Student Marks Analysis Project

1. Introduction

This project analyzes student performance based on subject-wise marks and attendance data. The goal is to understand the relationship between attendance and performance, identify subject strengths and weaknesses, and recommend strategies for improvement.

2. Dataset Description

The dataset contains the following columns:
- StudentID
- Gender
- Attendance (%)
- Marks in 5 subjects: Math, Science, English, History, Computer
- Grade (calculated)
- Total and Average marks (calculated)
- Rank and Result (Pass/Fail based on average marks)

3. Analysis&Visualizations

3.1 Attendance vs Performance

- A scatter plot was used to visualize Attendance (%) vs Average Marks.
- There is no strong positive correlation; high attendance does not guarantee high marks.
- Conclusion: Attendance alone does not predict performance.

3.2 Subject Correlation Heatmap

- Strong positive correlations:
  * Math & Science: 0.89
  * English & History: 0.86
  * Math & Computer: 0.85
- Very weak correlation:
  * Math & English: 0.022
- Insight: Students perform similarly in related subjects; analytical vs language skills differ.

3.3 Marks Distribution by Subject (Box Plot)

- English and History show lower medians and wider spreads.
- Math, Science, and Computer have higher, consistent performance.
- Several low outliers in English and History indicate the need for targeted support.

3.4 Performance Ranking

- Top 5 students show high total marks and grades.
- Bottom 5 students show consistently low performance across subjects.
- Pass/Fail status was determined by average marks ≥ 35.

4. Recommendations

- Provide remedial classes for English and History.
- Engage high attendance, low-performing students with active learning methods.
- Offer mentoring and progress tracking for bottom performers.
- Use group study and teaching strategies for subject clusters (Math-Science-Computer, English-History).
- Provide teacher training for better engagement in challenging subjects.

5. Conclusion

The analysis reveals that subject proficiency, not attendance, drives student performance. English and History require more focus due to low average scores. Using data-driven insights, educators can offer targeted support to improve student outcomes.