"""

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@Course: SDEV 300 Building Secure Python Applications

"""

Codes

```
import numpy as np

import pandas as pd

import matplotlib.pyplot as plt


# Read data from housing.csv and Popchange.csv and store it in numpy arrays as well as pandas dataframe for analysis

housing = pd.read_csv('Housing.csv')

houd = np.array(housing)

population = pd.read_csv('PopChange.csv')

popd = np.array(population)



# Define calc_pop to calculate statistics for population change columns

def calc_pop(num):

    print(" The Statistics For This Column Are: ")

    num = int(num)

    count = 0

    mean = 0

    min = 0
```

```
    max = 0
    sdev = 0
    # use pandas iloc and functions to get statistics column indexed at value num
    mean = round(population.iloc[:, num].mean(), 1)
    sdev = round(population.iloc[:, num].std(), 1)
    max = round(population.iloc[:, num].max(), 1)
    min = round(population.iloc[:, num].min(), 1)
    count = len(population.iloc[:, num])

    print(" Count = " + str(count))
    print(" Mean = " + str(mean))
    print("Standard deviation = ", sdev)
    print(" Min = " + str(min))
    print(" Max = " + str(max))
    n, bins, patches = plt.hist(popd[:, num], 50, density=True, facecolor="b"
                                , alpha=0.75)
    plt.grid(True)
    plt.show()


# Define get_pop that prompts for column name in population change csv and display the histogram
def get_pop():
    while True:
        print("\n")
        print(" You Have Entered Population Data. ")
        print("a. Pop Apr 1")
        print("b. Pop Jul 1")
        print("c. Change Pop")
        print("d. Exit Column")
```

```
        pick = input(" Please Enter Your Selection a - d: ").capitalize()

        if pick == "A":
            calc_pop(4)

        elif pick == "B":
            calc_pop(5)

        elif pick == "C":
            calc_pop(6)

        elif pick == "D":

            print("You selected to exit the column menu ")

            break



# Define calc_hou function that analyzes housing data and gets column statistics
def calc_hou(num):
    print(" The Statistics For This Column Are: ")
    num = int(num)
    count = 0
    mean = 0
    min = float(houd[count][num])
    max = float(houd[count][num])
    sdev = 0
    # use pandas iloc and functions to get statistics column indexed at value num
    mean = round(housing.iloc[:, num].mean(), 2)
```

```
    count = round(len(housing.iloc[:, num]), 2)
    min = round(housing.iloc[:, num].min(), 2)
    max = round(housing.iloc[:, num].max(), 2)
    sdev = round(housing.iloc[:, num].std(), 2)

    print(" Count = " + str(count))
    print(" Mean = " + str(mean))
    print("Standard Deviation = " + str(sdev))
    print(" Min = " + str(min))
    print(" Max = " + str(max))

    n, bins, patches = plt.hist(houd[:, num], 10, density=True, facecolor="b", alpha=0.75)
    plt.grid(True)
    plt.show()


# prompts user to input the column to be analyzed and display the histogram
def get_hou():
    while True:
        print("\n")
        print(" You Have Entered Housing Data. ")
        print(" Select The Column You Want to Analyze")
        print("a. Age")
        print("b. Bedroom")
        print("c. Built Year")
        print("d. Rooms")
        print("e. Utility")
        print("f. Exit Columns")
        pick = input(" Please Enter Your Selection a - f: ").capitalize()
```

```
        if pick == "A":
            calc_hou(0)

        elif pick == "B":
            calc_hou(1)

        elif pick == "C":
            calc_hou(2)

        elif pick == "D":
            calc_hou(4)

        elif pick == "E":
            calc_hou(6)

        elif pick == "F":

            print("You selected to exit the column menu ")
            break



print("****************** Welcome to the Python Data Analysis App**********")
# Main Program
while True:
    # Display Menu

    print("Select the file you want to analyze:")
    print("1. Population Data ")
```

```
print("2. Housing Data ")
print("3. Exit The Program ")

# This is the Menu part of my program
try:
    pic = int(input("Enter A Selection 1 - 3: "))
except:
    print("Try Again. Please Pick 1 - 3: ")

if pic == 1:
    # Call get_pop function to analyze population changd data
    get_pop()

elif pic == 2:
    # Call get_hou function to analyze population changd data
    get_hou()

elif pic == 3:
    print("********** Thanks for using the Data Analysis App**********.")
    break

else:
    print("Try Again. Please Pick 1 - 3: ")
```

Outputs

********** Welcome to the Python Data Analysis App**********

Select the file you want to analyze:

1. Population Data

2. Housing Data

3. Exit The Program

Enter A Selection 1 - 3: 1

You Have Entered Population Data.

a. Pop Apr 1

b. Pop Jul 1

c. Change Pop

d. Exit Column

Please Enter Your Selection a - d: a

The Statistics For This Column Are:

Count = 557

Mean = 56557.3

Standard deviation = 158127.1

Min = 13519

Max = 3726157

You Have Entered Population Data.

a. Pop Apr 1

b. Pop Jul 1

c. Change Pop

d. Exit Column

Please Enter Your Selection a - d: b

The Statistics For This Column Are:

Count = 557

Mean = 55758.5

Standard deviation = 136086.5

Min = 12619

Max = 3195153

You Have Entered Population Data.

a. Pop Apr 1

b. Pop Jul 1

c. Change Pop

d. Exit Column

Please Enter Your Selection a - d: c

The Statistics For This Column Are:

Count = 557

Mean = -798.8

Standard deviation = 22711.4

Min = -531004

Max = 22363

You Have Entered Population Data.

a. Pop Apr 1

b. Pop Jul 1

c. Change Pop

d. Exit Column

Please Enter Your Selection a - d: d

You selected to exit the column menu

Select the file you want to analyze:

1. Population Data

2. Housing Data

3. Exit The Program

Enter A Selection 1 - 3: 2

You Have Entered Housing Data.

Select The Column You Want to Analyze

a. Age

b. Bedroom

c. Built Year

d. Rooms

e. Utility

f. Exit Columns

Please Enter Your Selection a - f: a

The Statistics For This Column Are:

Count = 10042

Mean = 47.22

Standard Deviation = 23.15

Min = -9

Max = 93

You Have Entered Housing Data.

Select The Column You Want to Analyze

a. Age

b. Bedroom

c. Built Year

d. Rooms

e. Utility

f. Exit Columns

Please Enter Your Selection a - f: b

The Statistics For This Column Are:

Count = 10042

Mean = 2.71

Standard Deviation = 1.07

Min = 0

Max = 7

You Have Entered Housing Data.

Select The Column You Want to Analyze

a. Age

b. Bedroom

c. Built Year

d. Rooms

e. Utility

f. Exit Columns

Please Enter Your Selection a - f: c

The Statistics For This Column Are:

Count = 10042

Mean = 1966.95

Standard Deviation = 26.31

Min = 1919

Max = 2012

You Have Entered Housing Data.

Select The Column You Want to Analyze

a. Age

b. Bedroom

c. Built Year

d. Rooms

e. Utility

f. Exit Columns

Please Enter Your Selection a - f: c

The Statistics For This Column Are:

Count = 10042

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Min = 1919

Max = 2012

You Have Entered Housing Data.

Select The Column You Want to Analyze

a. Age

b. Bedroom

c. Built Year

d. Rooms

e. Utility

f. Exit Columns

Please Enter Your Selection a - f: d

The Statistics For This Column Are:

Count = 10042

Mean = 5.72

Standard Deviation = 1.88

Min = 1

Max = 14

You Have Entered Housing Data.

Select The Column You Want to Analyze

a. Age

b. Bedroom

c. Built Year

d. Rooms

e. Utility

f. Exit Columns

Please Enter Your Selection a - f: e

The Statistics For This Column Are:

Count = 10042

Mean = 189.59

Standard Deviation = 128.93

Min = 0.0

Max = 1107.58

You Have Entered Housing Data.

Select The Column You Want to Analyze

a. Age

b. Bedroom

c. Built Year

d. Rooms

e. Utility

f. Exit Columns

Please Enter Your Selection a - f: f

You selected to exit the column menu

Select the file you want to analyze:

1. Population Data

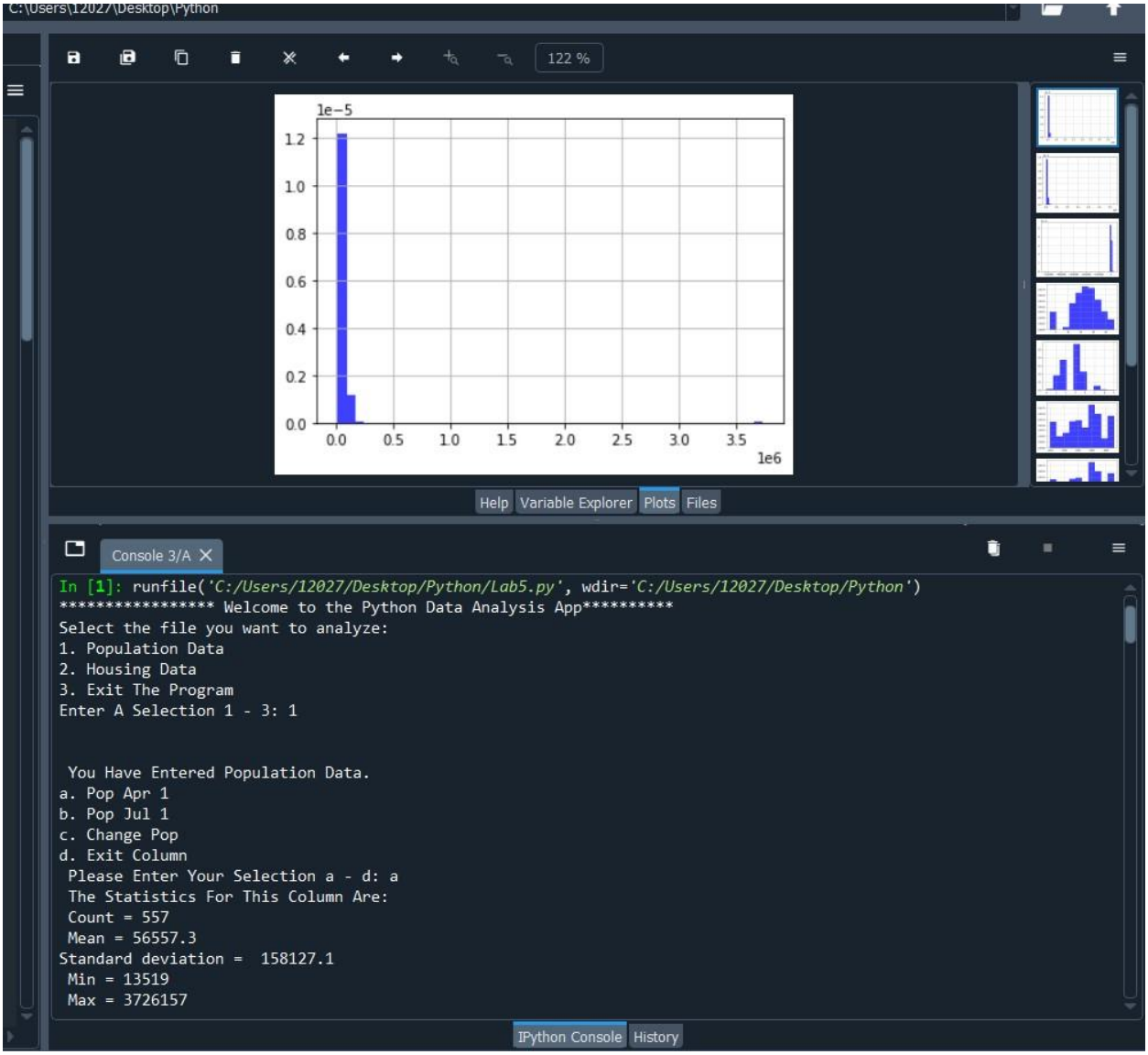
2. Housing Data

3. Exit the Program

Enter A Selection 1 - 3: 3

********** Thanks for using the Data Analysis App**********

Screenshots


C:\Users\12027\Desktop\Python
122 %
1e−5
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
1e6
Help
Variable Explorer
Plots
Files
Console 3/A
In [1]: runfile('C:/Users/12027/Desktop/Python/Lab5.py', wdir='C:/Users/12027/Desktop/Python')
********** Welcome to the Python Data Analysis App**********
Select the file you want to analyze:
1. Population Data
2. Housing Data
3. Exit The Program
Enter A Selection 1 - 3: 1
You Have Entered Population Data.
a. Pop Apr 1
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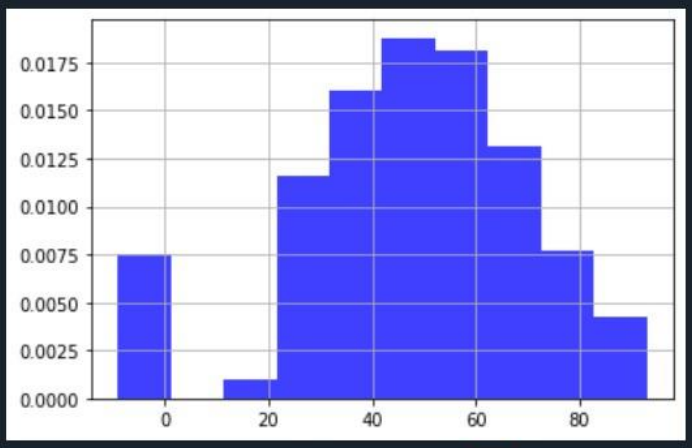
c. Change Pop
d. Exit Column
Please Enter Your Selection a - d: a
The Statistics For This Column Are:
Count = 557
Mean = 56557.3
Standard deviation = 158127.1
Min = 13519
Max = 3726157
IPython Console
History



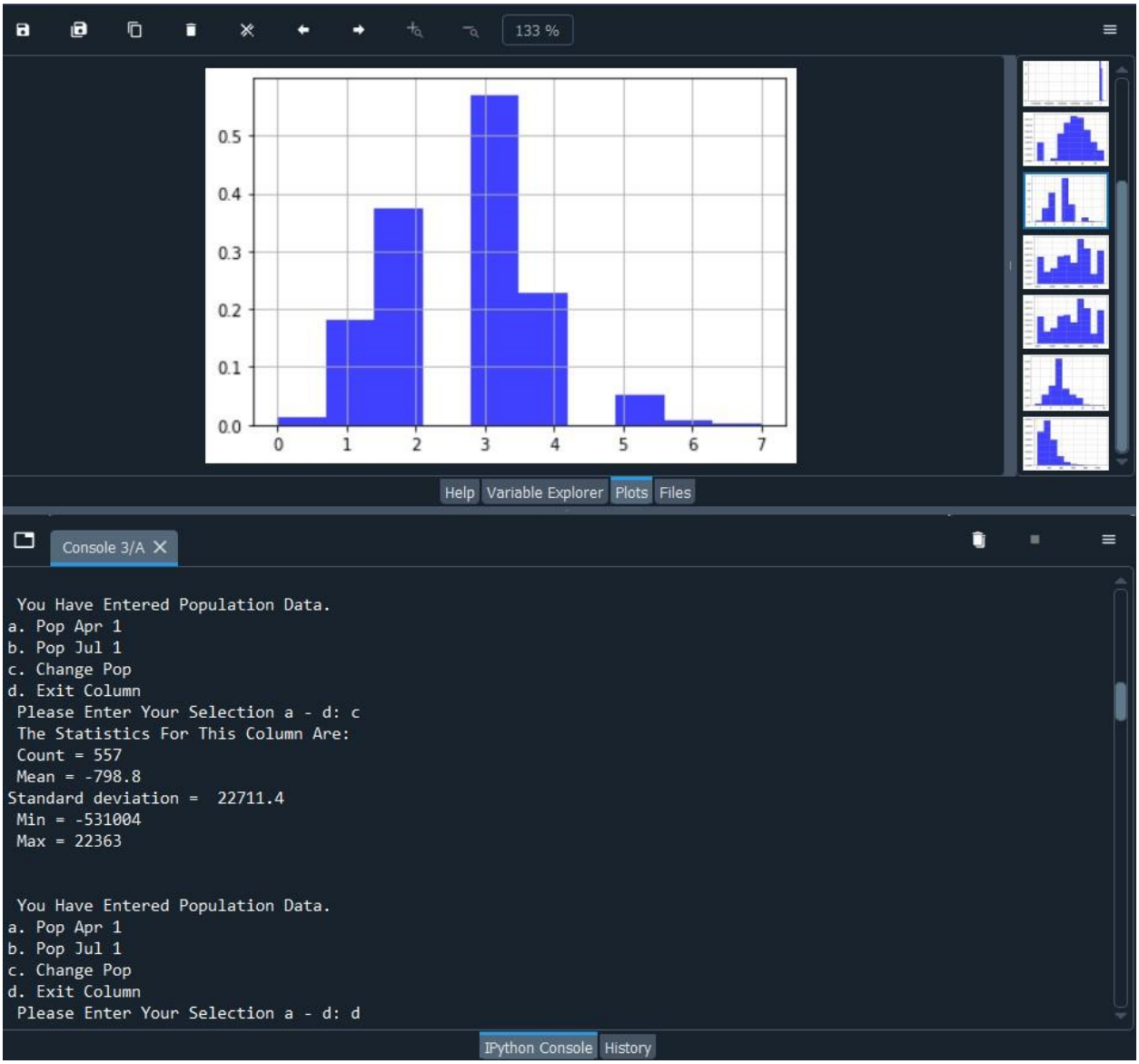
Help | Variable Explorer | Plots | Files

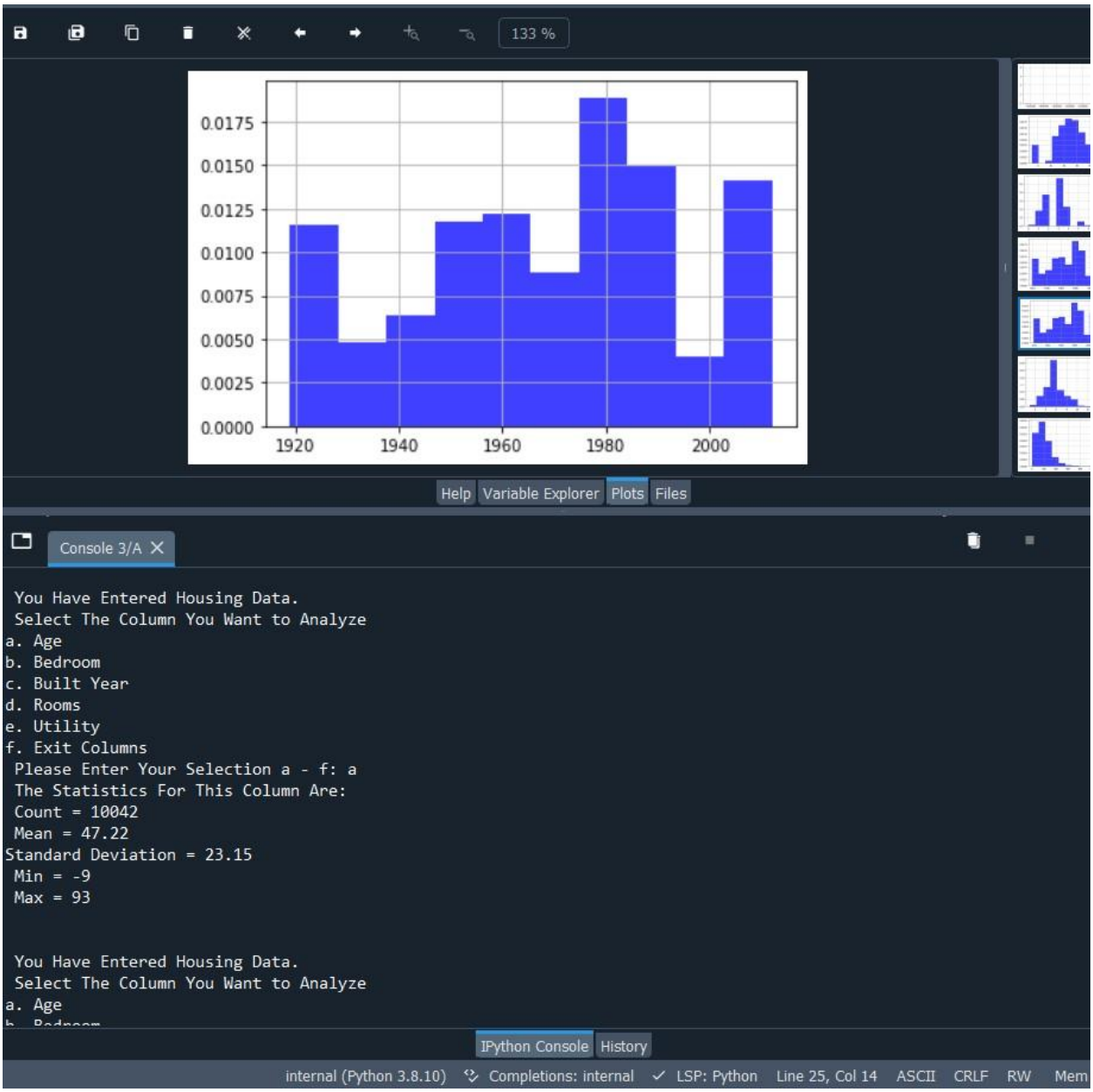
Console 3/A

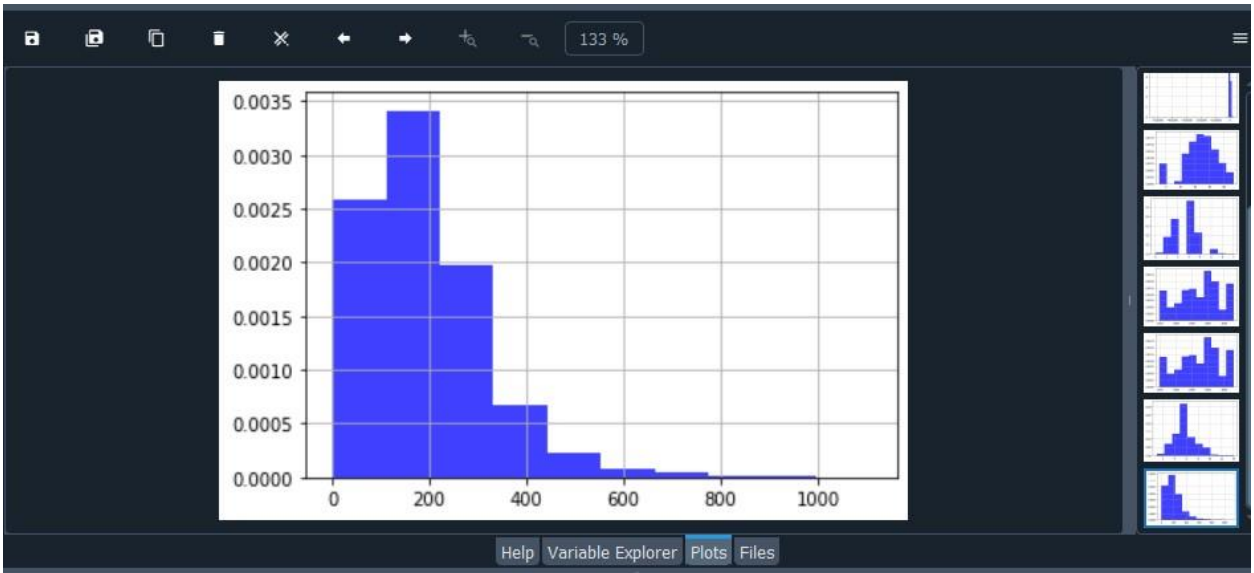
```
 You Have Entered Population Data.
a. Pop Apr 1
b. Pop Jul 1
c. Change Pop
d. Exit Column
 Please Enter Your Selection a - d: b
 The Statistics For This Column Are:
 Count = 557
 Mean = 55758.5
Standard deviation =  136086.5
 Min = 12619
 Max = 3195153


 You Have Entered Population Data.
a. Pop Apr 1
b. Pop Jul 1
c. Change Pop
d. Exit Column
 Please Enter Your Selection a - d: c
```

IPython Console | History


133 %
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
Help
Variable Explorer
Plots
Files
Console 3/A
You Have Entered Population Data.
a. Pop Apr 1
b. Pop Jul 1
c. Change Pop
d. Exit Column
Please Enter Your Selection a - d: c
The Statistics For This Column Are:
Count = 557
Mean = -798.8
Standard deviation = 22711.4
Min = -531004
Max = 22363
You Have Entered Population Data.
a. Pop Apr 1
b. Pop Jul 1
c. Change Pop
d. Exit Column
Please Enter Your Selection a - d: d
IPython Console
History


133 %
0.0175
0.0150
0.0125
0.0100
0.0075
0.0050
0.0025
0.0000
1920
1940
1960
1980
2000
Help
Variable Explorer
Plots
Files
Console 3/A
You Have Entered Housing Data.
Select The Column You Want to Analyze
a. Age
b. Bedroom
c. Built Year
d. Rooms
e. Utility
f. Exit Columns
Please Enter Your Selection a - f: a
The Statistics For This Column Are:
Count = 10042
Mean = 47.22
Standard Deviation = 23.15
Min = -9
Max = 93
You Have Entered Housing Data.
Select The Column You Want to Analyze
a. Age
IPython Console
History
internal (Python 3.8.10)
Completions: internal
LSP: Python
Line 25, Col 14
ASCII
CRLF
RW
Mem



Console 3/A

```
Min = 0.0
Max = 1107.58


 You Have Entered Housing Data.
 Select The Column You Want to Analyze
a. Age
b. Bedroom
c. Built Year
d. Rooms
e. Utility
f. Exit Columns
 Please Enter Your Selection a - f: f
You selected to exit the column menu
Select the file you want to analyze:
1. Population Data
2. Housing Data
3. Exit The Program
Enter A Selection 1 - 3: 3
********** Thanks for using the Data Analysis App**********.
```