1. **import pandas as pd**

Imports the pandas library, to work with structured data.

1. **student\_mat = pd.read\_csv('/mnt/data/student-mat.csv')**

reads the CSV

1. **student\_por = pd.read\_csv('/mnt/data/student-por.csv')**

reads the CSV student\_por.

1. **common\_columns = list(set(student\_mat.columns) & set(student\_por.columns))**

identify the columns that are common between both datasets and use to merge the datasets.

1. **student\_data = pd.merge(student\_mat, student\_por, on=common\_columns, suffixes=('\_math', '\_por'))**

merges the two datasets (student\_mat and student\_por) using the common columns, adds '\_math' and '\_por' to distinguish

1. **student\_data.rename(columns={'G3\_math': 'FinalGrade\_Math', 'G3\_por': 'FinalGrade\_Portuguese'}, inplace=True)**

Renames the columns 'G3\_math' and 'G3\_por' to 'FinalGrade\_Math' and 'FinalGrade\_Portuguese'

1. **student\_data['FinalGrade\_Math\_Scaled'] = student\_data['FinalGrade\_Math'] \* 5**

New column called 'FinalGrade\_Math\_Scaled'  scale the Math final grade from 0-20 to 0-100 multiplieng the original grade by 5.

1. **student\_data['FinalGrade\_Portuguese\_Scaled'] = student\_data['FinalGrade\_Portuguese'] \* 5**

Scaling the Portuguese final grade from a scale of [0-20] to [0-100].

1. **study\_time\_groups = student\_data.groupby('studytime')[['FinalGrade\_Math\_Scaled', 'FinalGrade\_Portuguese\_Scaled']]**

Group the students based on their weekly study time ('studytime') to analyze the effect on final grades.

1. **study\_time\_summary = study\_time\_groups.agg(['min', 'max', 'median', 'mean']).reset\_index()**

Calculates the minimum, maximum, median, and mean of the final grades for each study time group. Reset\_index() function make the summary easier to read.

1. **age\_absences\_corr = student\_data['age'].corr(student\_data['absences'])**

Calculate correlation between students' ages and the number of school absences.

1. **alcohol\_groups = student\_data.groupby(['Dalc', 'Walc'])[['FinalGrade\_Math\_Scaled', 'FinalGrade\_Portuguese\_Scaled']]**

Groupthe students by workday consumption ('Dalc') and weekend consumption ('Walc').

1. **alcohol\_performance\_summary = alcohol\_groups.mean().reset\_index()**

Calculate the mean final grades for each group based on alcohol consumption. The reset\_index()function to make the table more readable.

1. **romantic\_groups = student\_data.groupby('romantic')[['FinalGrade\_Math\_Scaled', 'FinalGrade\_Portuguese\_Scaled', 'higher']]**

Group the students based on whether they are in a romantic relationship ('romantic'). It selects the scaled final grades and 'higher' (whether a student desires to pursue higher education) for analysis. To see if beeing in a relatioship push you to work harder

1. **romantic\_summary = romantic\_groups.agg({'FinalGrade\_Math\_Scaled': 'mean', 'FinalGrade\_Portuguese\_Scaled': 'mean', 'higher': 'value\_counts'}).reset\_index()**

Mean of the final grades and counts the number of students who want to pursue higher education for each romantic relationship group. The reset\_index() function is used for readability.

1. **with pd.ExcelWriter("**/Users/thomas/Desktop/Erasmus/corsi/MATHEMATICS/PYTHON AND R/EXAM/ASSIGNMENT\_2­/**student\_performance\_analysis.xlsx") as writer:**

This line opens an Excel writer context to save the analysis results. Context manager (with) ensures that the file is saved and closed properly.

1. **study\_time\_summary.to\_excel(writer, sheet\_name=\"StudyTimeAnalysis\", index=False)**

Wrrite the study time analysis summary to an Excel sheet named 'StudyTimeAnalysis'. The index=False parameter ensures that the index column is not included in the Excel file.

1. **alcohol\_performance\_summary.to\_excel(writer, sheet\_name=\"AlcoholPerformance\", index=False)**

Writes the alcohol consumption analysis summary to an Excel sheet named 'AlcoholPerformance'.

1. **romantic\_summary.to\_excel(writer, sheet\_name=\"RomanticRelationship\", index=False)**

This line writes the romantic relationship analysis summary to an Excel sheet named 'RomanticRelationship'.