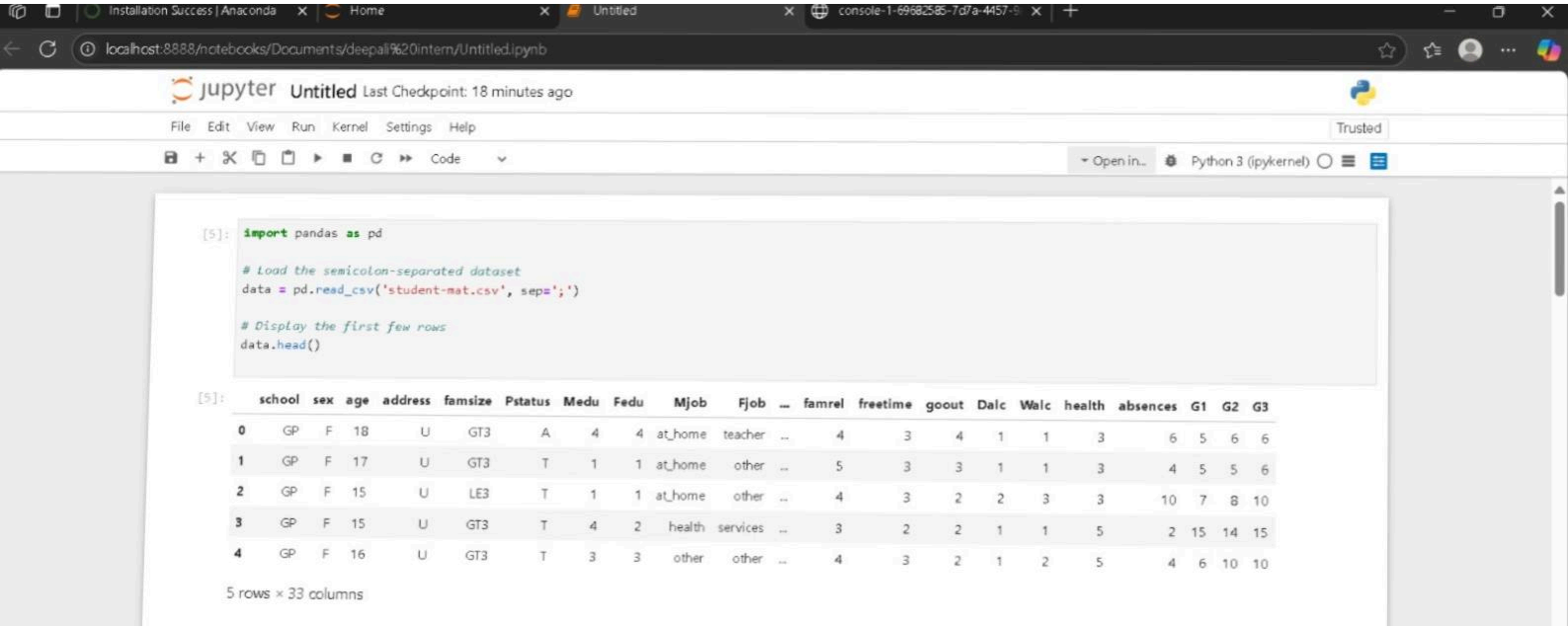
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Code
Open in...
Python 3 (ipykernel)
[5]:
import pandas as pd
# Load the semicolon-separated dataset
data = pd.read_csv('student-mat.csv', sep=';')
# Display the first few rows
data.head()
[5]:
school sex age address famsize Pstatus Medu Fedu Mjob Fjob ... famrel freetime goout Dalc Walc health absences G1 G2 G3
0 GP F 18 U GT3 A 4 4 at_home teacher ... 4 3 4 1 1 3 6 5 6 6
1 GP F 17 U GT3 T 1 1 at_home other ... 5 3 3 1 1 3 4 5 5 6
2 GP F 15 U LE3 T 1 1 at_home other ... 4 3 2 2 3 3 10 7 8 10
3 GP F 15 U GT3 T 4 2 health services ... 3 2 2 1 1 5 2 15 14 15
4 GP F 16 U GT3 T 3 3 other other ... 4 3 2 1 2 5 4 6 10 10
5 rows × 33 columns

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Code

Open in... Python 3 (ipykernel)

5 rows × 33 columns

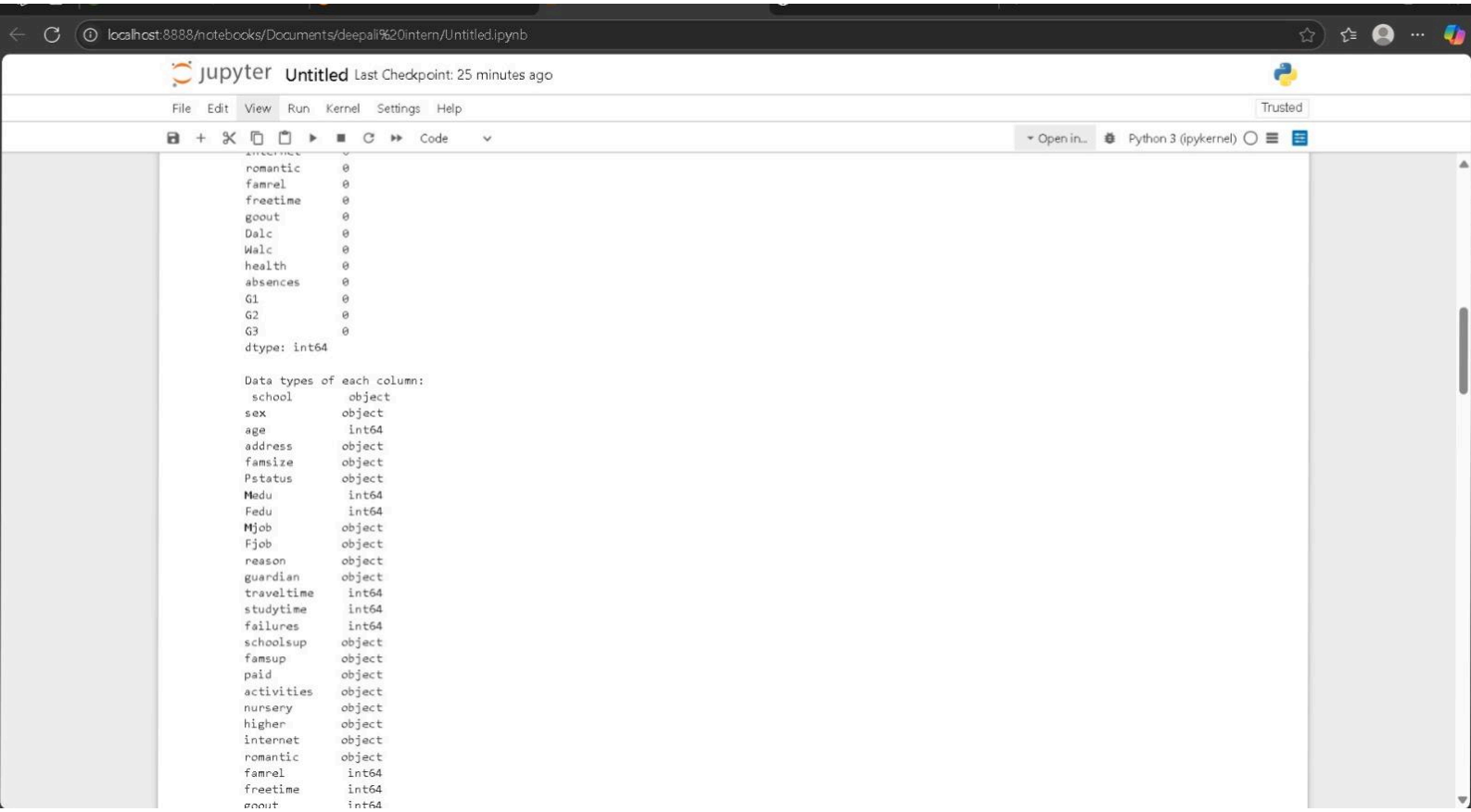
[6]:
```
# Program 2: Data Exploration

# Check for missing values
print("Missing values in each column:\n", data.isnull().sum())

# Display column data types
print("\nData types of each column:\n", data.dtypes)

# Dataset shape (rows, columns)
print("\nDataset shape (rows, columns):", data.shape)
```

```
Missing values in each column:
 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
```


localhost:8888/notebooks/Documents/deepali%20intern/Untitled.ipynb
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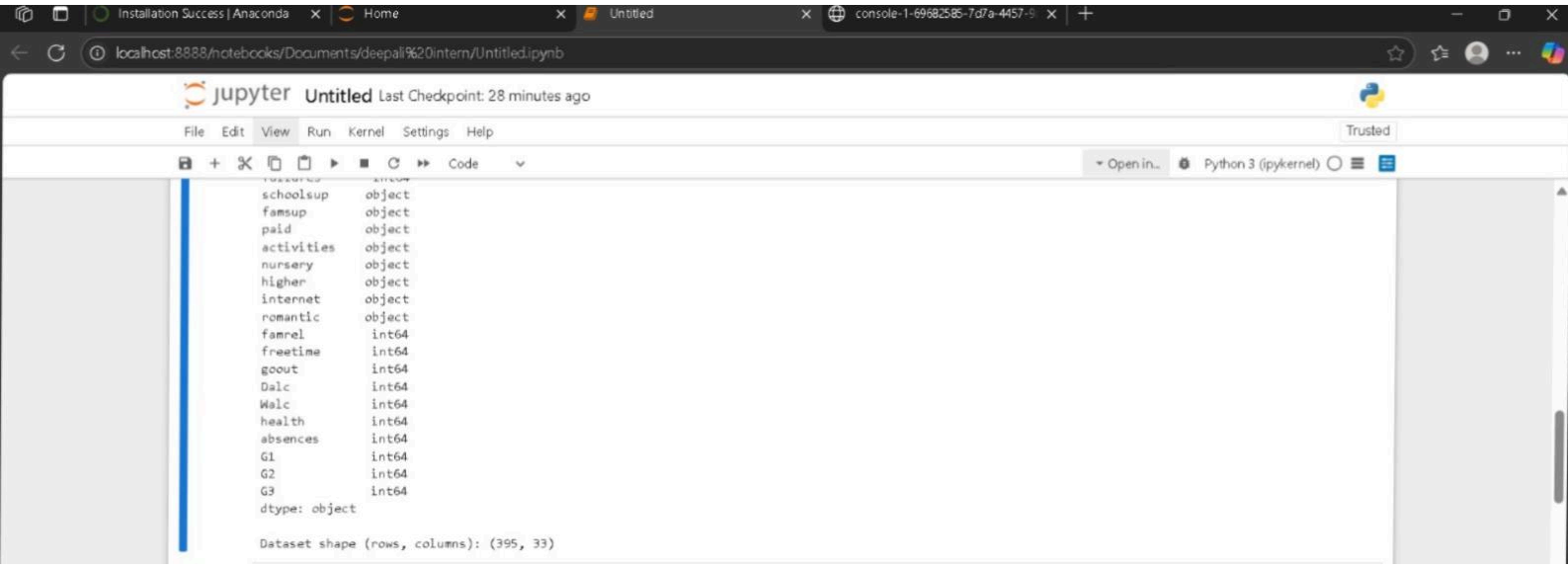
Code
Open in...
Python 3 (ipykernel)
romantic 0
famrel 0
freetime 0
goout 0
Dalc 0
Walc 0
health 0
absences 0
G1 0
G2 0
G3 0
dtype: int64
Data types of each column:
school object
sex object
age int64
address object
famsize object
Pstatus object
Medu int64
Fedu int64
Mjob object
Fjob object
reason object
guardian object
traveltime int64
studytime int64
failures int64
schoolsup object
famsup object
paid object
activities object
nursery object
higher object
internet object
romantic object
famrel int64
freetime int64
goout int64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Code
Open in...
Python 3 (ipykernel)
schoolsup object
famsup object
paid object
activities object
nursery object
higher object
internet object
romantic object
famrel int64
freetime int64
goout int64
Dalc int64
Walc int64
health int64
absences int64
G1 int64
G2 int64
G3 int64
dtype: object
Dataset shape (rows, columns): (395, 33)


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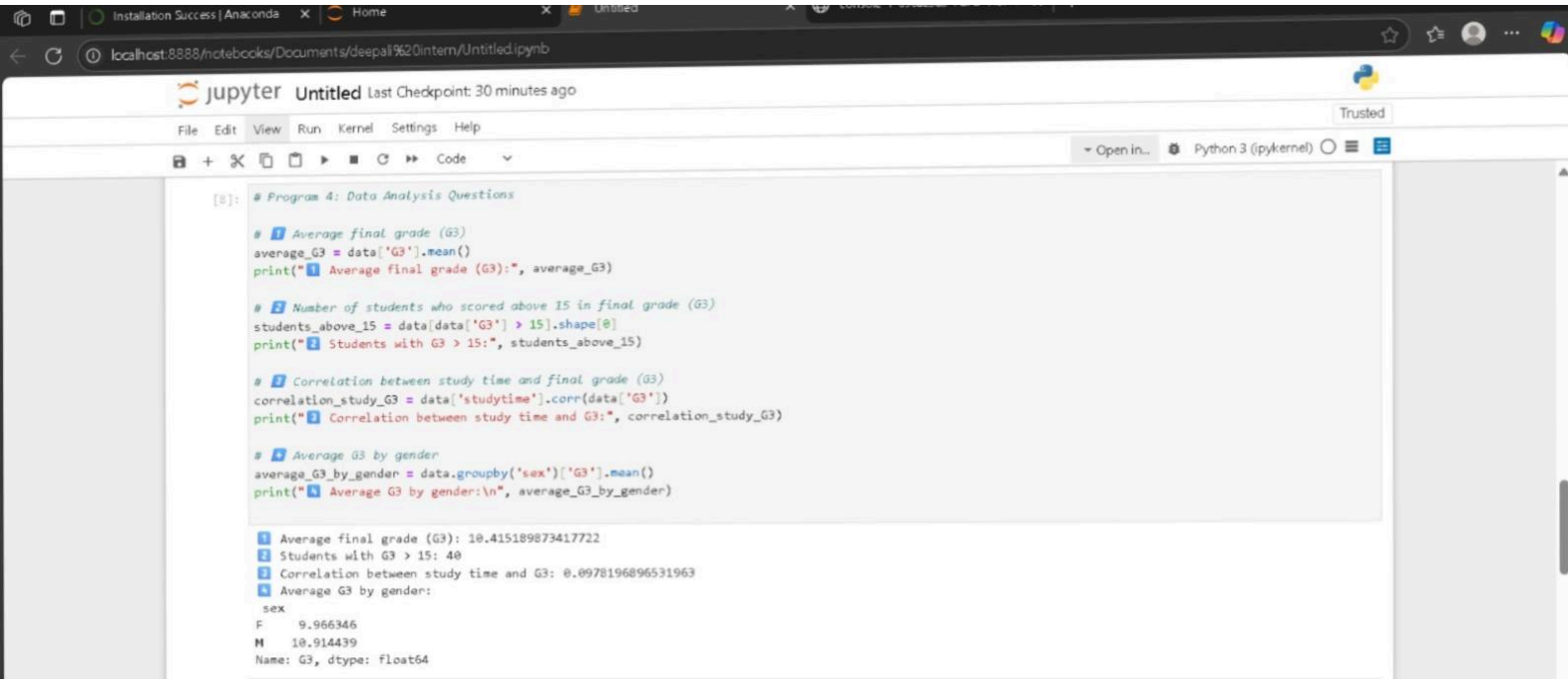
Code
Open in...
Python 3 (ipykernel)
[7]:
# Program 3: Data Cleaning
# Fill missing values with median (if any)
data = data.fillna(data.median(numeric_only=True))
# Remove duplicate rows
data = data.drop_duplicates()
# Display shape after cleaning
print("Dataset shape after cleaning:", data.shape)
Dataset shape after cleaning: (395, 33)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Code
Open in...
Python 3 (ipykernel)
[8]:
# Program 4: Data Analysis Questions
# 1️⃣ Average final grade (G3)
average_G3 = data['G3'].mean()
print("1️⃣ Average final grade (G3):", average_G3)
# 2️⃣ Number of students who scored above 15 in final grade (G3)
students_above_15 = data[data['G3'] > 15].shape[0]
print("2️⃣ Students with G3 > 15:", students_above_15)
# 3️⃣ Correlation between study time and final grade (G3)
correlation_study_G3 = data['studytime'].corr(data['G3'])
print("3️⃣ Correlation between study time and G3:", correlation_study_G3)
# 4️⃣ Average G3 by gender
average_G3_by_gender = data.groupby('sex')['G3'].mean()
print("4️⃣ Average G3 by gender:\n", average_G3_by_gender)
1️⃣ Average final grade (G3): 10.415189873417722
2️⃣ Students with G3 > 15: 40
3️⃣ Correlation between study time and G3: 0.0978196896531963
4️⃣ Average G3 by gender:
sex
F 9.966346
M 10.914439
Name: G3, dtype: float64

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Code — Open in... — Python 3 (ipykernel)

[11]:
```
import matplotlib.pyplot as plt
import seaborn as sns

# 1️⃣ Histogram of final grades (G3)
plt.figure(figsize=(8,5))
plt.hist(data['G3'], bins=15, color='skyblue', edgecolor='black')
plt.title('Distribution of Final Grades (G3)')
plt.xlabel('Final Grade (G3)')
plt.ylabel('Frequency')
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.show()

# 2️⃣ Scatter plot: Study Time vs Final Grade (G3)
plt.figure(figsize=(8,5))
plt.scatter(data['studytime'], data['G3'], color='green', alpha=0.7)
plt.title('Study Time vs Final Grade (G3)')
plt.xlabel('Study Time (hours/week)')
plt.ylabel('Final Grade (G3)')
plt.grid(True, linestyle='--', alpha=0.7)
plt.show()

# 3️⃣ Bar chart: Average G3 by Gender
avg_G3_gender = data.groupby('sex')['G3'].mean().reset_index()

plt.figure(figsize=(6,4))
sns.barplot(data=avg_G3_gender, x='sex', y='G3', hue='sex', palette='pastel', edgecolor='black', legend=False)
plt.title('Average Final Grade (G3) by Gender')
plt.xlabel('Gender')
plt.ylabel('Average Final Grade (G3)')
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.show()
```

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Code

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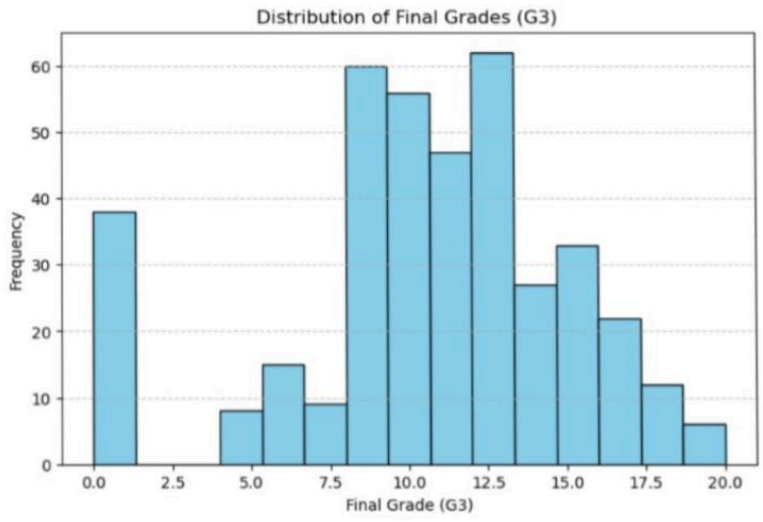
```
plt.show()
```



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Code

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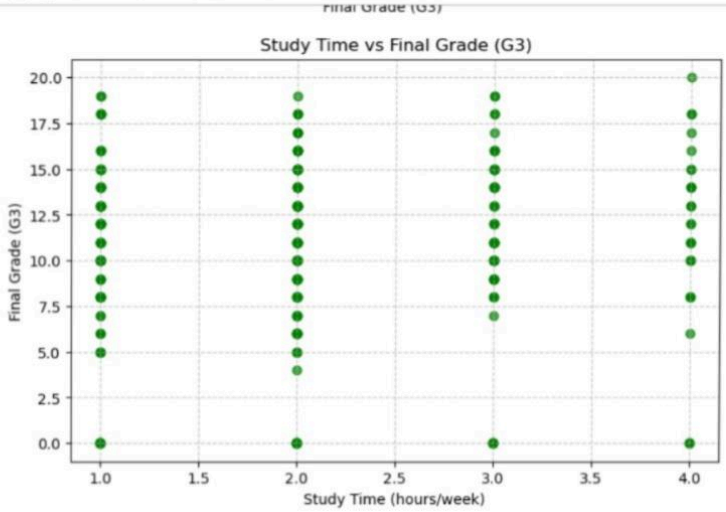

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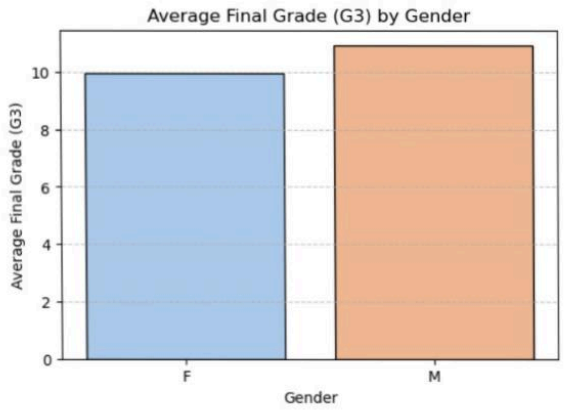
Code Open in... Python 3 (ipykernel)



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