Project 1

The hypothesis for this research is that “**Students in technical programs tend to have a higher CGPA than students in non-technical programs.”**

The objective of this project is to examine whether there is a significant difference in the Cumulative Grade Point Average (CGPA) between students enrolled in technical programs (e.g., engineering, computer science, etc.) and those enrolled in non-technical programs (e.g., management, humanities, etc.).

To validate or disprove the hypothesis, I will use the dataset named “Academic performance.csv” that contains academic records of students, including their program of study, gender, graduation year, and performance metrics such as CGPA and SGPA. This research will provide insights into whether the academic performance (CGPA) of students is influenced by their choice of program, with a focus on comparing the performance of students in technical vs. non-technical fields.

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I selected the columns

* ID No - Randomly generated number sequence
* Prog Code (Program of Study)
* YoG (Year of Graduation)
* CGPA (Overall Cumulative Grade Point Average)
* CGPA100 - Cumulative Grade Point Average at the end of the first year
* CGPA400 - Cumulative Grade Point Average at the end of the fourth year

I created a filed named “columns\_AP.csv” containing the columns above using awk command and pushed it to GitHub.



Created an awk command to gather initial data. Since I think students in technical programs have a higher CGPA then those in non-technical programs, I filtered the students between Technical and Non-Technical Students major and compared the average CGPA for both groups.

In the first awk I calculated average CGPA for technical students(CEN - Computer Engineering, CIS - Computer Science, CVE - Civil Engineering, EEE - Electrical and Electronics Engineering, ICE - Information and Communication Engineering, and MCE - Mechanical Engineering)

For the second awk I calculate average CGPA for non-technical students (MIS - Management and Information System, MCB – Microbiology, BCH – Biochemistry, CHM - Industrial Chemistry, MAT – Mathematics)

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Based on these initial calculations, the average CGPA for students in technical programs is **3.50695**, which is noticeably higher than the average CGPA of **3.41589** for students in non-technical programs. This suggests that, at least in this dataset, students in technical programs tend to have higher academic performance as measured by CGPA compared to their non-technical counterparts.

HW 2

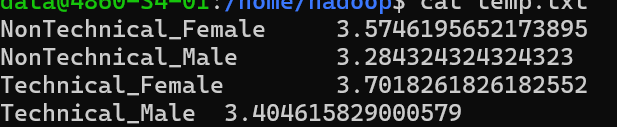
As a follow on to see what other factor may have an effect on the CGPA I decided to analyze whether there is a significant difference in CGPA between male and female students using the previous dataset AcademicPerformance.csv, I extracted the gender and CGPA of each student and calculated the average CGPA for both groups.

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The average CGPA was found to be **3.68 for female students** and **3.39 for male students**, suggesting that on average, female students tend to outperform male students academically. However, the difference is not astounding.

For more complex analysis, I am going to determine the difference In CGPA in gender as well as in technical vs non-technical major.



Female students have a higher CGPA than males in average. However, female students in technical programs have higher CGPA (3.79) compared to female students in Non-TechnicalPrograms3.66)

"While the results indicate that students in technical programs tend to have a higher CGPA than their non-technical counterparts, the analysis is influenced by a significant imbalance in the sample size — with 2640 students in technical programs compared to only 406 in non-technical programs. This discrepancy may affect the generalizability of the findings and should be considered when interpreting the results.