explanation
Angela has been an employee for 1 month and earns $3443 per month.
Michael has been an employee for 6 months and earns $2017 per month.
Todd has been an employee for 5 months and earns $3396 per month.
Joe has been an employee for 9 months and earns $3573 per month.
We order our output by ascending employee_id.

Q142.

Write a query identifying the type of each record in the TRIANGLES table using its three side lengths. Output one of the following statements for each record in the table:

- Equilateral: It's a triangle with sides of equal length.
- Isosceles: It's a triangle with sides of equal length.
- Scalene: It's a triangle with sides of differing lengths.
- Not A Triangle: The given values of A, B, and C don't form a triangle.

Input Format
The TRIANGLES table is described as follows:

Column	Type
A	Integer
B	Integer
C	Integer

Each row in the table denotes the lengths of each of a triangle's three sides.
Sample Input

A	B	C
20	20	23
20	20	20
20	21	22
13	14	30

Sample
Output
Isosceles
Equilateral
Scalene
Not A Triangle

Explanation
Values in the tuple(20,20,23) form an Isosceles triangle, because A ≡ B.
Values in the tuple(20,20,20) form an Equilateral triangle, because A ≡ B ≡ C . Values in the tuple(20,21,22) form a Scalene triangle, because A ≠ B ≠C .
Values in the tuple (13,14,30) cannot form a triangle because the combined value of sides A and B is not larger than that of side C .

Q143.

Samantha was tasked with calculating the average monthly salaries for all employees in the EMPLOYEES table, but did not realise her keyboard's 0 key was broken until after completing the calculation. She wants your help finding the difference between her miscalculation (using salaries with any zeros removed), and the actual average salary.
Write a query calculating the amount of error (i.e.: actual - miscalculated average monthly salaries), and round it up to the next integer.

Input Format
The EMPLOYEES table is described as follows:

Column	Type
ID	Integer
Name	String
Salary	Integer

Note: Salary is per month. Constraints 1000<salary < 10^5 Sample Input

ID	Name	Salary
1	Kristeen	1420
2	Ashley	2006
3	Julia	2210
4	Maria	3000

Sample Output 2061

Explanation
The table below shows the salaries without zeros as they were entered by Samantha:

ID	Name	Salary
1	Kristeen	142
2	Ashley	26
3	Julia	221
4	Maria	3

Samantha computes an average salary of 98.00 . The actual average salary is 2159.00.
The resulting error between the two calculations is 2159.00-98.00 = 2061.00. Since it is equal to the integer 2061, it does not get rounded up.

Q144.

We define an employee's total earnings to be their monthly salary * months worked, and the maximum total earnings to be the maximum total earnings for any employee in the Employee table. Write a query to find the maximum total earnings for all employees as well as the total number of employees who have maximum total earnings. Then print these values as 2 space-separated integers.
Level - Easy
Hint - Use Aggregation functions
Input Format
The Employee table containing employee data for a company is described as follows:

Column	Type
employee_id	Integer
name	String
months	Integer
salary	Integer

where employee_id is an employee's ID number, name is their name, months is the total number of months they've been working for the company, and salary is the their monthly salary.
Sample Input

employee_id	name	months	salary
12228	Rose	15	1968
33645	Angela	1	3443
45692	Frank	17	1608
56118	Patrick	7	1345
59725	Lisa	11	2330
74197	Kimberly	16	4372
78454	Bonnie	8	1771
83565	Michael	6	2017
98607	Todd	5	3396
99989	Joe	9	3573

Sample
Output 69952
1

Explanation:
The table and earnings data is depicted in the following diagram:

employee_id	name	months	salary	earnings
12228	Rose	15	1968	29520
33645	Angela	1	3443	3443
45692	Frank	17	1608	27336
56118	Patrick	7	1345	9415
59725	Lisa	11	2330	25630
74197	Kimberly	16	4372	69952
78454	Bonnie	8	1771	14168
83565	Michael	6	2017	12102
98607	Todd	5	3396	16980
99989	Joe	9	3573	32157

The maximum earnings value is 69952. The only employee with earnings= 69952 is Kimberly, so we print the maximum earnings value (69952) and a count of the number of employees who have earned $69952 (which is 1) as two space-separated values.

Q145.

Generate the following two result sets:

1. Query an alphabetically ordered list of all names in OCCUPATIONS, immediately followed by the first letter of each profession as a parenthetical (i.e.: enclosed in parentheses). For example: AnActorName(A), ADoctorName(D), AProfessorName(P), and ASingerName(S).

Query the number of occurrences of each occupation in OCCUPATIONS. Sort the occurrences in ascending order, and output them in the following format:
Level - Medium
There are a total of [occupation_count] [occupation]s.

2. where [occupation_count] is the number of occurrences of an occupation in OCCUPATIONS and [occupation] is the lowercase occupation name. If more than one Occupation has the same [occupation_count], they should be ordered alphabetically.

Note: There will be at least two entries in the table for each type of occupation.
Input Format
The OCCUPATIONS table is described as follows:

Column	Type
Name	String
Occupation	String

Occupation will only contain one of the following values: Doctor, Professor, Singer or Actor.
Sample Input
An OCCUPATIONS table that contains the following records:

Name	Occupation
Samantha	Doctor
Julia	Actor
Maria	Actor
Meera	Singer
Ashely	Professor
Ketty	Professor
Christeen	Professor
Jane	Actor
Jenny	Doctor
Priya	Singer

Sample
Output
Ashely(P)
Christeen(P)
Jane(A)
Jenny(D)
Julia(A)
Ketty(P)
Maria(A)
Meera(S)
Priya(S)
Samantha(D)
There are a total of 2 doctors.
There are a total of 2 singers.
There are a total of 3 actors.
There are a total of 3 professors.

Hint -
The results of the first query are formatted to the problem description's specifications.
The results of the second query are ascendingly ordered first by number of names corresponding to each profession (2<= 2<=3<=3), and then alphabetically by profession (doctor <= singer , and actor <= professor).

Q146 .

Pivot the Occupation column in OCCUPATIONS so that each Name is sorted alphabetically and displayed underneath its corresponding Occupation. The output column headers should be Doctor, Professor, Singer, and Actor, respectively.
Note: Print NULL when there are no more names corresponding to an occupation.

Input Format
The OCCUPATIONS table is described as follows:

Column	Type
Name	String
Occupation	String

Occupation will only contain one of the following values: Doctor, Professor, Singer or Actor.
Sample Input

Name	Occupation
Samantha	Doctor
Julia	Actor
Maria	Actor
Meera	Singer
Ashely	Professor
Ketty	Professor
Christeen	Professor
Jane	Actor
Jenny	Doctor
Priya	Singer

Sample Output
Jenny Ashley Meera Jane
Samantha Christeen Priya Julia
NULL Ketty NULL Maria

Hint -
The first column is an alphabetically ordered list of Doctor names.
The second column is an alphabetically ordered list of Professor names.
The third column is an alphabetically ordered list of Singer names.
The fourth column is an alphabetically ordered list of Actor names.
The empty cell data for columns with less than the maximum number of names per occupation (in this case, the Professor and Actor columns) are filled with NULL values.

Q147.

You are given a table, BST, containing two columns: N and P, where N represents the value of a node in Binary Tree, and P is the parent of N.

Column	Type
N	Integer
P	Integer

Write a query to find the node type of Binary Tree ordered by the value of the node. Output one of the following for each node:

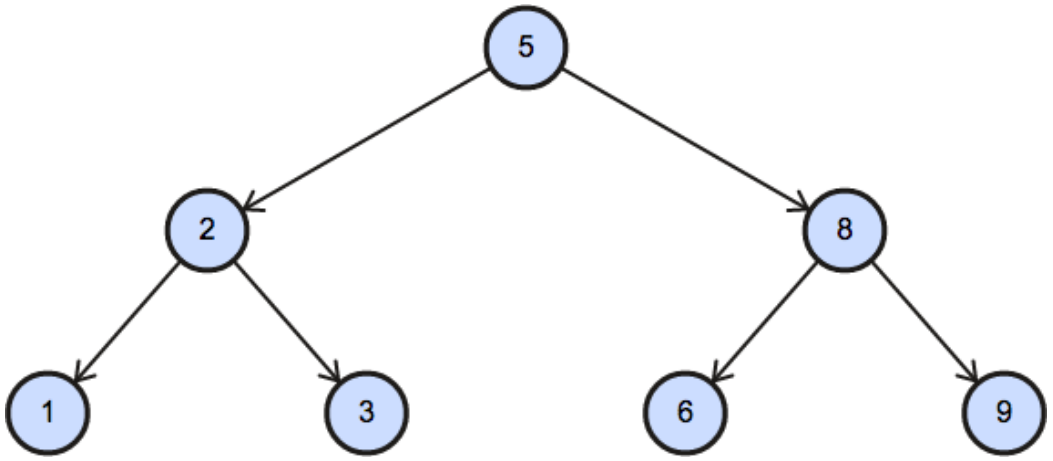
- Root: If node is root node.
- Leaf: If node is leaf node.
- Inner: If node is neither root nor leaf node.

Sample Input

N	P
1	2
3	2
6	8
9	8
2	5
8	5
5	null

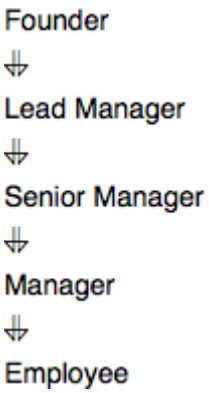
Sample
Output 1 Leaf
2 Inner
3 Leaf
5 Root
6 Leaf
8 Inner
9 Leaf

Explanation
The Binary Tree below illustrates the sample:



Q148 .

Amber's conglomerate corporation just acquired some new companies. Each of the companies follows this hierarchy:



Given the table schemas below, write a query to print the company_code, founder name, total number of lead managers, total number of senior managers, total number of managers, and total number of employees. Order your output by ascending company_code.
Level -
Medium Note:

- The tables may contain duplicate records.

- The company_code is string, so the sorting should not be numeric. For example, if the company_codes are C_1, C_2, and C_10, then the ascending company_codes will be C_1, C_10, and C_2.

Input Format

The following tables contain company data:

- Company: The company_code is the code of the company and founder is the founder of the company.

Column	Type
company_code	String
founder	String

- Lead_Manager: The lead_manager_code is the code of the lead manager, and the company_code is the code of the working company.

Column	Type
lead_manager_code	String
company_code	String

- Senior_Manager: The senior_manager_code is the code of the senior manager, the lead_manager_code is the code of its lead manager, and the company_code is the code of the working company.

Column	Type
senior_manager_code	String
lead_manager_code	String
company_code	String

- Manager: The manager_code is the code of the manager, the senior_manager_code is the code of its senior manager, the lead_manager_code is the code of its lead manager, and the company_code is the code of the working company.

Column	Type
manager_code	String
senior_manager_code	String
lead_manager_code	String
company_code	String

- Employee: The employee_code is the code of the employee, the manager_code is the code of its manager, the senior_manager_code is the code of its senior manager, the

lead_manager_code is the code of its lead manager, and the company_code is the code of the working company.

Column	Type
employee_code	String
manager_code	String
senior_manager_code	String
lead_manager_code	String
company_code	String

Sample Input

Company Table:

company_code	founder
C1	Monika
C2	Samantha

Lead_Manager Table:

lead_manager_code	company_code
LM1	C1
LM2	C2

Senior_Manager Table:

senior_manager_code	lead_manager_code	company_code
SM1	LM1	C1
SM2	LM1	C1
SM3	LM2	C2

Manager Table:

manager_code	senior_manager_code	lead_manager_code	company_code
M1	SM1	LM1	C1
M2	SM3	LM2	C2
M3	SM3	LM2	C2

Employee Table:

employee_code	manager_code	senior_manager_code	lead_manager_code	company_code
E1	M1	SM1	LM1	C1
E2	M1	SM1	LM1	C1
E3	M2	SM3	LM2	C2
E4	M3	SM3	LM2	C2

Sample Output
C1 Monika 1 2 1
2
C2 Samantha 1 1 2 2

Hint -
In company C1, the only lead manager is LM1. There are two senior managers, SM1 and SM2, under LM1. There is one manager, M1, under senior manager SM1. There are two employees, E1 and E2, under manager M1.
In company C2, the only lead manager is LM2. There is one senior manager, SM3, under LM2. There are two managers, M2 and M3, under senior manager SM3. There is one employee, E3, under manager M2, and another employee, E4, under manager, M3.

Q149 .

You are given a table, Functions, containing two columns: X and Y.

Column	Type
X	Integer
Y	Integer

Two pairs (X1, Y1) and (X2, Y2) are said to be symmetric pairs if X1 = Y2 and X2 = Y1.
Write a query to output all such symmetric pairs in ascending order by the value of X. List the rows such that X1 ≤ Y1.
Level - Medium
Source -
Hackerrank
Hint - Use group by and having clause .
Sample Input

X	Y
20	20
20	20
20	21
23	22
22	23
21	20

Sample
Output 20 20
20 21
22 23

Q150 .

You are given three tables: Students, Friends and Packages. Students contains two columns: ID and Name. Friends contains two columns: ID and Friend_ID (ID of the ONLY best friend). Packages contain two columns: ID and Salary (offered salary in $ thousands per month).

Column	Type
ID	Integer
Name	String

Students

Column	Type
ID	Integer
Friend_ID	Integer

Friends

Column	Type
ID	Integer
Salary	Float

Packages

Write a query to output the names of those students whose best friends got offered a higher salary than them. Names must be ordered by the salary amount offered to the best friends. It is guaranteed that no two students get the same salary offer.

Sample Input

ID	Friend_ID
1	2
2	3
3	4
4	1

Friends

ID	Name
1	Ashley
2	Samantha
3	Julia
4	Scarlet

Students

ID	Salary
1	15.20
2	10.06
3	11.55
4	12.12

Packages

Sample
Output
Samantha
Julia
Scarlet

Explanation
See the following table:

ID	1	2	3	4
Name	Ashley	Samantha	Julia	Scarlet
Salary	15.20	10.06	11.55	12.12
Friend ID	2	3	4	1
Friend Salary	10.06	11.55	12.12	15.20

Now,

- Samantha's best friend got offered a higher salary than her at 11.55
- Julia's best friend got offered a higher salary than her at 12.12
- Scarlet's best friend got offered a higher salary than her at 15.2
- Ashley's best friend did NOT get offered a higher salary than her The

name output, when ordered by the salary offered to their friends, will be:

- Samantha
- Julia
- Scarlet

Q151.

Julia just finished conducting a coding contest, and she needs your help assembling the leaderboard! Write a query to print the respective hacker_id and name of hackers who achieved full scores for more than one challenge. Order your output in descending order by the total number of challenges in which the hacker earned a full score. If more than one hacker received full scores in the same number of challenges, then sort them by ascending hacker_id.
Level - Medium
Hint - Use group by and having clause and order by .
Input Format
The following tables contain contest data:

- Hackers: The hacker_id is the id of the hacker, and name is the name of the hacker.

Column	Type
hacker_id	Integer
name	String

- Difficulty: The difficult_level is the level of difficulty of the challenge, and score is the score of the challenge for the difficulty level.

Column	Type
difficulty_level	Integer
score	Integer

- Challenges: The challenge_id is the id of the challenge, the hacker_id is the id of the hacker who created the challenge, and difficulty_level is the level of difficulty of the challenge.

Column	Type
challenge_id	Integer
hacker_id	Integer
difficulty_level	Integer

- Submissions: The submission_id is the id of the submission, hacker_id is the id of the hacker who made the submission, challenge_id is the id of the challenge that the submission belongs

Column	Type
submission_id	Integer
hacker_id	Integer
challenge_id	Integer
score	Integer

to, and score is the score of the submission.

Sample Input

Hackers Table:

hacker_id	name
5580	Rose
8439	Angela
27205	Frank
52243	Patrick
52348	Lisa
57645	Kimberly
77726	Bonnie
83082	Michael
86870	Todd
90411	Joe

Difficulty Table:

difficulty_level	score
1	20
2	30
3	40
4	60
5	80
6	100
7	120

Challenges Table:

challenge_id	hacker_id	difficulty_level
4810	77726	4
21089	27205	1
36566	5580	7
66730	52243	6
71055	52243	2

:

submission_id	hacker_id	challenge_id	score
68628	77726	36566	30
65300	77726	21089	10
40326	52243	36566	77
8941	27205	4810	4
83554	77726	66730	30
43353	52243	66730	0
55385	52348	71055	20
39784	27205	71055	23
94613	86870	71055	30
45788	52348	36566	0
93058	86870	36566	30
7344	8439	66730	92
2721	8439	4810	36
523	5580	71055	4
49105	52348	66730	0
55877	57645	66730	80
38355	27205	66730	35
3924	8439	36566	80
97397	90411	66730	100
84162	83082	4810	40
97431	90411	71055	30

Submissions Table

Sample Output
90411 Joe

Explanation
Hacker 86870 got a score of 30 for challenge 71055 with a difficulty level of 2, so 86870 earned a full score for this challenge.
Hacker 90411 got a score of 30 for challenge 71055 with a difficulty level of 2, so 90411 earned a full score for this challenge.
Hacker 90411 got a score of 100 for challenge 66730 with a difficulty level of 6, so 90411 earned a full score for this challenge.
Only hacker 90411 managed to earn a full score for more than one challenge, so we print their hacker_id and name as 2 space-separated values.

Q152.

You are given a table, Projects, containing three columns: Task_ID, Start_Date and End_Date. It is guaranteed that the difference between the End_Date and the Start_Date is equal to 1 day for each row in the table.
Level - Medium
Hint - Use Advance join

Column	*Type*
Task_ID	*Integer*
Start_Date	*Date*
End_Date	*Date*

If the End_Date of the tasks are consecutive, then they are part of the same project. Samantha is interested in finding the total number of different projects completed.
Write a query to output the start and end dates of projects listed by the number of days it took to complete the project in ascending order. If there is more than one project that have the same number of completion days, then order by the start date of the project.
Sample Input

Task_ID	Start_Date	End_Date
1	2015-10-01	2015-10-02
2	2015-10-02	2015-10-03
3	2015-10-03	2015-10-04
4	2015-10-13	2015-10-14
5	2015-10-14	2015-10-15
6	2015-10-28	2015-10-29
7	2015-10-30	2015-10-31

Sample Output
2015-10-28 2015-10-29
2015-10-30 2015-10-31
2015-10-13 2015-10-15
2015-10-01 2015-10-04

Explanation
The example describes following four projects:

- Project 1: Tasks 1, 2 and 3 are completed on consecutive days, so these are part of the project. Thus the start date of project is 2015-10-01 and end date is 2015-10-04, so it took 3 days to complete the project.
- Project 2: Tasks 4 and 5 are completed on consecutive days, so these are part of the project. Thus, the start date of project is 2015-10-13 and end date is 2015-10-15, so it took 2 days to complete the project.
- Project 3: Only task 6 is part of the project. Thus, the start date of project is 2015-10-28 and end date is 2015-10-29, so it took 1 day to complete the project.
- Project 4: Only task 7 is part of the project. Thus, the start date of project is 2015-10-30 and end date is 2015-10-31, so it took 1 day to complete the project.

Query:

```
SELECT Start_Date, min(End_Date)
FROM
 (SELECT Start_Date FROM Projects WHERE Start_Date NOT IN (SELECT End_Date FROM Projects)) a ,
 (SELECT End_Date FROM Projects WHERE End_Date NOT IN (SELECT Start_Date FROM Projects)) b
WHERE Start_Date < End_Date
GROUP BY Start_Date
ORDER BY DATEDIFF(min(End_Date), Start_Date) ASC, Start_Date ASC;
```

Q153.

In an effort to identify high-value customers, Amazon asked for your help to obtain data about users who go on shopping sprees. A shopping spree occurs when a user makes purchases on 3 or more consecutive days.
List the user IDs who have gone on at least 1 shopping spree in ascending

order. transactions Table:

Column Name	Type
user_id	integer
amount	float
transaction_date	timestamp

transactions Example Input:

user_id	amount	transaction_date
1	9.99	08/01/2022 10:00:00
1	55	08/17/2022 10:00:00
2	149.5	08/05/2022 10:00:00
2	4.89	08/06/2022 10:00:00
2	34	08/07/2022 10:00:00

Example Output:

user_id
2

```
SELECT t1.user_id FROM transactions t1
inner join transactions t2 on t1.user_id = t2.user_id and
t2.transaction_date=t1.transaction_date+INTERVAL '1 day'
inner join transactions t3 on  t1.user_id = t3.user_id and
t3.transaction_date=t1.transaction_date+INTERVAL '2 day'
;
```

Q154 .

You are given a table of PayPal payments showing the payer, the recipient, and the amount paid. A two-way unique relationship is established when two people send money back and forth. Write a query to find the number of two-way unique relationships in this data.
Assumption:

- A payer can send money to the same recipient multiple times.

`payments` Table:

Column Name	Type
payer_id	integer
recipient_id	integer
amount	integer

`payments` Example Input:

payer_id	recipient_id	amount
101	201	30
201	101	10
101	301	20
301	101	80
201	301	70

Example Output:

unique_relationships
2

```
with cte as(
SELECT DISTINCT p1.payer_id,p1.recipient_id
from payments p1 join
payments p2
on p1.payer_id = p2.recipient_id and p1.recipient_id = p2.payer_id
and p1.payer_id<p1.recipient_id
)
Select count(1) as unique_relationships
from cte;
```

Q155 .

Assume you are given the table below containing information on Facebook user logins. Write a query to obtain the number of reactivated users (which are dormant users who did not log in the previous month, then logged in during the current month).
Output the current month (in numerical) and number of reactivated

users. Assumption:

- The rows in the user_logins table are complete for the year of 2022 and there are no missing dates.

Level - Medium
Hint - Reactivated users are dormant users who did not log in the previous month, who then logged in the following month

`user_logins` Table:

Column Name	Type
user_id	integer
login_date	datetime

`user_logins` Table:

user_id	login_date
725	03/03/2022 12:00:00
245	03/28/2022 12:00:00
112	03/05/2022 12:00:00
245	04/29/2022 12:00:00

112	04/05/2022 12:00:00

Assume that the above table is complete for the months of February to April 2022.

Query:

```
SELECT EXTRACT(MONTH from login_date) current_month,count(distinct user_id)
FROM user_logins curr_month
where not exists (
Select * from user_logins prev_month
where curr_month.user_id = prev_month.user_id AND
EXTRACT(MONTH from prev_month.login_date) = (
EXTRACT(MONTH from curr_month.login_date-'1 month'::interval))
)
group by extract(month from curr_month.login_date)
ORDER BY current_month
```

Q156. Assume you are given the table below on user transactions. Write a query to obtain the list of customers whose first transaction was valued at $50 or more. Output the number of users.
Clarification:

- Use the `transaction_date` field to determine which transaction should be labeled as the first for each user.
- Use a specific function (we can't give too much away!) to account for scenarios where a user had multiple transactions on the same day, and one of those was the first.

`user_transactions` Table:

Column Name	Type
transaction_id	integer
user_id	integer
spend	decimal
transaction_date	timestamp

`user_transactions` Example Input:

transaction_id	user_id	spend	transaction_date
759274	111	49.50	02/03/2022 00:00:00
850371	111	51.00	03/15/2022 00:00:00
615348	145	36.30	03/22/2022 00:00:00
137424	156	151.00	04/04/2022 00:00:00
248475	156	87.00	04/16/2022 00:00:00

Example Output:

users
1

```
with cte as(
Select *,dense_rank() over(partition by user_id order by transaction_date) rnk
from user_transactions
)
Select count(disitinct user_id) as users from cte where rnk=1 and spend>=50;
```

Q157.

Assume you are given the table below containing measurement values obtained from a sensor over several days. Measurements are taken several times within a given day.
Write a query to obtain the sum of the odd-numbered and even-numbered measurements on a particular day, in two different columns.

Note that the 1st, 3rd, 5th measurements within a day are considered odd-numbered measurements and the 2nd, 4th, 6th measurements are even-numbered measurements.

`measurements` Table:

Column Name	Type
measurement_id	integer
measurement_value	decimal
measurement_time	datetime

`measurements` Example Input:

measurement_id	measurement_value	measurement_time
131233	1109.51	07/10/2022 09:00:00
135211	1662.74	07/10/2022 11:00:00
523542	1246.24	07/10/2022 13:15:00
143562	1124.50	07/11/2022 15:00:00
346462	1234.14	07/11/2022 16:45:00

Example Output:

measurement_day	odd_sum	even_sum
07/10/2022 00:00:00	2355.75	1662.74
07/11/2022 00:00:00	1124.50	1234.14

query:

```
with cte as(
select  measurement_value,measurement_time,
row_number() over (PARTITION BY measurement_time::Date order by measurement_time) rn
from measurements)
select measurement_time::Date measurement_day,
sum(case when rn%2!=0 then measurement_value else 0 end) as odd_sum,
sum(case when rn%2=0 then measurement_value else 0 end) as even_sum
from cte
group by measurement_time::Date
order by measurement_value
```

Q158.

In an effort to identify high-value customers, Amazon asked for your help to obtain data about users who go on shopping sprees. A shopping spree occurs when a user makes purchases on 3 or more consecutive days.
List the user IDs who have gone on at least 1 shopping spree in ascending order.

Level - Medium
Hint - Use self
join

`transactions` Table:

Column Name	Type
user_id	integer
amount	float
transaction_date	timestamp

`transactions` Example Input:

user_id	amount	transaction_date
1	9.99	08/01/2022 10:00:00
1	55	08/17/2022 10:00:00
2	149.5	08/05/2022 10:00:00
2	4.89	08/06/2022 10:00:00
2	34	08/07/2022 10:00:00

Example Output:

user_id
2

Q159.

The Airbnb Booking Recommendations team is trying to understand the "substitutability" of two rentals and whether one rental is a good substitute for another. They want you to write a query to find the unique combination of two Airbnb rentals with the same exact amenities offered.
Output the count of the unique combination of Airbnb rentals.

Level - Medium
Hint - Use unique statement
Assumptions:

- If property 1 has a kitchen and pool, and property 2 has a kitchen and pool too, it is a good substitute and represents a unique matching rental.
- If property 3 has a kitchen, pool and fireplace, and property 4 only has a pool and fireplace, then it is not a good substitute.

`rental_amenities` Table:

Column Name	Type
rental_id	integer
amenity	string

`rental_amenities` Example Input:

rental_id	amenity
123	pool
123	kitchen
234	hot tub
234	fireplace
345	kitchen
345	pool
456	pool

Example Output:

matching_airbnb
1

Query:

```
with cte as(
Select rental_id,string_agg(amenity,',' order by amenity) amenities
from rental_amenities
group by rental_id
)
select count(1) matching_aribnb from
cte c1 join
cte c2 on c1.rental_id<c2.rental_id and c1.amenities = c2.amenities;
```

Q160.

Google marketing managers are analysing the performance of various advertising accounts over the last month. They need your help to gather the relevant data.
Write a query to calculate the return on ad spend (ROAS) for each advertiser across all ad campaigns. Round your answer to 2 decimal places, and order your output by the advertiser_id.

Level - Medium
Hint: ROAS = Ad Revenue / Ad Spend

ad_campaigns Table:

Column Name	Type
campaign_id	integer
spend	integer
revenue	float
advertiser_id	integer

ad_campaigns Example Input:

campaign_id	spend	revenue	advertiser_id
1	5000	7500	3
2	1000	900	1
3	3000	12000	2
4	500	2000	4
5	100	400	4

Example Output:

advertiser_id	ROAS

1	0.9
2	4
3	1.5
4	4

Query:
```
SELECT advertiser_id,round((sum(revenue)/sum(spend))::numeric,2) ROAS
FROM ad_campaigns
group by advertiser_id
order by 1
;
```

Q161.

Your team at Accenture is helping a Fortune 500 client revamp their compensation and benefits program. The first step in this analysis is to manually review employees who are potentially overpaid or underpaid.
An employee is considered to be potentially overpaid if they earn more than 2 times the average salary for people with the same title. Similarly, an employee might be underpaid if they earn less than half of the average for their title. We'll refer to employees who are both underpaid and overpaid as compensation outliers for the purposes of this problem.

Write a query that shows the following data for each compensation outlier: employee ID, salary, and whether they are potentially overpaid or potentially underpaid (refer to Example Output below).

Hint: ROAS = Ad Revenue / Ad Spend

employee_pay Table:

Column Name	Type
employee_id	integer
salary	integer
title	varchar

employee_pay Example Input:

employee_id	salary	title
101	80000	Data Analyst
102	90000	Data Analyst
103	100000	Data Analyst
104	30000	Data Analyst
105	120000	Data Scientist

106	100000	Data Scientist
107	80000	Data Scientist
108	310000	Data Scientist

Example Output:

employee_id	salary	status
104	30000	Underpaid
108	310000	Overpaid

Query:

```
Select employee_id,salary,
case when salary<(q.avg_salary/2) then 'Underpaid'
when salary>(2*avg_salary) then 'Overpaid'
end as status
from employee_pay e
JOIN
(Select title,avg(salary) avg_salary from employee_pay group by title)q
on e.title = q.title
where salary<(q.avg_salary/2) or salary>(2*avg_salary);
```

Q162.

You are given a table of PayPal payments showing the payer, the recipient, and the amount paid. A two-way unique relationship is established when two people send money back and forth. Write a query to find the number of two-way unique relationships in this data.
Assumption:

- A payer can send money to the same recipient multiple times.

Hint- Use the INTERSECT set operator.

payments Table:

Column Name	Type
payer_id	integer
recipient_id	integer
amount	integer

payments Example Input:

payer_id	recipient_id	amount
101	201	30
201	101	10

101	301	20
301	101	80
201	301	70

Example Output:

unique_relationships
2

Q163.

Assume you are given the table below containing information on user purchases. Write a query to obtain the number of users who purchased the same product on two or more different days. Output the number of unique users.
PS. On 26 Oct 2022, we expanded the purchases data set, thus the oficial output may vary from before.

Hint- Count the distinct number of dates formatted into the DATE format in the COUNT(DISTINCT).

purchases Table:

Column Name	Type
user_id	integer
product_id	integer
quantity	integer
purchase_date	datetime

purchasesExample Input:

user_id	product_id	quantity	purchase_date
536	3223	6	01/11/2022 12:33:44
827	3585	35	02/20/2022 14:05:26
536	3223	5	03/02/2022 09:33:28
536	1435	10	03/02/2022 08:40:00
827	2452	45	04/09/2022 00:00:00

Example Output:

repeat_purchasers
1

Query:

```
SELECT count(DISTINCT p1.user_id) users_num
FROM purchases p1
join purchases p2
on p1.user_id = p2.user_id and p1.product_id = p2.product_id
and p1.purchase_date!=p2.purchase_date
GROUP BY p1.user_id
```

Q164.

Assume you are given the table below containing the information on the searches attempted and the percentage of invalid searches by country. Write a query to obtain the percentage of invalid searches. Output the country in ascending order, total searches and overall percentage of invalid searches rounded to 2 decimal places.

Level - Medium
Hint- Use sum() and where clause

Notes:

- num_search = Number of searches attempted; invalid_result_pct = Percentage of invalid searches.
- In cases where countries have search attempts but do not have a percentage of invalid searches in invalid_result_pct, it should be excluded, and vice versa.
- To find the percentages, multiply by 100.0 and not 100 to avoid integer division.

search_category Table:

Column Name	Type
country	string
search_cat	string
num_search	integer
invalid_result_pct	decimal

search_category Example Input:

country	search_cat	num_search	invalid_result_pct
UK	home	null	null
UK	tax	98000	1.00

UK	travel	100000	3.25

Query:
```
with cte as
(SELECT country,sum(num_search) total_search,
sum((num_search*invalid_result_pct)/100) invalid_results
FROM search_category
where num_search is not null and invalid_result_pct is not null
group by country)
Select country,total_search,round((invalid_results/total_search)*100.0,2) invalid_reosult_pct
from cte order by 1;
```

Q165.

Say you have access to all the transactions for a given merchant account. Write a query to print the cumulative balance of the merchant account at the end of each day, with the total balance reset back to zero at the end of the month. Output the transaction date and cumulative balance.
Hint-You should use

CASE. `transactions` Table:

Column Name	Type
transaction_id	integer
type	string ('deposit', 'withdrawal')
amount	decimal
transaction_date	timestamp

`transactions` Example Input:

transaction_id	type	amount	transaction_date
19153	deposit	65.90	07/10/2022 10:00:00
53151	deposit	178.55	07/08/2022 10:00:00
29776	withdrawal	25.90	07/08/2022 10:00:00
16461	withdrawal	45.99	07/08/2022 10:00:00
77134	deposit	32.60	07/10/2022 10:00:00

Example Output:

transaction_date	balance
07/08/2022 12:00:00	106.66
07/10/2022 12:00:00	205.16

Query:

```
with cte as(
Select transaction_date::date,
sum(case when type='withdrawal' then -1*amount else amount end) as amount
from transactions
group by transaction_date::date
)
Select transaction_date,
sum(amount)
over(PARTITION BY EXTRACT(year from transaction_date),
extract(month from transaction_date) order by transaction_date) as cum_sum
from cte;
```

Q166.

Assume you are given the table below containing information on Amazon customers and their spend on products belonging to various categories. Identify the top two highest-grossing products within each category in 2022. Output the category, product, and total spend.

Hint- Use where ,and, group by .

product_spend Table:

Column Name	Type
category	string
product	string
user_id	integer
spend	decimal
transaction_date	timestamp

product_spend Example Input:

category	product	user_id	spend	transaction_date
appliance	refrigerator	165	246.00	12/26/2021 12:00:00
appliance	refrigerator	123	299.99	03/02/2022 12:00:00
appliance	washing machine	123	219.80	03/02/2022 12:00:00
electronics	vacuum	178	152.00	04/05/2022 12:00:00
electronics	wireless headset	156	249.90	07/08/2022 12:00:00
electronics	vacuum	145	189.00	07/15/2022 12:00:00

Example Output:

category	product	total_spend

appliance	refrigerator	299.99
appliance	washing machine	219.80
electronics	vacuum	341.00
electronics	wireless headset	249.90

Query:

```
with cte as(
Select category,product,sum(spend) total_spend,
dense_rank() over(partition by category order by sum(spend) desc) rnk
from product_spend
where EXTRACT(year from transaction_date)=2022
group by category,product
)
select category,product,total_spend
from cte where rnk<3;
```

Q167.

Facebook is analysing its user signup data for June 2022. Write a query to generate the churn rate by week in June 2022. Output the week number (1, 2, 3, 4, ...) and the corresponding churn rate rounded to 2 decimal places.
For example, week number 1 represents the dates from 30 May to 5 Jun, and week 2 is from 6 Jun to 12 Jun.

Hint- Use

Extract.

Assumptions:

- If the last_login date is within 28 days of the signup_date, the user can be considered churned.
- If the last_login is more than 28 days after the signup date, the user didn't churn.

users Table:

Column Name	Type
user_id	integer
signup_date	datetime
last_login	datetime

users Example Input:

user_id	signup_date	last_login
1001	06/01/2022 12:00:00	07/05/2022 12:00:00
1002	06/03/2022 12:00:00	06/15/2022 12:00:00

1004	06/02/2022 12:00:00	06/15/2022 12:00:00
1006	06/15/2022 12:00:00	06/27/2022 12:00:00
1012	06/16/2022 12:00:00	07/22/2022 12:00:00

Example Output:

signup_week	churn_rate
1	66.67
3	50.00

User ids 1001, 1002, and 1004 signed up in the first week of June 2022. Out of the 3 users, 1002 and 1004's last login is within 28 days from the signup date, hence they are churned users.

To calculate the churn rate, we take churned users divided by total users signup in the week. Hence 2 users / 3 users = 66.67%.

Query:

Query:

```
with cte as(
Select *,
extract('day' from last_login-signup_date) diff,
(extract('day' from date_trunc('week', signup_date) -
            date_trunc('week', date_trunc('month', signup_date))) / 7 + 1)::int signup_week
from users WHERE
signup_date between '2022-06-01' and '2022-06-30'),
churn_users as(
Select signup_week,COUNT(1) cu
from cte
where diff<=28
group by signup_week),
users_per_week AS(
Select signup_week,count(1) tu from cte group by signup_week
)
Select u.signup_week,round(100*((cu*1.0)/tu),2) churn_rate from churn_users c
join users_per_week u on c.signup_week = u.signup_week
order by 1
;
```

Q168.

You're given two tables on Spotify users' streaming data. songs_history table contains the historical streaming data and songs_weekly table contains the current week's streaming data.
Write a query to output the user id, song id, and cumulative count of song plays as of 4 August 2022 sorted in descending order.

Hint- Use group

by Definitions:

- song_weekly table currently holds data from 1 August 2022 to 7 August 2022.
- songs_history table currently holds data up to to 31 July 2022. The output should include

the historical data in this table.

Assumption:

- There may be a new user or song in the songs_weekly table not present in the songs_history table.

songs_history Table:

Column Name	Type
history_id	integer
user_id	integer
song_id	integer
song_plays	integer

songs_history Example Input:

history_id	user_id	song_id	song_plays
10011	777	1238	11
12452	695	4520	1

song_plays: Refers to the historical count of streaming or song plays by the user.

songs_weekly Table:

Column Name	Type
user_id	integer
song_id	integer
listen_time	datetime

songs_weekly Example Input:

user_id	song_id	listen_time
777	1238	08/01/2022 12:00:00
695	4520	08/04/2022 08:00:00
125	9630	08/04/2022 16:00:00
695	9852	08/07/2022 12:00:00

Example Output:

user_id	song_id	song_plays
777	1238	12
695	4520	2
125	9630	1

Q169.

New TikTok users sign up with their emails, so each signup requires a text confirmation to activate the new user's account.
Write a query to find the confirmation rate of users who confirmed their signups with text messages. Round the result to 2 decimal places.

Hint- Use

Joins

Assumptions:

- A user may fail to confirm several times with text. Once the signup is confirmed for a user, they will not be able to initiate the signup again.
- A user may not initiate the signup confirmation process at all.

`emails` Table:

Column Name	Type
email_id	integer
user_id	integer
signup_date	datetime

`emails` Example Input:

email_id	user_id	signup_date
125	7771	06/14/2022 00:00:00
236	6950	07/01/2022 00:00:00
433	1052	07/09/2022 00:00:00

`texts` Table:

Column Name	Type
text_id	integer
email_id	integer

signup_action	varchar

texts Example Input:

text_id	email_id	signup_action
6878	125	Confirmed
6920	236	Not Confirmed
6994	236	Confirmed

Example Output:

confirm_rate
0.67

Query:-

```
with cte as(
select user_id,song_id,count(1) song_plays from songs_weekly
where listen_time<='08/04/2022 23:59:00'
GROUP BY user_id,song_id
UNION ALL
select user_id,song_id,song_plays from songs_history
)
select user_id,song_id,sum(song_plays) song_plays
from cte group by user_id,song_id
order by 3 desc
```

Q170.

The table below contains information about tweets over a given period of time. Calculate the 3-day rolling average of tweets published by each user for each date that a tweet was posted. Output the user id, tweet date, and rolling averages rounded to 2 decimal places.
Hint- Use Count and group

by Important Assumptions:

- Rows in this table are *consecutive* and ordered by date.
- Each row represents a different day
- A day that does not correspond to a row in this table is not counted. The most recent day is the next row above the current row.

Note: Rolling average is a metric that helps us analyze data points by creating a series of averages based on different subsets of a dataset. It is also known as a moving average, running average, moving mean, or rolling mean.

tweets Table:

Column Name	Type
tweet_id	integer

user_id	integer
tweet_date	timestamp

tweets Example Input:

tweet_id	user_id	tweet_date
214252	111	06/01/2022 12:00:00
739252	111	06/01/2022 12:00:00
846402	111	06/02/2022 12:00:00
241425	254	06/02/2022 12:00:00
137374	111	06/04/2022 12:00:00

Example Output:

user_id	tweet_date	rolling_avg_3days
111	06/01/2022 12:00:00	2.00
111	06/02/2022 12:00:00	1.50
111	06/04/2022 12:00:00	1.33
254	06/02/2022 12:00:00	1.00

Query:

```
with cte as(
SELECT user_id,tweet_date,count(1) cnt FROM tweets
group by user_id,tweet_date
)
Select user_id,tweet_date,
round(avg(cnt) over(PARTITION BY user_id order by tweet_date
rows BETWEEN 2 preceding and current row),2) rolling_avg_3d
from cte
order by 1,2;
```

Q171.

Assume you are given the tables below containing information on Snapchat users, their ages, and their time spent sending and opening snaps. Write a query to obtain a breakdown of the time spent sending vs. opening snaps (as a percentage of total time spent on these activities) for each age group.

Hint- Use join and case

Output the age bucket and percentage of sending and opening snaps. Round the percentage to 2 decimal places.

Notes:

- You should calculate these percentages:
    - time sending / (time sending + time opening)
    - time opening / (time sending + time opening)
- To avoid integer division in percentages, multiply by 100.0 and not 100.

`activities` Table:

Column Name	Type
activity_id	integer
user_id	integer
activity_type	string ('send', 'open', 'chat')
time_spent	float
activity_date	datetime

`activities` Example Input:

activity_id	user_id	activity_type	time_spent	activity_date
7274	123	open	4.50	06/22/2022 12:00:00
2425	123	send	3.50	06/22/2022 12:00:00
1413	456	send	5.67	06/23/2022 12:00:00
1414	789	chat	11.00	06/25/2022 12:00:00
2536	456	open	3.00	06/25/2022 12:00:00

`age_breakdown` Table:

Column Name	Type
user_id	integer
age_bucket	string ('21-25', '26-30', '31-25')

`age_breakdown` Example Input:

user_id	age_bucket
123	31-35
456	26-30
789	21-25

Example Output:

age_bucket	send_perc	open_perc
26-30	65.40	34.60
31-35	43.75	56.25

Query:

```
with cte AS
 ( Select age_bucket,
 sum(case when activity_type='open' then time_spent else 0 end) as time_opening,
 sum(case when activity_type='send' then time_spent else 0 end) as time_sending,
 sum(time_spent) total
  from activities a join age_breakdown ab
  on a.user_id = ab.user_id
  where activity_type in ('open','send')
  group by age_bucket)
Select age_bucket,
ROUND(100.0* time_sending/total,2) send_perc,
ROUND(100.0* time_opening/total,2) open_perc
from cte;
```

Q172 .

The LinkedIn Creator team is looking for power creators who use their personal profile as a company or influencer page. This means that if someone's Linkedin page has more followers than all the companies they work for, we can safely assume that person is a Power Creator. Keep in mind that if a person works at multiple companies, we should take into account the company with the most followers.

Level - Medium
Hint- Use join and group by

Write a query to return the IDs of these LinkedIn power creators in ascending order.

Assumptions:

- A person can work at multiple companies.
- In the case of multiple companies, use the one with largest follower base.

`personal_profiles` Table:

Column Name	Type
profile_id	integer
name	string
followers	integer

`personal_profiles` Example Input:

profile_id	name	followers
1	Nick Singh	92,000

2	Zach Wilson	199,000
3	Daliana Liu	171,000
4	Ravit Jain	107,000
5	Vin Vashishta	139,000
6	Susan Wojcicki	39,000

`employee_company` Table:

Column Name	Type
personal_profile_id	integer
company_id	integer

`employee_company` Example Input:

personal_profile_id	company_id
1	4
1	9
2	2
3	1
4	3
5	6
6	5

`company_pages` Table:

Column Name	Type
company_id	integer
name	string
followers	integer

`company_pages` Example Input:

company_id	name	followers
1	The Data Science Podcast	8,000
2	Airbnb	700,000
3	The Ravit Show	6,000
4	DataLemur	200
5	YouTube	1,6000,000
6	DataScience.Vin	4,500
9	Ace The Data Science Interview	4479

Example Output:

profile_id
1
3
4
5

Query:

```
with cte as(
Select p.profile_id,p.name,p.followers,c.company_id,c.followers company_followers
from personal_profiles p join employee_company e
on p.profile_id = e.personal_profile_id
join company_pages c on c.company_id = e.company_id
)
Select distinct profile_id from cte c
where not exists
(Select * from cte c1 where c.profile_id = c1.profile_id and c1.followers<c1.company_followers)
order by 1;
```