Kumar Boste

https://github.com/KumarBoste/Student_Performance_and_Attendance_System

Index

1. Project Overview

The Student Performance & Attendance System is designed to track students' academic results and attendance details to evaluate their overall performance. This system helps educational institutions analyze how attendance impacts academic outcomes and identify students who need support.

2. Problem Statement

Educational institutions often face challenges in evaluating the link between student attendance and academic performance. Manual tracking makes it difficult to:

- Identify students with low attendance or grades.
- Analyze subject-wise performance trends.
- Support teachers with actionable insights.

This system aims to solve these issues by maintaining a structured database in PostgreSQL that connects students, subjects, attendance, and marks.

3. Database Schema & Tools

Database : PostgreSQL
Tool : PgAdmin 4

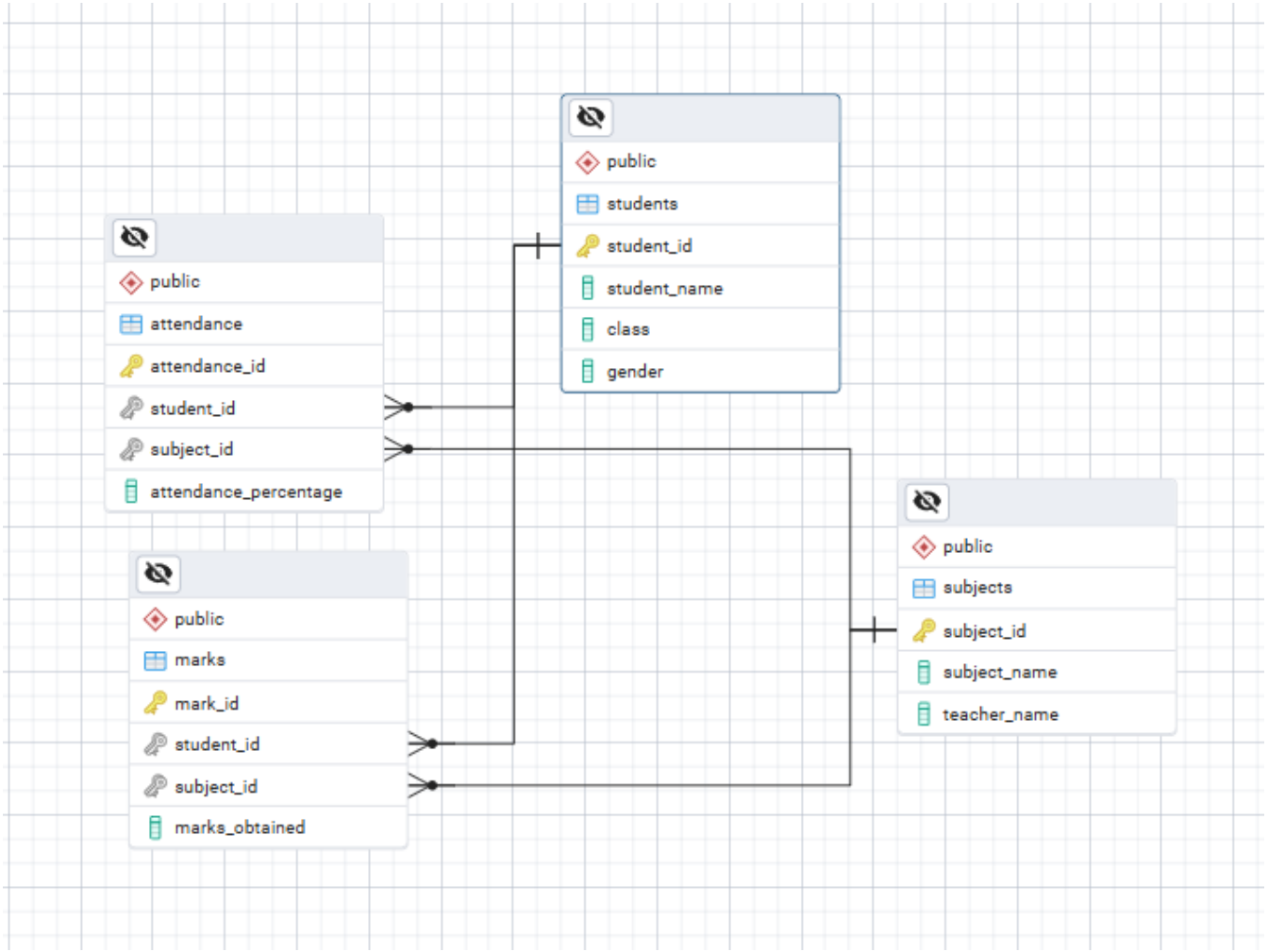
Overview of the Schema :

The Schema consists of 4 interconnected tables that provide insights into the "**Student Performance & Attendance System".**

The project involves multiple table :

- ❖ Students
- ❖ Subjects
- ❖ Attendance
- ❖ Marks

4. Entity Relationship Diagram



5. Analysis 1 – Basic Queries

1. List all Students

Question:
Show all details of students in the database.

SQL Query :

```sql
-- 1. List all students
SELECT * FROM students;
```

Output :

	student_id [PK] integer	student_name character varying (50)	class character varying (20)	gender character varying (10)
1	1	Amit Sharma	10A	Male
2	2	Priya Singh	10A	Female
3	3	Rahul Verma	10B	Male
4	4	Sneha Patel	10B	Female
5	5	Vikram Joshi	10A	Male
6	6	Neha Gupta	10B	Female
7	7	Ravi Kumar	10C	Male
8	8	Pooja Mehta	10C	Female
9	9	Karan Yadav	10A	Male
10	10	Anjali Das	10B	Female

Insight:

Displays all student details — used for verification and roster generation.

2. Show all Subjects and their Teachers

Question:
Which subjects are taught, and who teaches them?

SQL Query :

```
-- 2. Show all subjects and teachers
SELECT subject_name, teacher_name FROM subjects;
```

Output :

	subject_name character varying (50)	teacher_name character varying (50)
1	Mathematics	Mr. Rao
2	Science	Mrs. Iyer
3	English	Mr. Sinha
4	Social Studies	Ms. Thomas

Insight :

Helps identify which teacher teaches which subject.

3. Display Student Attendance details

Question:
Show each student's attendance percentage per subject.

SQL Query :

```
-- 3. Display student attendance details
SELECT s.student_name, sub.subject_name, a.attendance_percentage
FROM attendance a
JOIN students s ON a.student_id = s.student_id
JOIN subjects sub ON a.subject_id = sub.subject_id;
```

Output :

	student_name character varying (50)	subject_name character varying (50)	attendance_percentage numeric (5,2)
1	Amit Sharma	Mathematics	92.50
2	Priya Singh	Mathematics	88.00
3	Rahul Verma	Science	75.00
4	Sneha Patel	Science	95.00
5	Vikram Joshi	English	80.00
6	Neha Gupta	English	85.50
7	Ravi Kumar	Social Studies	60.00
8	Pooja Mehta	Social Studies	70.00
9	Karan Yadav	Mathematics	50.00
10	Anjali Das	Science	96.00

Insight :

Gives attendance data for each student per subject.

4. Find Students in Class ‘10A’

Question:
List the names of all students belonging to class 10A.

SQL Query :

```
-- 4. Find students in class ‘10A’
SELECT student_name FROM students WHERE class = '10A';
```

Output :

	student_name character varying (50)
1	Amit Sharma
2	Priya Singh
3	Vikram Joshi
4	Karan Yadav

Insight :

Helps teachers or class monitors view class-wise lists.

5. Show all Students who scored more than 80 marks

Question:
Which students scored above 80 in any subject?

SQL Query :

```sql
-- 5. Show all students who scored more than 80 marks
SELECT s.student_name, sub.subject_name, m.marks_obtained
FROM marks m
JOIN students s ON m.student_id = s.student_id
JOIN subjects sub ON m.subject_id = sub.subject_id
WHERE m.marks_obtained > 80;
```

Output :

	student_name character varying (50)	subject_name character varying (50)	marks_obtained integer
1	Amit Sharma	Mathematics	88
2	Priya Singh	Mathematics	90
3	Sneha Patel	Science	92
4	Anjali Das	Science	95

Insight :

Identifies top performers in each subject.

6. Analysis 2 – Advance Queries

6. Average Marks of each Subject

Question:

What is the average score per subject across all students?

SQL Query :

```
-- 6. Average marks of each subject
SELECT sub.subject_name, ROUND(AVG(m.marks_obtained),2) AS avg_marks
FROM marks m
JOIN subjects sub ON m.subject_id = sub.subject_id
GROUP BY sub.subject_name;
```

Output :

	subject_name character varying (50)	avg_marks numeric
1	English	77.50
2	Mathematics	72.67
3	Social Studies	57.50
4	Science	84.00

Insight :

Helps evaluate subject difficulty and teaching effectiveness.

7. Correlation between Attendance and Performance

Question:

Is there a link between attendance percentage and marks obtained?

SQL Query :

```sql
-- 7. Correlation between attendance and performance
SELECT s.student_name, a.attendance_percentage, m.marks_obtained
FROM attendance a
JOIN marks m ON a.student_id = m.student_id AND a.subject_id = m.subject_id
JOIN students s ON s.student_id = a.student_id
ORDER BY a.attendance_percentage DESC;
```

Output :

	student_name character varying (50)	attendance_percentage numeric (5,2)	marks_obtained integer
1	Anjali Das	96.00	95
2	Sneha Patel	95.00	92
3	Amit Sharma	92.50	88
4	Priya Singh	88.00	90
5	Neha Gupta	85.50	80
6	Vikram Joshi	80.00	75
7	Rahul Verma	75.00	65
8	Pooja Mehta	70.00	60
9	Ravi Kumar	60.00	55
10	Karan Yadav	50.00	40

Insight :

Observe if students with higher attendance generally have higher marks.

8. Identify Students with Attendance below 70%

Question:
Which students have poor attendance (less than 70%)?

SQL Query :

```sql
-- 8. Identify students with attendance below 70%
SELECT s.student_name, a.attendance_percentage
FROM attendance a
JOIN students s ON a.student_id = s.student_id
WHERE a.attendance_percentage < 70;
```

Output :

	student_name character varying (50)	attendance_percentage numeric (5,2)
1	Ravi Kumar	60.00
2	Karan Yadav	50.00

Insight :

Helps teachers identify students at risk due to low attendance, allowing intervention before exams or poor performance.

9. Rank students by total marks

Question:

Rank students based on their overall total marks.

SQL Query :

```
-- 9. Rank students by total marks
SELECT s.student_name, SUM(m.marks_obtained) AS total_marks,
       RANK() OVER (ORDER BY SUM(m.marks_obtained) DESC) AS rank
FROM marks m
JOIN students s ON m.student_id = s.student_id
GROUP BY s.student_name;
```

Output :

	student_name character varying (50)	total_marks bigint	rank bigint
1	Anjali Das	95	1
2	Sneha Patel	92	2
3	Priya Singh	90	3
4	Amit Sharma	88	4
5	Neha Gupta	80	5
6	Vikram Joshi	75	6
7	Rahul Verma	65	7
8	Pooja Mehta	60	8
9	Ravi Kumar	55	9
10	Karan Yadav	40	10

Insight :

Provides a leaderboard that useful for progress reports, merit lists, or end-term analysis.

10. Average attendance per class

Question:

Which class maintains better average attendance overall?

SQL Query :

```
-- 10. Average attendance per class
SELECT s.class, ROUND(AVG(a.attendance_percentage),2) AS avg_attendance
FROM attendance a
JOIN students s ON a.student_id = s.student_id
GROUP BY s.class;
```

Output :

	class character varying (20)	avg_attendance numeric
1	10B	87.88
2	10C	65.00
3	10A	77.63

Insight :

Determines which class maintains better attendance discipline.

7. SWOT Analysis

Factors	Description
Strengths	Efficient tracking of attendance and performance, easily scalable, supports detailed insights.
Weaknesses	Depends on data accuracy; manual data entry can introduce errors.
Opportunities	Integration with dashboards, machine learning for predicting performance trends.
Threats	Data privacy and security if student data is mishandled

8. Conclusion

The **Student Performance & Attendance System** effectively demonstrates how data-driven insights can enhance educational decision-making.

By integrating **attendance and academic performance**, teachers can identify patterns, intervene early, and improve outcomes.

PostgreSQL's relational capabilities make it ideal for such structured educational data management.