Assignment 1

```
# Importing libraries
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

#load the data into a dataframe
data = pd.read_csv("student-mat.csv", sep=";")
print("Data loaded succesfully!")



#Step 2: data exploration
print(data.head()) # display the fist five rows
print("\nDataset Info:")
print(data.info()) # check data type and missing values

#Step 3: data cleaning
#Check the missing values
print("\nMissing values:")
print(data.isnull().sum())

#remove duplicates
data = data.drop_duplicates()

#Step 4: data analysis
#question 1 :what is the average score in math(G3)?
average_score = data['G3'].mean()
print(f"\nAverage Math Score (G3): {average_score:.2f}")
```

```
#question 2: how many student scored above 15 in their finel grade(G3)?
student_above_15 = len(data[data['G3'] > 15])
print(f"number of student scoring above 15:{student_above_15}")

#question 3: is there a correlation b/w study time and finel grade?
correlation = data['studytime'].corr(data['G3'])
print(f"coorelation between study time and finel grade: {correlation:2f}")

#question4 :which gender has a higher average finel grade?
average_grade_by_gender = data.groupby('sex')['G3'].mean()
print("\nAverage Finel Grade by Gender:")
print(average_grade_by_gender)

#step 5:data visualization
#histogram of finel grades
plt.figure(figsize=(8,5))
plt.hist(data['G3'],bins=10,color='yellow',edgecolor='black')
plt.title("Distribition of Finel Grades(G3)")
plt.xlabel("finel grade")
plt.ylabel("frequency")
plt.show()

#scatter plot of study time vs finel grade
plt.figure(figsize=(8,5))
sns.scatterplot(data=data, x='studytime',y='G3', hue='sex')
plt.title("Study Time vs Finel Grade")
plt.xlabel("study time (hours)")
plt.ylabel("Final Grade")
plt.legend(title="gender")
plt.show()
```

```
#bar chart of average scores by gender
plt.figure(figsize=(8,5))
average_grade_by_gender.plot(kind='bar', color=['blue', 'red'])
plt.title("Average Final Grade by Gender")
plt.ylabel("Average Finel Grade")
plt.xlabel("Gender")
plt.xticks(rotation=0)
plt.show()
```

output:

```
Data loaded succesfully!
  school sex  age address famsize Pstatus  Medu  Fedu     Mjob      Fjob  ...  \
0     GP   F   18       U     GT3       A     4     4  at_home   teacher  ...
1     GP   F   17       U     GT3       T     1     1  at_home     other  ...
2     GP   F   15       U     LE3       T     1     1  at_home     other  ...
3     GP   F   15       U     GT3       T     4     2   health  services  ...
4     GP   F   16       U     GT3       T     3     3    other     other  ...

  famrel freetime  goout  Dalc  Walc health absences  G1  G2  G3
0      4        3      4     1     1      3        6   5   6   6
1      5        3      3     1     1      3        4   5   5   6
2      4        3      2     2     3      3       10   7   8  10
3      3        2      2     1     1      5        2  15  14  15
4      4        3      2     1     2      5        4   6  10  10

[5 rows x 33 columns]
```

Dataset Info:

<class 'pandas.core.frame.DataFrame'>

RangeIndex: 395 entries, 0 to 394

Data columns (total 33 columns):

#	Column	Non-Null Count	Dtype

--- ------ -------------- -----

0 school 395 non-null object

1 sex 395 non-null object

2 age 395 non-null int64

3 address 395 non-null object

4 famsize 395 non-null object

5 Pstatus 395 non-null object

6 Medu 395 non-null int64

7 Fedu 395 non-null int64

8 Mjob 395 non-null object

9 Fjob 395 non-null object

10 reason 395 non-null object

11 guardian 395 non-null object

12 traveltime 395 non-null int64

13 studytime 395 non-null int64

14 failures 395 non-null int64

15 schoolsup 395 non-null object

16 famsup 395 non-null object

17 paid 395 non-null object

18 activities 395 non-null object

19 nursery 395 non-null object

20 higher 395 non-null object

21 internet 395 non-null object

22 romantic 395 non-null object

23 famrel 395 non-null int64

24 freetime 395 non-null int64

25 goout 395 non-null int64

26 Dalc 395 non-null int64

27 Walc 395 non-null int64

28 health 395 non-null int64

29 absences 395 non-null int64

30 G1 395 non-null int64

31 G2 395 non-null int64

32 G3 395 non-null int64

dtypes: int64(16), object(17)

memory usage: 102.0+ KB

None

Missing values:

school 0

sex 0

age 0

address 0

famsize 0

Pstatus 0

Medu 0

Fedu 0

Mjob 0

Fjob 0

reason 0

guardian 0

traveltime 0

studytime 0

failures 0

schoolsup 0

famsup 0

paid 0

activities 0

nursery 0

higher 0

internet 0

romantic 0

famrel 0

freetime 0

goout 0

Dalc 0

Walc 0

health 0

absences 0

G1 0

G2 0

G3 0

dtype: int64

Average Math Score (G3): 10.42

number of student scoring above 15:40

coorelation between study time and finel grade: 0.097820

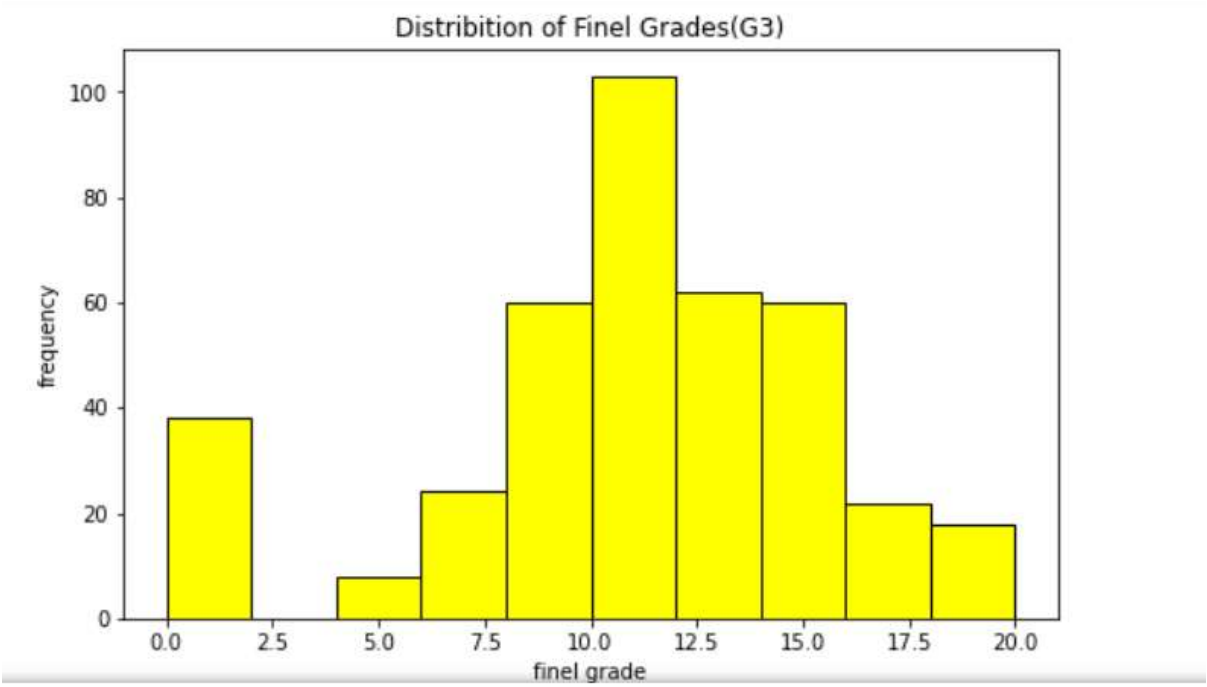
Average Finel Grade by Gender:

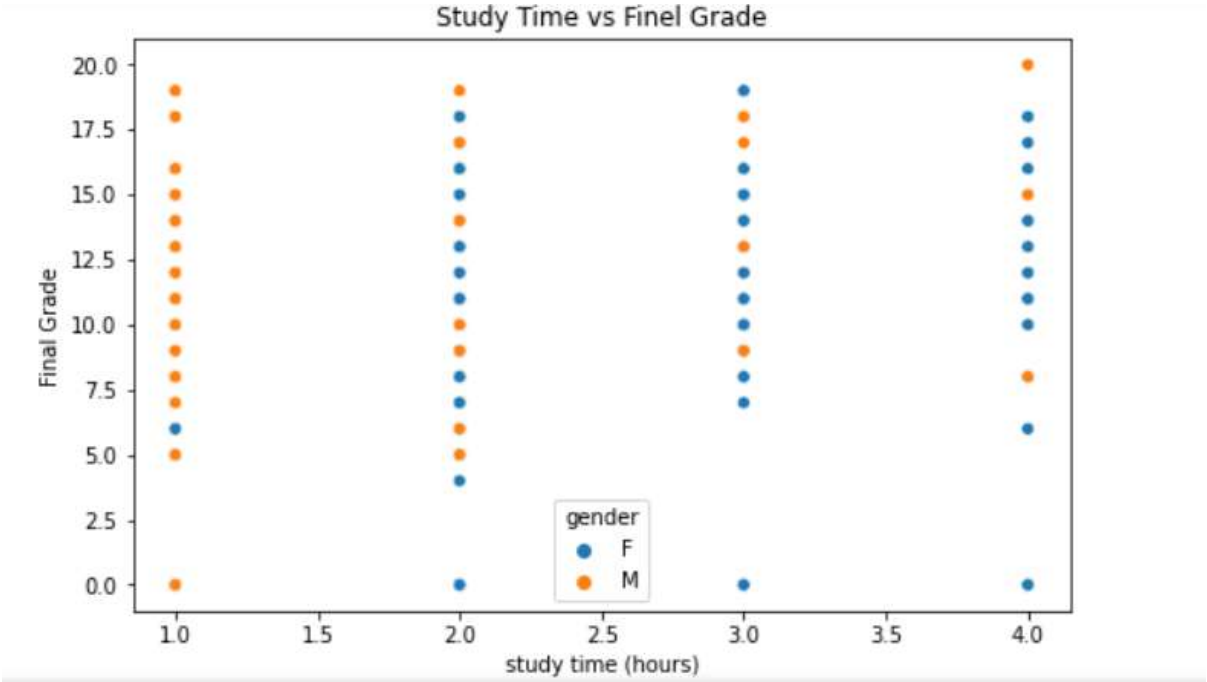
sex

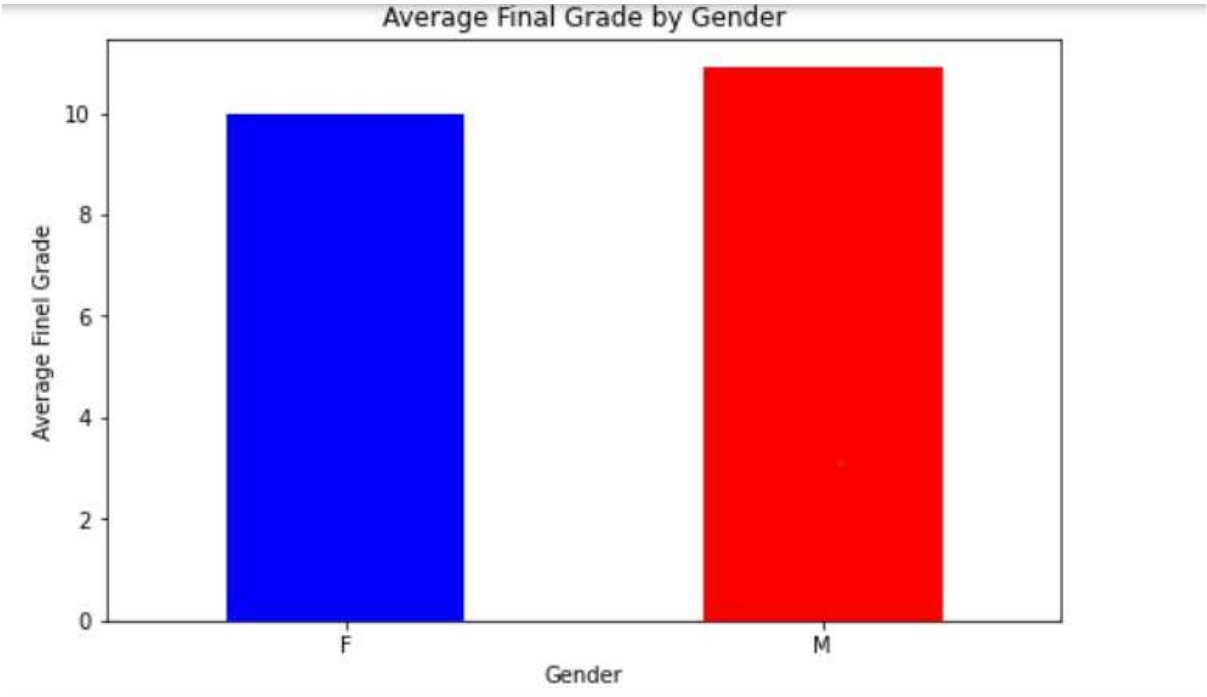
F 9.966346

M 10.914439

Name: G3, dtype: float64


Distribition of Finel Grades(G3)
frequency
finel grade
0
20
40
60
80
100
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0


Study Time vs Finel Grade
Final Grade
study time (hours)
gender
F
M
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
1.0
1.5
2.0
2.5
3.0
3.5
4.0


Average Final Grade by Gender
Average Finel Grade
0
2
4
6
8
10
F
M
Gender