2.

**Data visualization:**

import pandas as pd

import matplotlib.pyplot as plt

import seaborn as sns

# Load data

data = pd.read\_csv('student\_performance.csv')

# Visualization 1: Scatter plot

sns.scatterplot(data=data, x='study\_time', y='final\_grade')

plt.title('Final grade vs. study time')

plt.show()

# Visualization 2: Histogram

sns.histplot(data=data, x='final\_grade')

plt.title('Distribution of final grades')

plt.show()

# Visualization 3: Bar chart

sns.barplot(data=data, x='gender', y='final\_grade')

plt.title('Average final grade by gender')

plt.show()

# Visualization 4: Box plot

sns.boxplot(data=data, y='final\_grade')

plt.title('Distribution of final grades')

plt.show()

# Visualization 5: Line plot

sns.lineplot(data=data, x='study\_time', y='final\_grade')

plt.title('Final grade over’)

plt.show()

Explanation of what analysis has become easier with each of the visualizations:

1. Scatter plot: The first sort of visualization is the scatter plot, which demonstrates the connection between two variables. To see whether there is a correlation between them, you can make a scatter plot of the final grades and the study time in this situation. This kind of data can assist you in determining whether or not students who study more earn higher grades.

2. Histogram: This style of visualization displays how a value is distributed. To determine how many students received each grade in this instance, you can make a histogram of the final grades. You can better grasp the kids' overall performance with the use of this kind of analysis.3. Bar chart: This type of visualization compares two or more variables. In this case, you can create a bar chart to compare the average final grades of male and female students. This type of analysis can help you understand if there is a gender gap in the performance of the students.

4. Box plot: This type of visualization shows the distribution of a variable and any outliers. In this case, you can create a box plot.

5. Line plot: The line plot demonstrates the gender-specific changes in the final grade over time. This image can be used to spot any changes in performance over time between male and female pupils.

To create the folder structure for the first task, you can follow the following steps:

1. Create a new folder called "project \_name.

2. Inside the project\_name folder, create a new folder called 'data'.

3. Inside the data folder, create three subfolders: 'raw\_data’, 'processed\_data’, and ‘final data’.

4. Inside the 'raw\_data folder, place the raw data file (' my\_data.csv').

5. Create a separate folder for each processing step inside the processed \_data folder. For instance, if you use Python scripts to preprocess the data, you can establish a folder named "pre-processing python”.

6. Create a subdirectory called code inside each processing step folder" where you can keep all the scripts required for that phase.

7. Create an output subdirectory inside each processing step folder so you can save the output the scripts produce there.

**OUTPUT:**

Chart, scatter chart

Description automatically generated

Chart, histogram

Description automatically generated

Chart, bar chart

Description automatically generated

Chart, box and whisker chart

Description automatically generated

Graphical user interface

Description automatically generated