### **Student Performance Analytics - Summary and Insights**

This report analyzes student performance metrics across various factors, aiming to provide actionable insights and key observations. Data cleaning and visualization have been utilized to create a comprehensive and interactive dashboard.

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#### **Key Findings:**

1. **Academic Performance:**
   * **Participation Score:** The average participation score is **4.98%**, significantly lower compared to other academic metrics, indicating room for improvement in student engagement.
   * **Midterm and Final Scores:** Averages of **70.33%** and **74.92%,** respectively, show consistent academic performance across exams and projects.
   * **Assignment Performance:** An average score of **74.80%** highlights strong coursework engagement.
2. **Gender Demographics:**
   * The student population is nearly evenly distributed between **Male (51.02%)** and **Female (48.98%)**, ensuring a balanced demographic for gender-based analyses.
3. **Impact of Lifestyle Factors:**
   * **Sleep Hours vs. Final Scores:** Students’ average sleep hours (6.48–6.50) show no significant impact on final scores, suggesting minimal correlation between sleep and academic outcomes.
4. **Department-Wise Analysis:**
   * **Top Performers:** Departments such as **Computer Science (CS)** and **Engineering** exhibit higher average scores in Midterm, Final, and Attendance metrics.
   * **Underperformers:** Departments like **Business** and **Mathematics** show relatively lower scores, pointing to potential areas of improvement.
5. **Family Income Influence:**
   * **High-Income Families:** Students from high-income families achieve better scores across the board, highlighting the impact of socioeconomic factors.
   * **Medium and Low-Income Families:** These groups also perform well but lag slightly behind in comparison to high-income students.
6. **Attendance Trends:**
   * An overall attendance rate of **75%** positively correlates with higher academic scores, underscoring the importance of class participation.

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#### **Insights:**

1. **Encouraging Participation:**
   * The low participation score (4.98%) indicates the need for initiatives to boost student involvement in interactive or extracurricular activities.
2. **Departmental Intervention:**
   * Focused intervention and resources may be needed for underperforming departments like **Business** and **Mathematics** to uplift student outcomes.
3. **Addressing Socioeconomic Disparities:**
   * Providing additional support or resources to students from low and medium-income families could bridge the performance gap with high-income counterparts.
4. **Balanced Academic Load:**
   * With consistent sleep hours (6.48–6.50) showing minimal performance correlation, efforts can be directed toward reducing stress levels and encouraging effective time management.
5. **Leveraging Attendance:**
   * With attendance positively affecting scores, incentivizing consistent attendance can further enhance student performance across all departments.