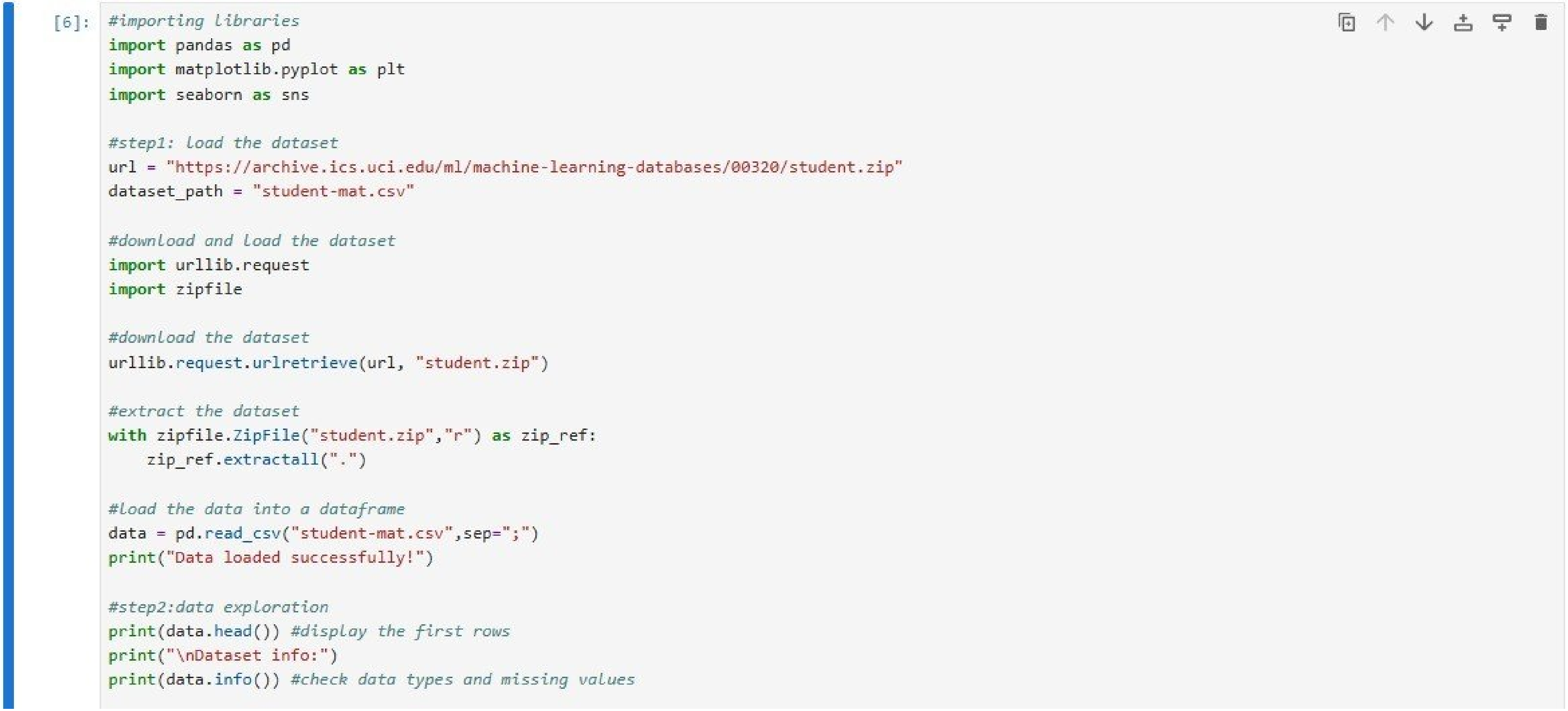
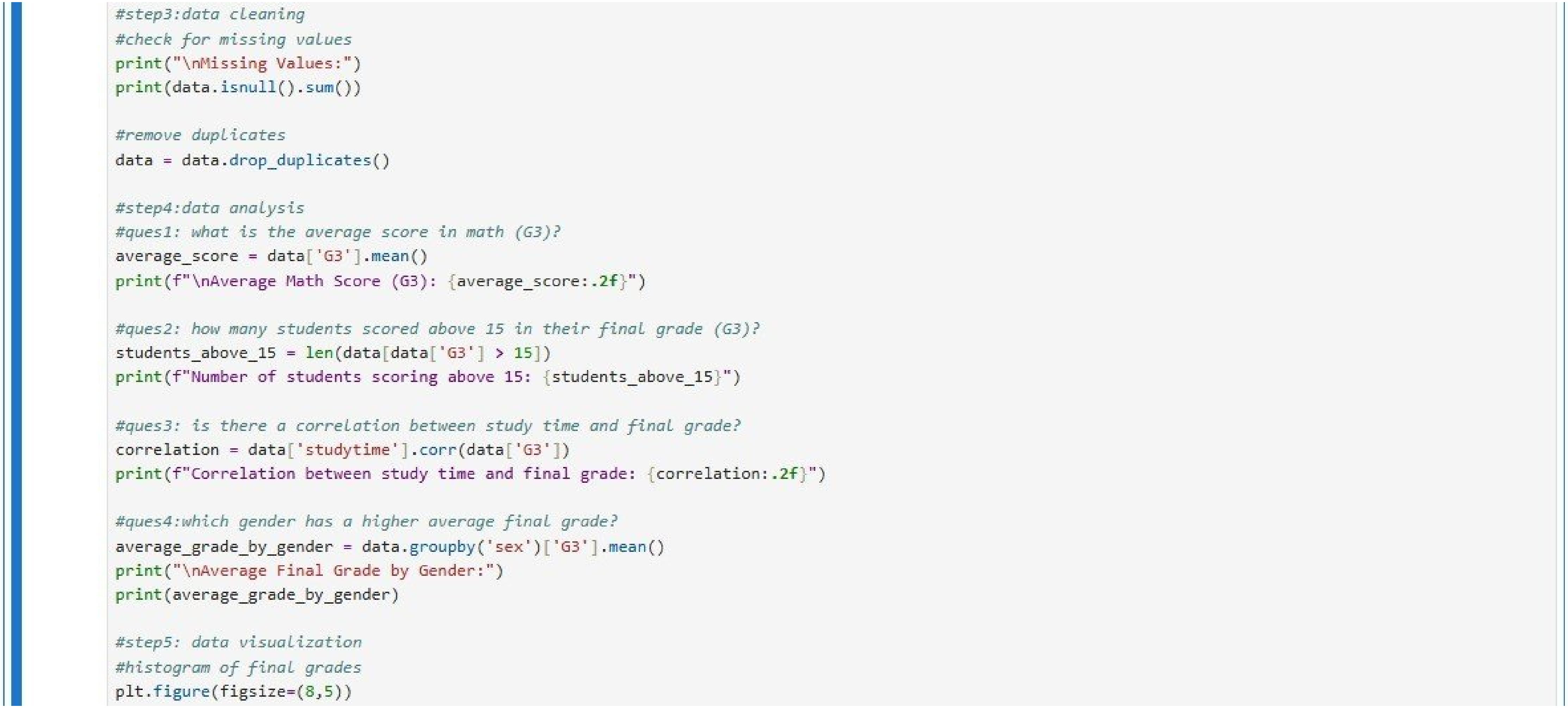
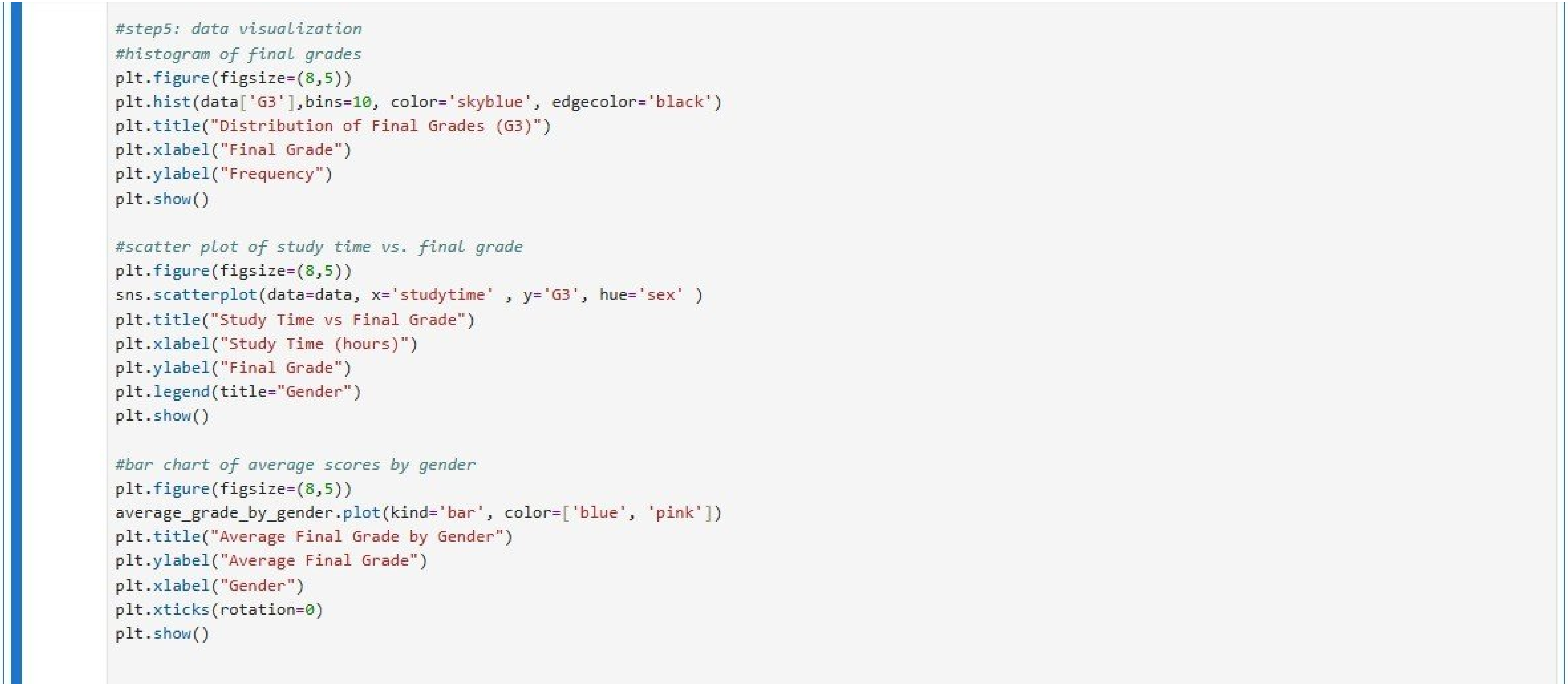


[6]:

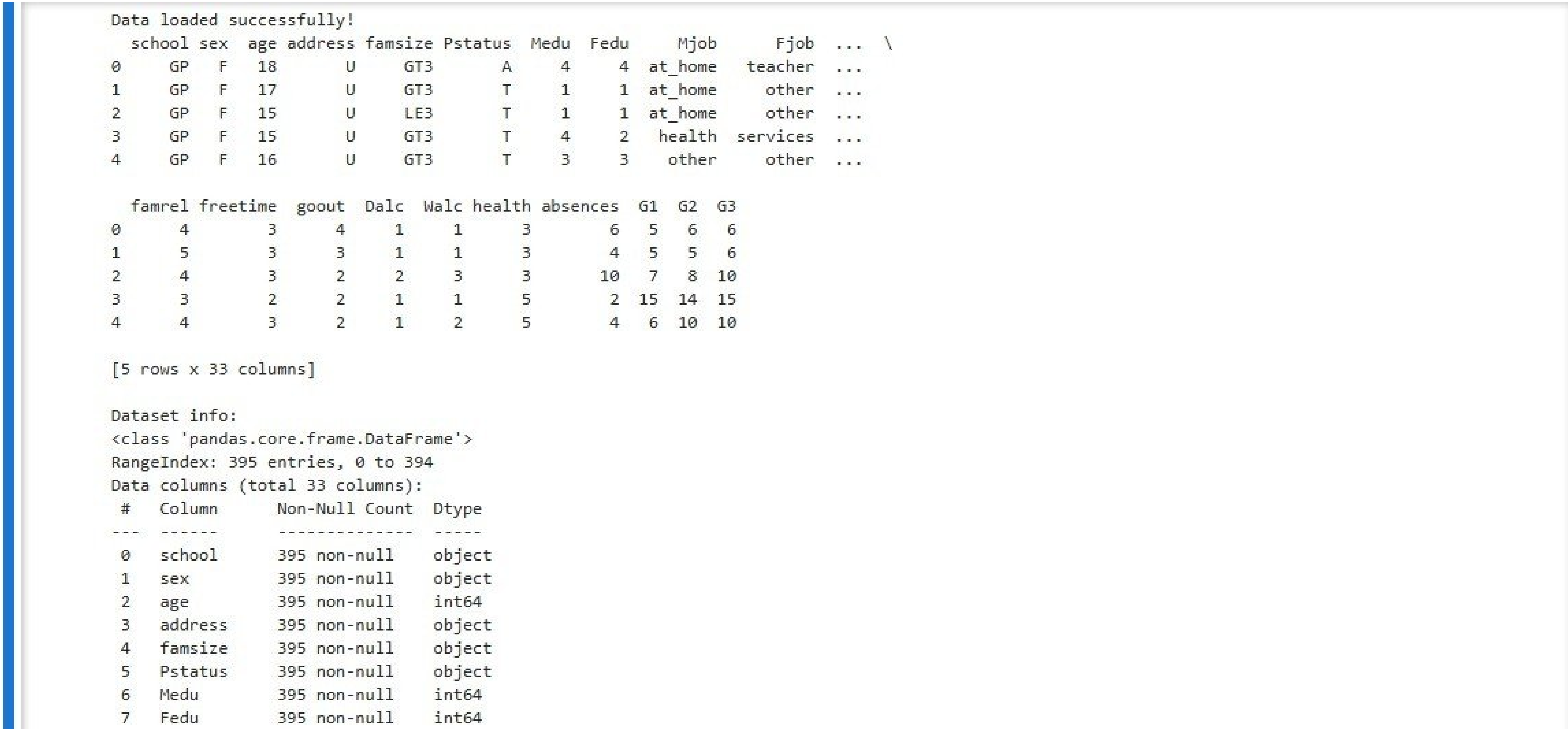
```
#importing libraries
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

#step1: load the dataset
url = "https://archive.ics.uci.edu/ml/machine-learning-databases/00320/student.zip"
dataset_path = "student-mat.csv"

#download and load the dataset
import urllib.request
import zipfile

#download the dataset
urllib.request.urlretrieve(url, "student.zip")

#extract the dataset
with zipfile.ZipFile("student.zip","r") as zip_ref:
    zip_ref.extractall(".")

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

#step2:data exploration
print(data.head()) #display the first rows
print("\nDataset info:")
print(data.info()) #check data types and missing values
```



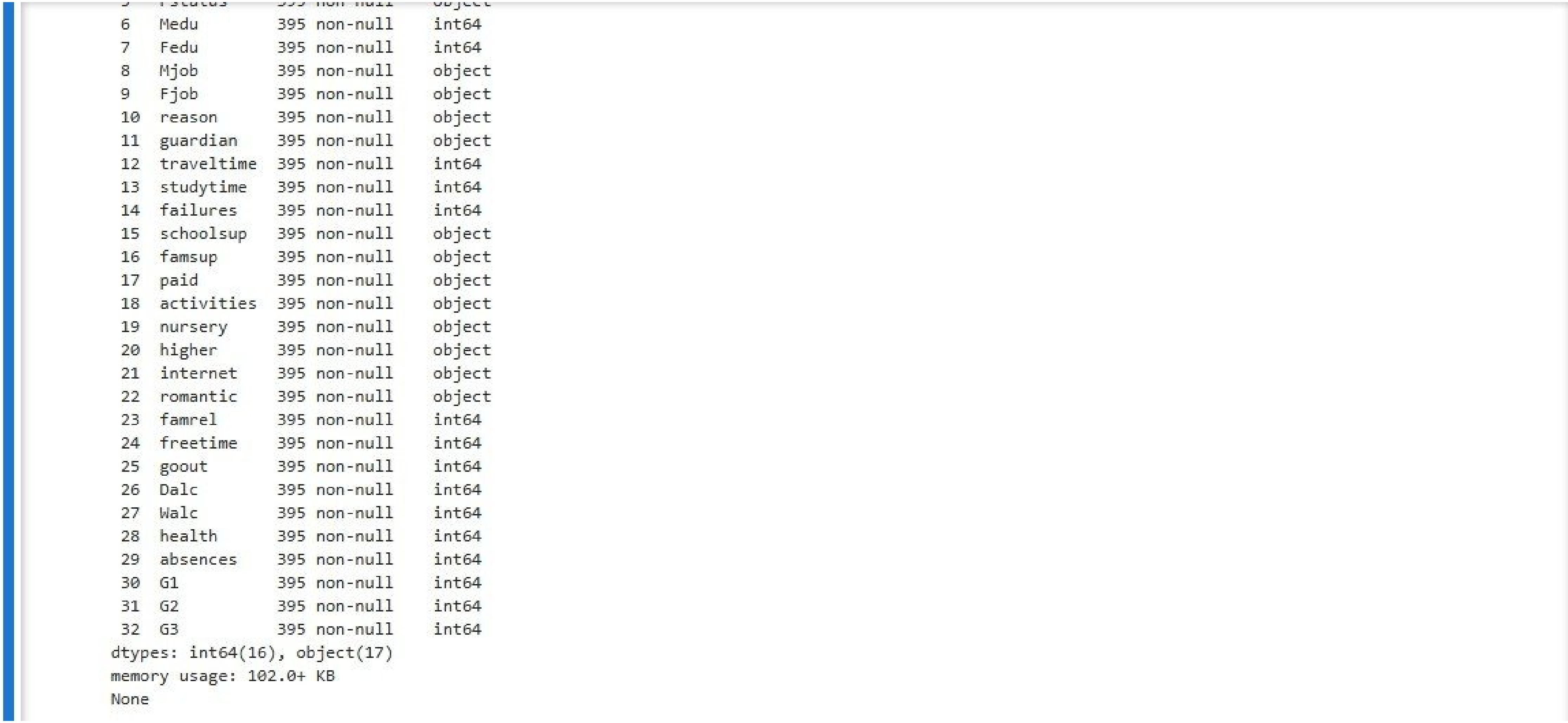
```
#step3:data cleaning
#check for missing values
print("\nMissing Values:")
print(data.isnull().sum())

#remove duplicates
data = data.drop_duplicates()

#step4:data analysis
#ques1: what is the average score in math (G3)?
average_score = data['G3'].mean()
print(f"\nAverage Math Score (G3): {average_score:.2f}")

#ques2: how many students scored above 15 in their final grade (G3)?
students_above_15 = len(data[data['G3'] > 15])
print(f"Number of students scoring above 15: {students_above_15}")

#ques3: is there a correlation between study time and final grade?
correlation = data['studytime'].corr(data['G3'])
print(f"Correlation between study time and final grade: {correlation:.2f}")

#ques4:which gender has a higher average final grade?
average_grade_by_gender = data.groupby('sex')['G3'].mean()
print("\nAverage Final Grade by Gender:")
print(average_grade_by_gender)

#step5: data visualization
#histogram of final grades
plt.figure(figsize=(8,5))
```



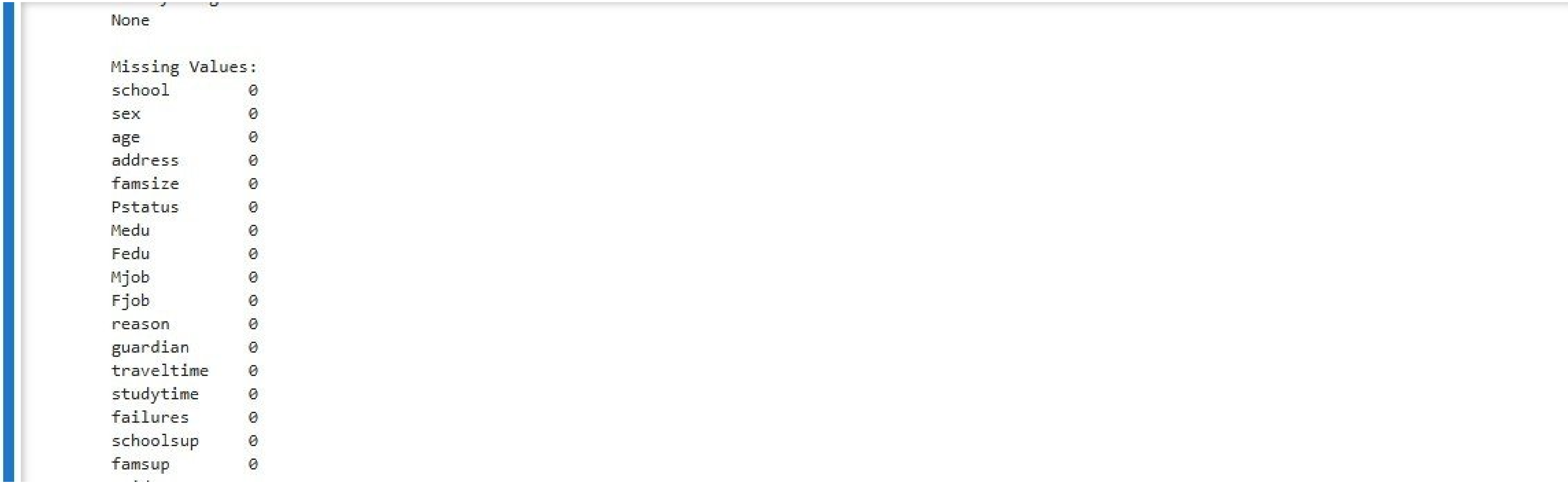
```python
#step5: data visualization
#histogram of final grades
plt.figure(figsize=(8,5))
plt.hist(data['G3'],bins=10, color='skyblue', edgecolor='black')
plt.title("Distribution of Final Grades (G3)")
plt.xlabel("Final Grade")
plt.ylabel("Frequency")
plt.show()

#scatter plot of study time vs. final grade
plt.figure(figsize=(8,5))
sns.scatterplot(data=data, x='studytime' , y='G3', hue='sex' )
plt.title("Study Time vs Final 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', 'pink'])
plt.title("Average Final Grade by Gender")
plt.ylabel("Average Final Grade")
plt.xlabel("Gender")
plt.xticks(rotation=0)
plt.show()
```



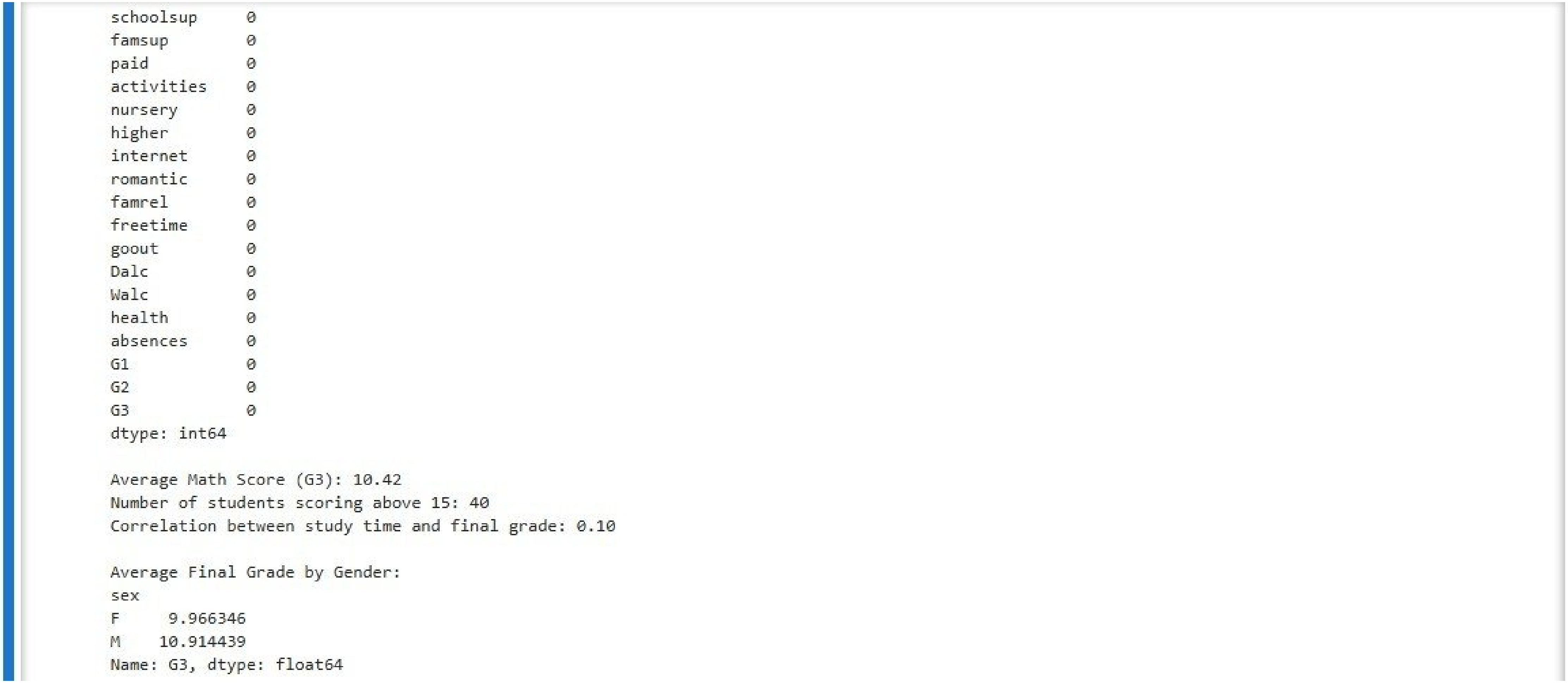
```
Data loaded successfully!
  school sex  age address famsize Pstatus  Medu  Fedu     Mjob      Fjob  ...  \
0     GP   F   18       U     GT3       A     4     4  at_home   teacher  ...
1     GP   F   17       U     GT3       T     1     1  at_home     other  ...
2     GP   F   15       U     LE3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



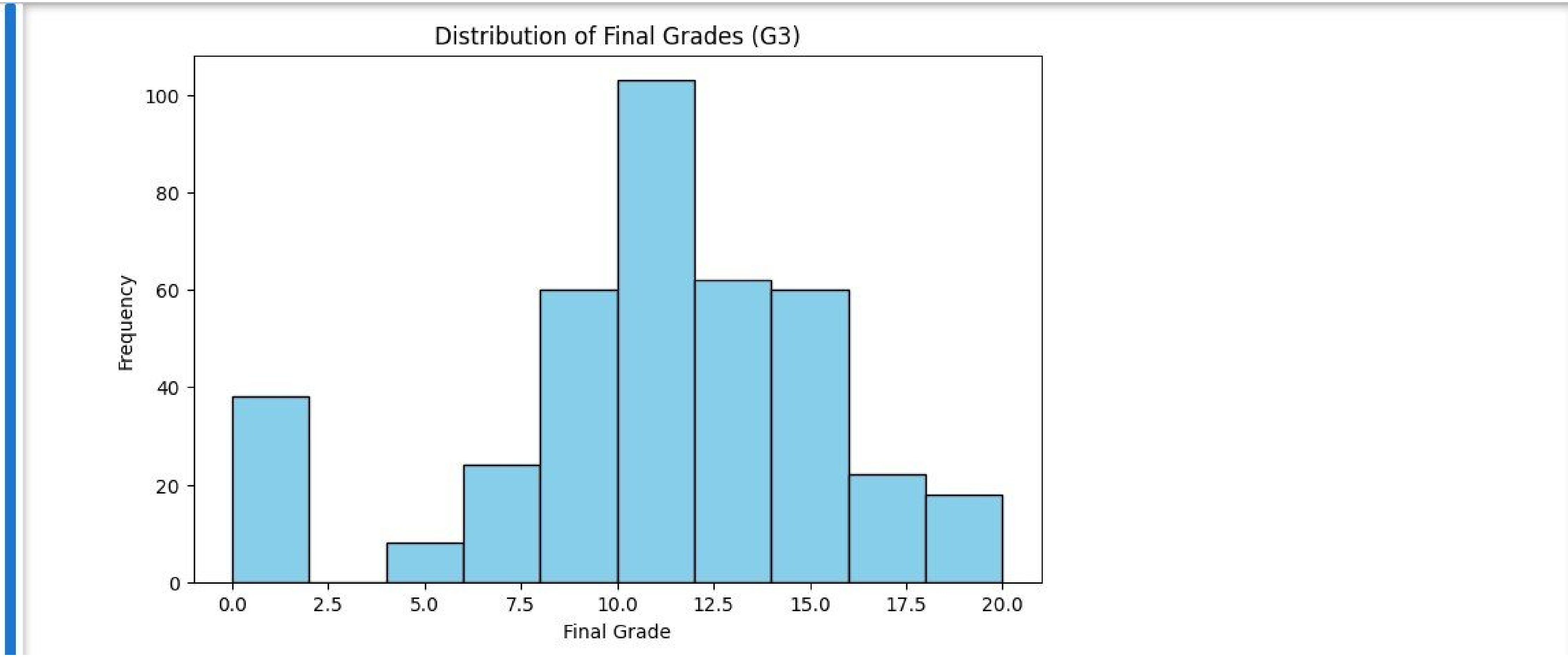
```
 5   Pstatus     395 non-null    object
 6   Medu        395 non-null    int64
 7   Fedu        395 non-null    int64
 8   Mjob        395 non-null    object
 9   Fjob        395 non-null    object
 10  reason      395 non-null    object
 11  guardian    395 non-null    object
 12  traveltime  395 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
```

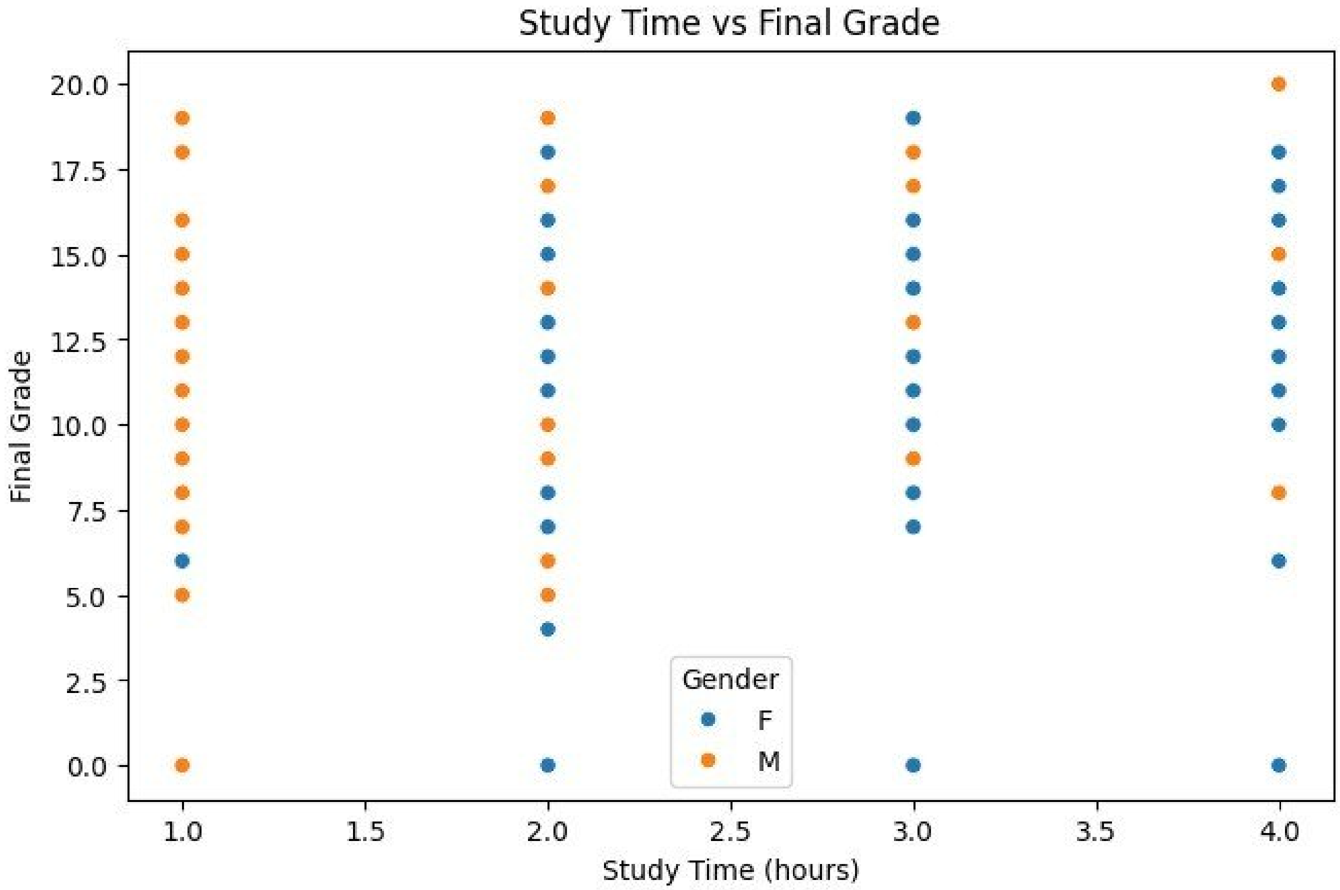


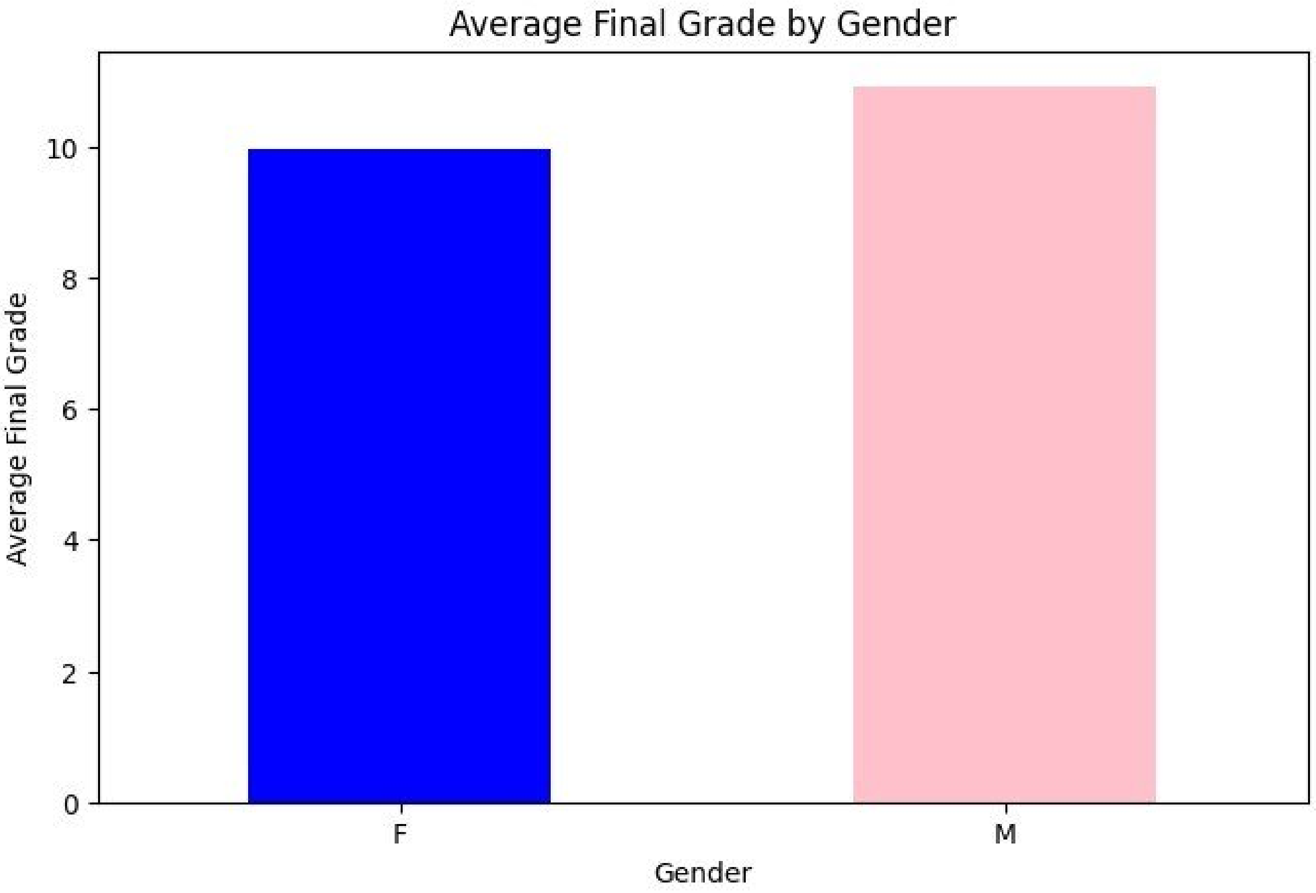
```
None

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
```



```
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 students scoring above 15: 40
Correlation between study time and final grade: 0.10

Average Final Grade by Gender:
sex
F     9.966346
M    10.914439
Name: G3, dtype: float64
```


Distribution of Final Grades (G3)
Frequency
0
20
40
60
80
100
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
Final Grade


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


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