-- STUDENT RESULT GENERATOR --

Relation Database Management System (RDMS): PostgreSQL.

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PROBLEM STATEMENT:

Given tables represent the marks scored by engineering students.

Create a report to display the following results for each student.

- Student_id, Student name, Total Percentage of all marks.
- Failed subjects (must be comma separated values in case of multiple failed subjects)
- Result (if percentage >= 70% then 'First Class', if >= 50% & <=70% then 'Second class', if <=50% then 'Third class' else 'Fail'. The result should be "**Failed**" If a student's fails in any subject irrespective of the percentage marks).

The sequence of subjects in **student_marks** table match with the sequential id from **subjects' table**.

*** Students have the option to choose either 4 or 5 subjects only.

STUDENTS	
ROLL_NO	NAME
2GR5CS011	Maryam
2GR5CS012	Rose
2GR5CS013	Alice
2GR5CS014	Lilly
2GR5CS015	Anna
2GR5CS016	Zoya

STUDENT_MARKS						
STUDENT_ID	SUBJECT1	SUBJECT2	SUBJECT3	SUBJECT4	SUBJECT5	SUBJECT6
2GR5CS011	75		56	69	82	
2GR5CS012	57	46	32	30		
2GR5CS013	40	52	56		31	40
2GR5CS014	65	73		81	33	41
2GR5CS015	98		94		90	20
2GR5CS016		98	98	81	84	89

SUBJECTS		
ID	NAME	PASS_MARKS
S1	Mathematics	40
S2	Algorithms	35
S3	Computer Networks	35
S4	Data Structure	40
S5	Artificial Intelligence	30
S6	Object Oriented Programming	35

We have Three table.

- Students Table.
- Students Marks Table
- Subjects Table

SQL QUERIES PARTS

*select * from students;*
*select * from student_marks;*
*select * from subjects*

To transform a Student Marks Table and Join with a Students Table:

```
select student_id, s.name, column1 as subject_code, column2 as marks
from student_marks sm
cross join lateral (values ('subject1', subject1), ('subject2', subject2), ('subject3', subject3),
                                         ('subject4', subject4), ('subject5', subject5), ('subject6', subject6)) x
join students s on s.roll_no = sm.student_id
where column2 is not null;
```

student_id	name	subject_code	marks
2GR5CS011	Maryam	subject1	75
2GR5CS011	Maryam	subject3	56
2GR5CS011	Maryam	subject4	69
2GR5CS011	Maryam	subject5	82
2GR5CS012	Rose	subject1	57
2GR5CS012	Rose	subject2	46
2GR5CS012	Rose	subject3	32
2GR5CS012	Rose	subject4	30

To Join the new table with a Subject Table to get Subjects name of each Subject code(By using Information Schema because there is no any table have relationship with Subject table).

```
select subject_code, subject_name, pass_marks
from( select row_number() over (order by ordinal_position) as rn, column_name as subject_code
        from information_schema.columns
       where table_name = 'student_marks' and column_name like 'subject%') a
join ( select row_number() over (order by id) as rn, name as subject_name, pass_marks
        from subjects) b
            on b.rn = a.rn;
```

subject_code	subject_name	pass_marks
subject1	Mathematics	40
subject2	Algorithms	35
subject3	Computer Networks	35
subject4	Data Structure	40
subject5	Artificial Intelligence	30
subject6	Object Oriented Programming	35

Then Join this Subject Table with the Existed Table which is Student_Table:
And fetch the following columns which is
student_id, name, subject_name, marks, pass_marks

student_id	name	subject_name	marks	pass_marks
2GR5CS011	Maryam	Mathematics	75	40
2GR5CS011	Maryam	Computer Networks	56	35
2GR5CS011	Maryam	Data Structure	69	40
2GR5CS011	Maryam	Artificial Intelligence	82	30
2GR5CS012	Rose	Mathematics	57	40
2GR5CS012	Rose	Algorithms	46	35
2GR5CS012	Rose	Computer Networks	32	35
2GR5CS012	Rose	Data Structure	30	40

Then find the Average of each student corresponding on the subject he/she takes and the find the subject which he/she failed by getting below pass_marks.
round(avg(marks), 2) as percentage_marks
string_agg(case when marks >= pass_marks then null else subject_name end, ’ , ’) as failed_subject

student_id	name	percentage_marks	failed_subject
2GR5CS011	Maryam	70.5	null
2GR5CS012	Rose	41.25	Computer Networks , Data Structure
2GR5CS013	Alice	43.8	Mathematics
2GR5CS014	Lilly	58.6	null
2GR5CS015	Anna	75.5	Object Oriented Programming
2GR5CS016	Zoya	90	null

coalesce (failed_subject, ’-’) as failed_subject – This convert “**null**” value to be ‘- ‘.

FINAL QUERY:

```
with cte_marks as
        ( select student_id, s.name, column1 as subject_code, column2 as marks
         from student_marks sm
         cross join lateral(values ('subject1', subject1), ('subject2', subject2),('subject3', subject3),
                                     ('subject4', subject4), ('subject5', subject5), ('subject6', subject6)) x
         join students s on s.roll_no = sm.student_id
         where column2 is not null),

     cte_sub as
        (select subject_code, subject_name, pass_marks
         From
            ( select row_number() over (order by ordinal_position) as rn, column_name as  subject_code
            from information_schema.columns
            where table_name = 'student_marks' and column_name like 'subject%')  a
         join
            ( select row_number() over (order by id) as rn, name as subject_name, pass_marks
             from subjects) b
        on b.rn = a.rn),

    cte_agg as
        (select student_id, name
          , round(avg(marks), 2) as average_marks
                , string_agg(case when marks >= pass_marks then null else subject_name end, ' , ') as
                failed_subject
        from cte_marks cm
        join cte_sub cs on cs.subject_code = cm.subject_code
        group by student_id, name)

select student_id, name, average_marks, coalesce(failed_subject, '-') as failed_subject
, case when failed_subject is not null then 'Fail'
          when average_marks >= 70 then 'First Class'
          when average_marks between 50 and 70 then 'Second Class'
          when average_marks < 50 then 'Third Class' end as Result
from cte_agg;
```

THE OUTPUT:

Student_Id	Name	Average_marks	Failed_subject	Result
2GR5CS011	Maryam	70.5	-	First Class
2GR5CS012	Rose	41.25	Computer Networks , Data Structure	Fail
2GR5CS013	Alice	43.8	-	Third Class
2GR5CS014	Lilly	58.6	-	Second Class
2GR5CS015	Anna	75.5	Object Oriented Programming	Fail
2GR5CS016	Zoya	90	-	First Class