Jeanine Carhart

CEIS 110 | FINAL PROJECT | JUNE 25, 2022

Introduction

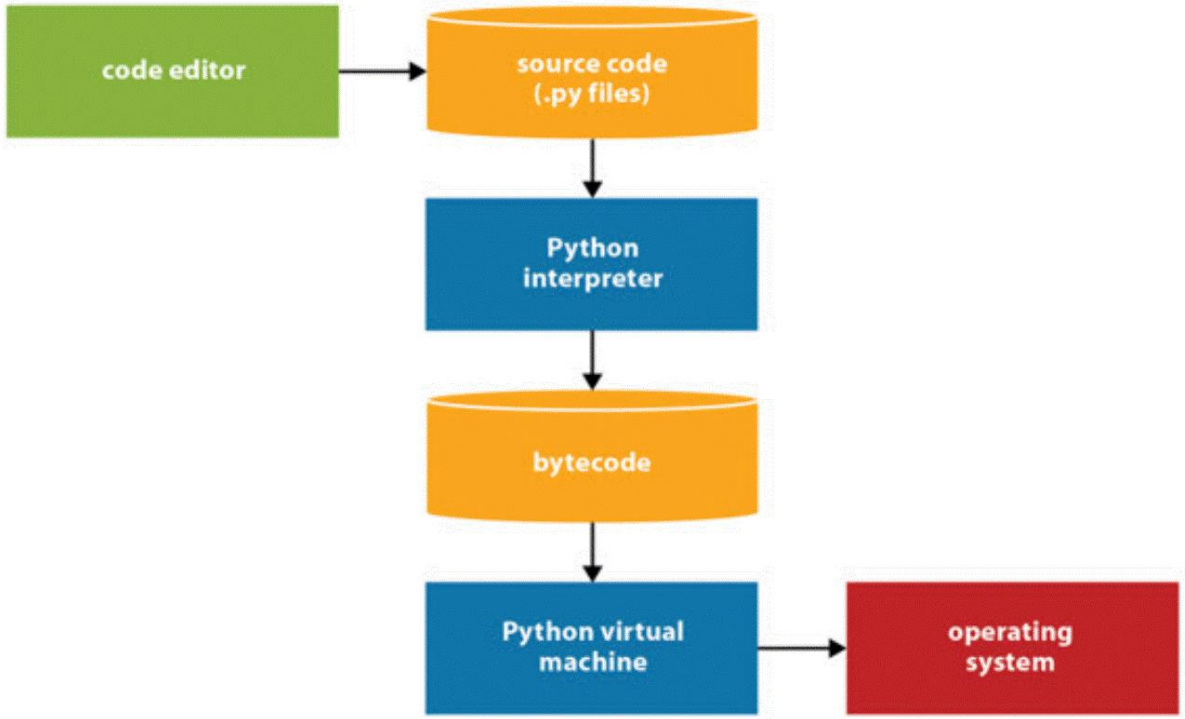
Why Learn Python?

- Accessible for beginning programmers
- Simple syntax
- Valuable skill set
- Software quality
- Program portability
- Developer productivity promotion
- Libraries support
- Component Integration
- Free
- Powerful
- Easy to use
- Portable

Creating a Program

The process for creating and running a program is as follows.

1. A programmer uses an IDE to enter source code into the editor windows. Python programs end with a .py extension.
2. The source code gets compiled by the Python interpreter into bytecode.
3. The bytecode is translated by the Python virtual machine into target code so the CPU can understand it directly.



Module 2

Design and Library Setup

Flowchart

Include the following processes:

Install python

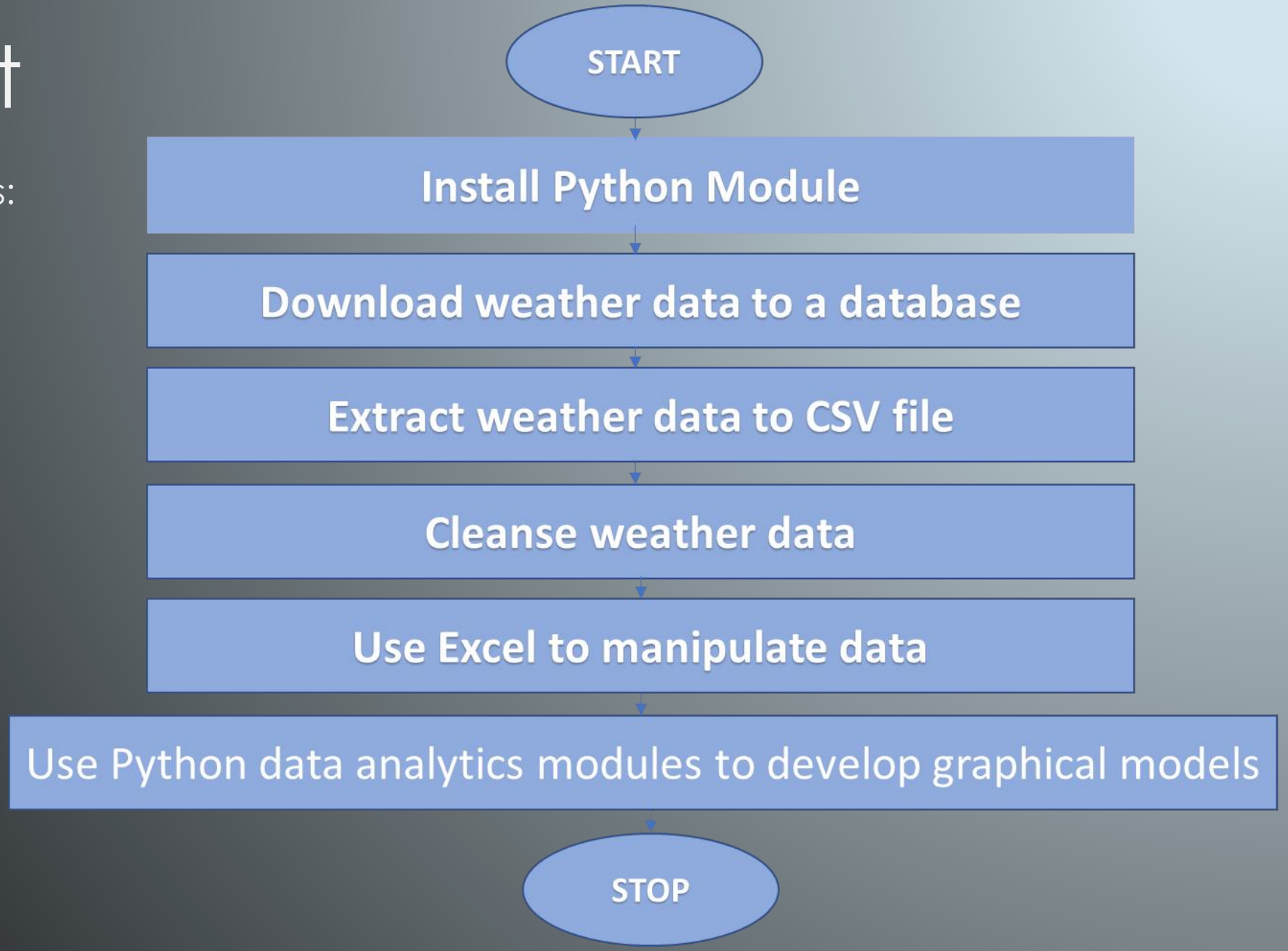
Download weather data to a database

Extract weather data from database into a comma separated file with python

Cleanse weather data

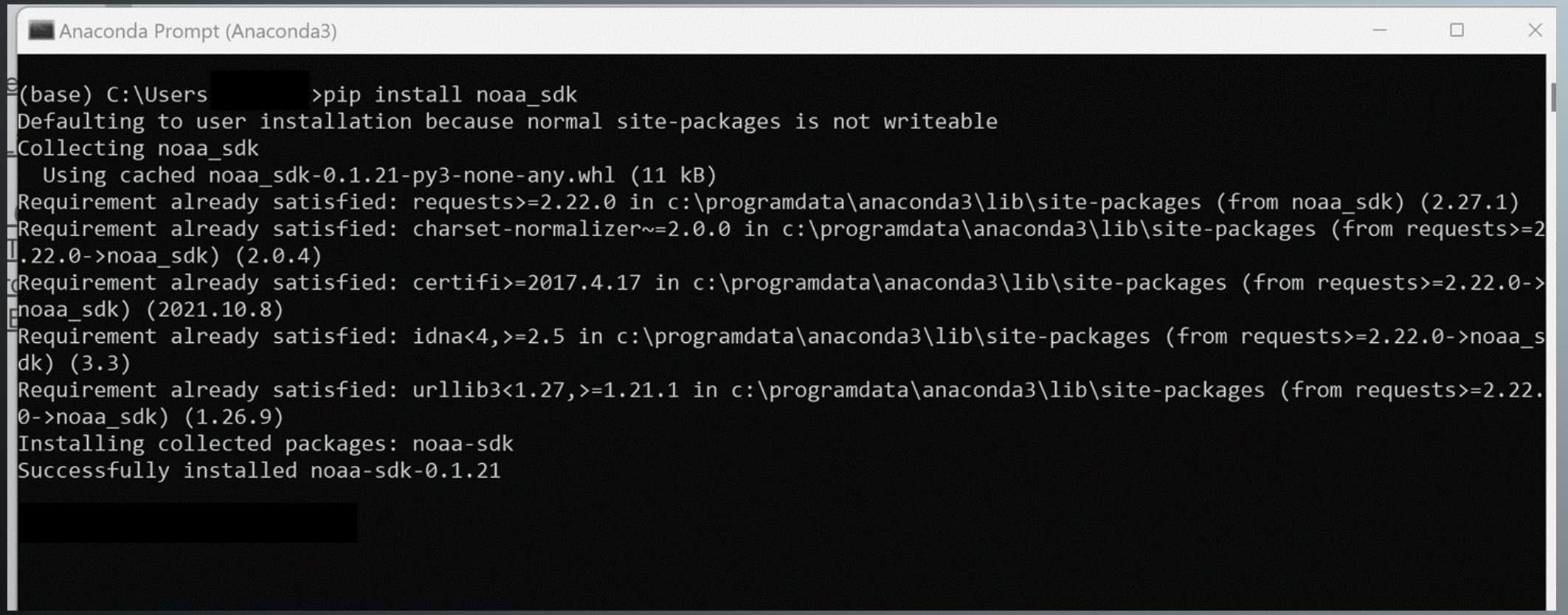
Use Excel to manipulate data

Use python data analytics modules to develop graphical models



Software Inventory

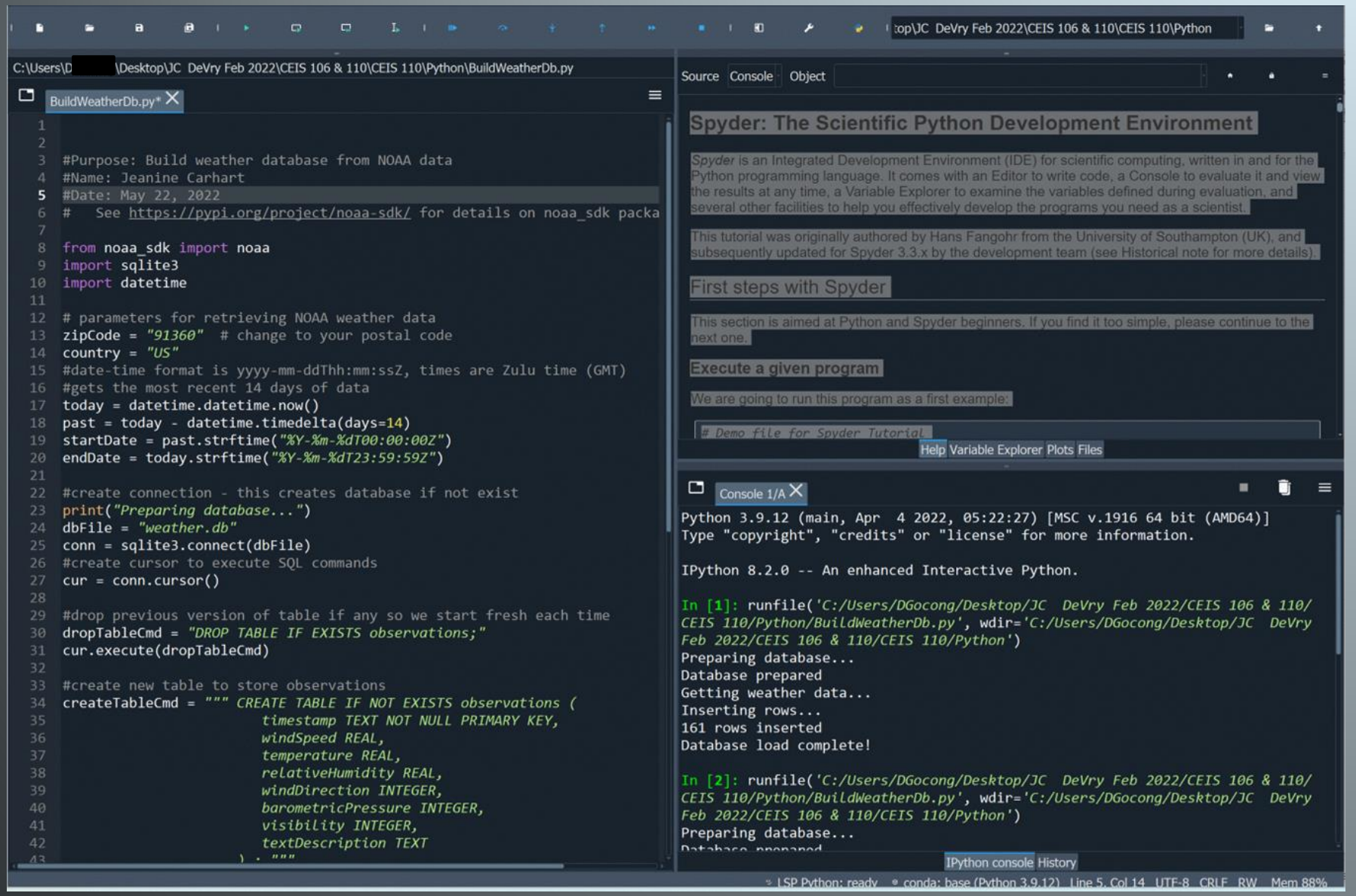
NOAA-SDK Library Installed



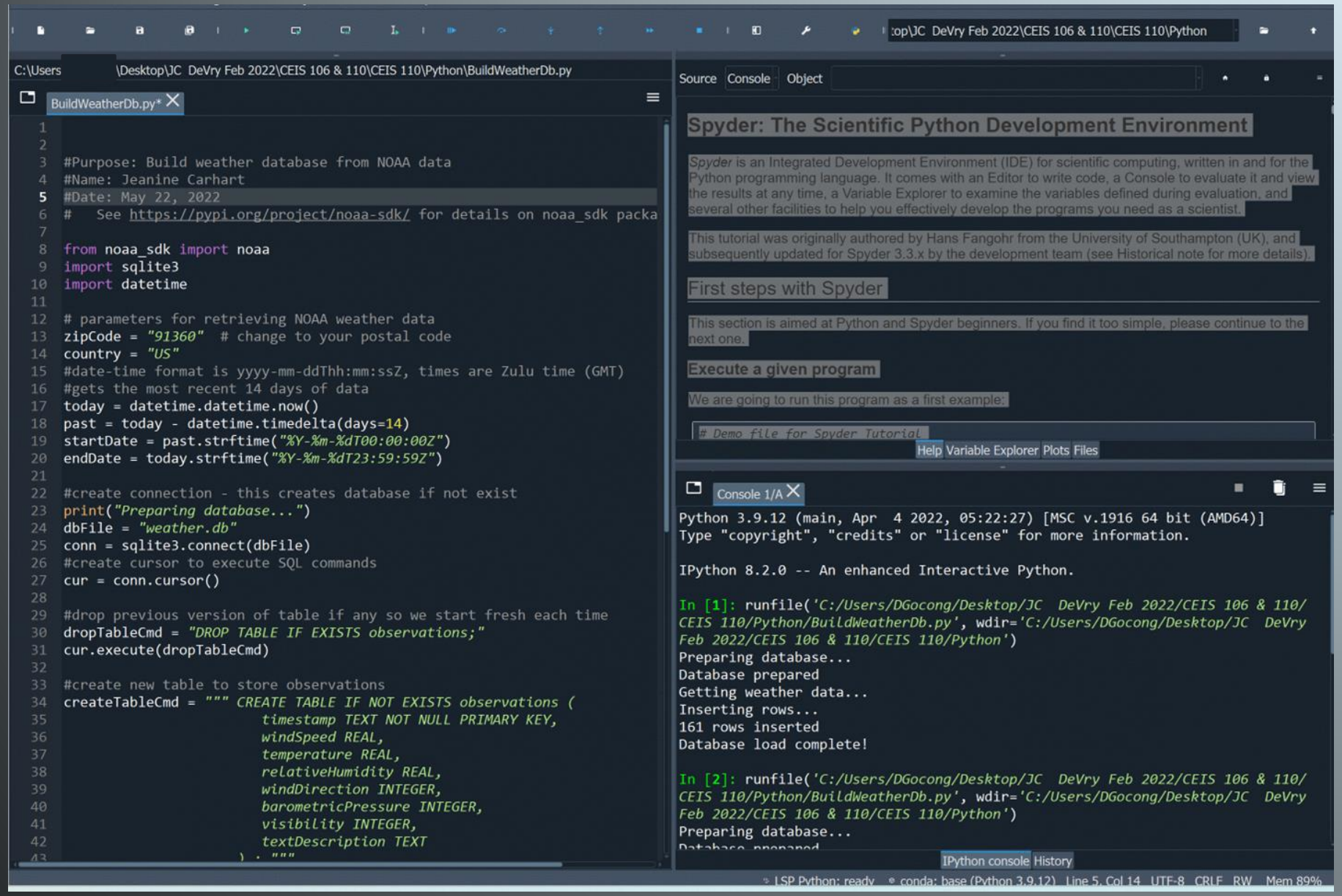
Module 3

Downloading Weather Data

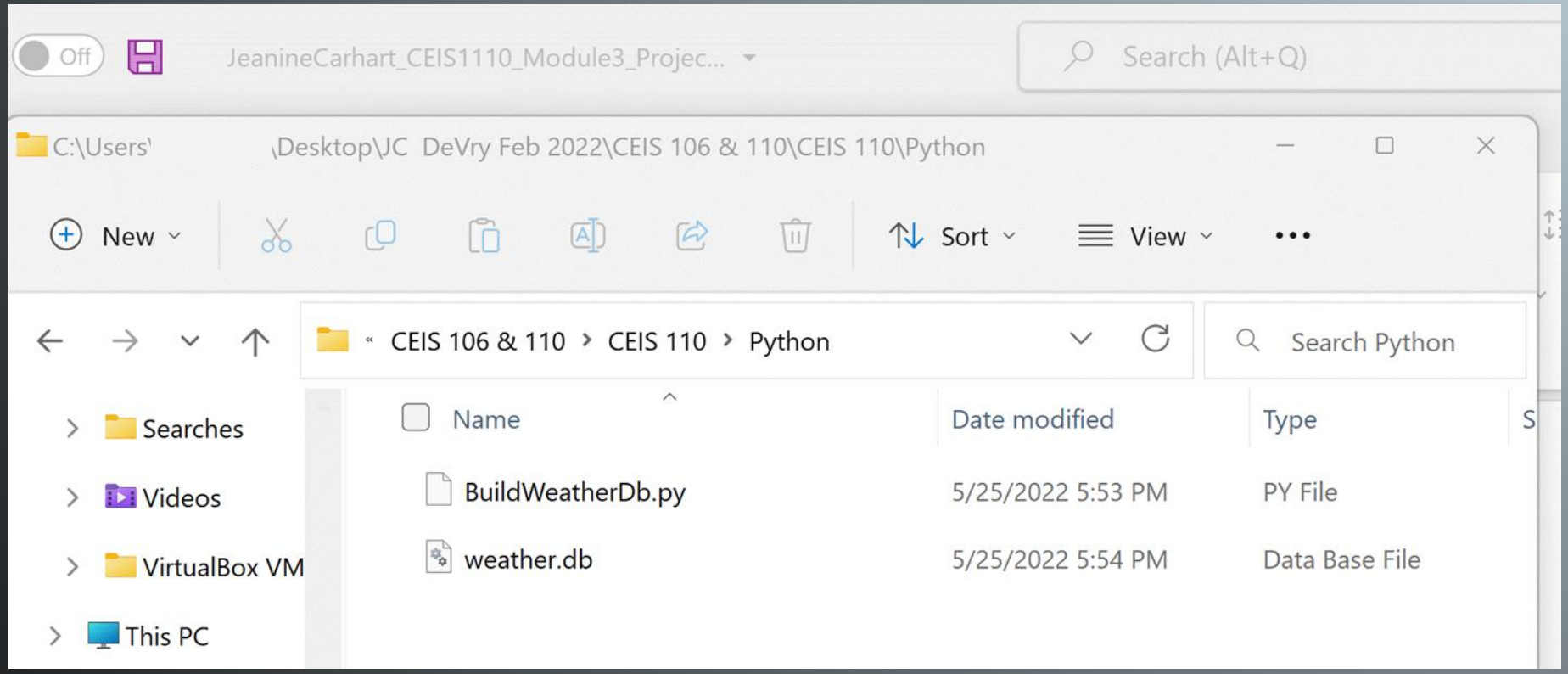
BuildWeatherDb.py Code



Python Console



Weather.db File



Module 4

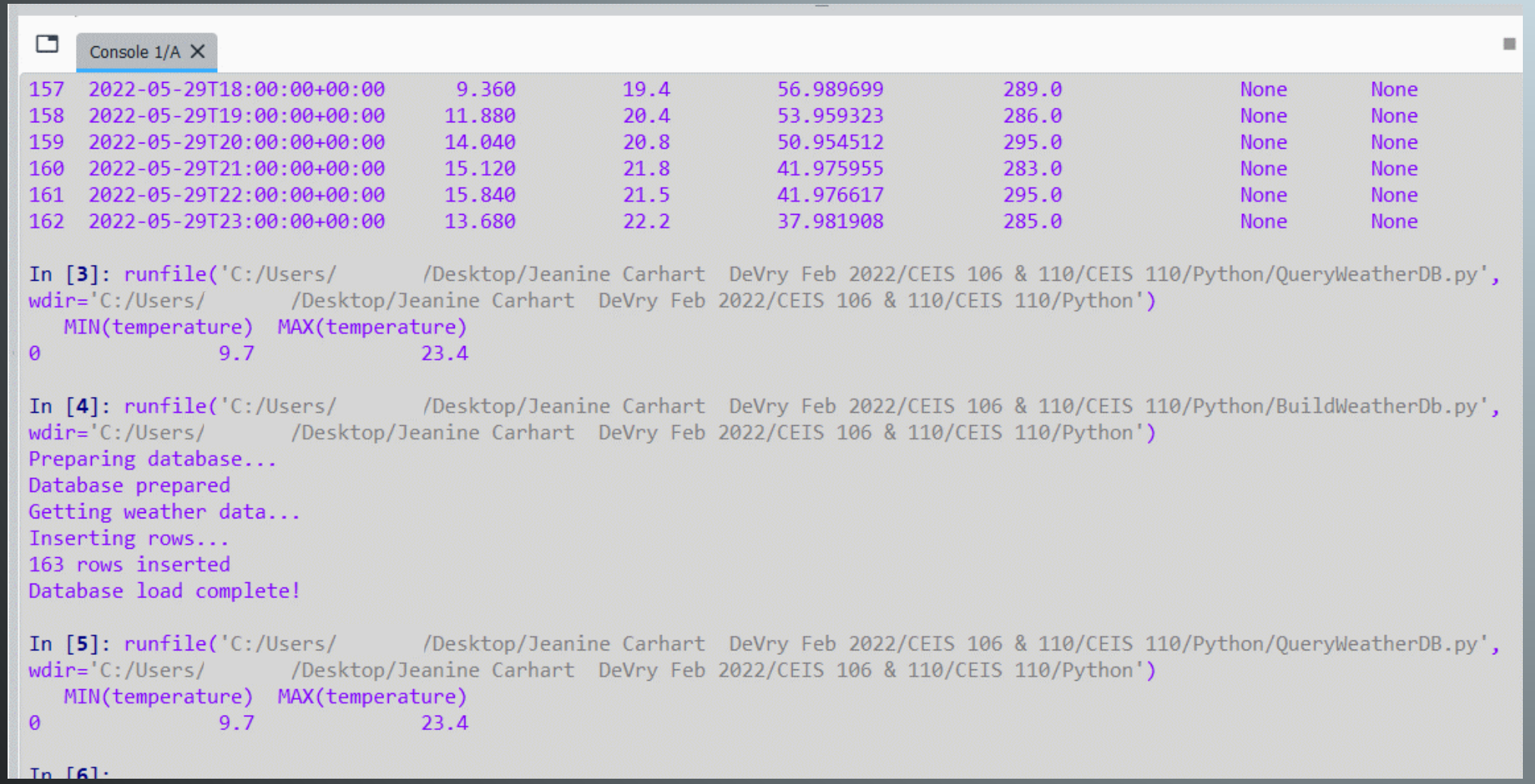
Querying the Database with SQL

Querying to Retrieve all Columns and Rows

```
In [2]: runfile('C:/Users/       /Desktop/Jeanine Carhart  DeVry Feb 2022/CEIS 106 & 110/CEIS 110/Python/QueryWeatherDB.py',
wdir='C:/Users/       /Desktop/Jeanine Carhart  DeVry Feb 2022/CEIS 106 & 110/CEIS 110/Python')
```

	timestamp	windSpeed	temperature	relativeHumidity	windDirection	barometricPressure	visibility	textDescription
0	2022-05-23T01:00:00+00:00	11.880	17.9	60.989512	289.0	None	None	
1	2022-05-23T03:00:00+00:00	7.200	15.5	68.005278	332.0	None	None	
2	2022-05-23T04:00:00+00:00	NaN	NaN	NaN	NaN	None	None	
3	2022-05-23T05:00:00+00:00	5.040	12.6	78.980694	343.0	None	None	
4	2022-05-23T06:00:00+00:00	NaN	NaN	NaN	NaN	None	None	
5	2022-05-23T07:00:00+00:00	1.440	12.0	82.990709	319.0	None	None	
6	2022-05-23T08:00:00+00:00	1.440	11.8	82.019994	340.0	None	None	
7	2022-05-23T09:00:00+00:00	1.440	11.3	83.017312	292.0	None	None	
8	2022-05-23T10:00:00+00:00	1.080	10.9	83.987953	270.0	None	None	
9	2022-05-23T11:00:00+00:00	1.800	10.5	83.998564	323.0	None	None	
10	2022-05-23T12:00:00+00:00	2.160	10.2	84.999740	305.0	None	None	
11	2022-05-23T13:00:00+00:00	3.240	9.7	88.012004	284.0	None	None	
12	2022-05-23T14:00:00+00:00	NaN	NaN	NaN	NaN	None	None	
13	2022-05-23T15:00:00+00:00	3.240	10.1	89.977946	334.0	None	None	
14	2022-05-23T16:00:00+00:00	3.240	10.9	89.977390	330.0	None	None	
15	2022-05-23T17:00:00+00:00	6.120	13.0	85.018590	297.0	None	None	
16	2022-05-23T18:00:00+00:00	6.480	16.2	69.989095	302.0	None	None	
17	2022-05-23T19:00:00+00:00	10.440	18.0	62.994305	298.0	None	None	
18	2022-05-23T20:00:00+00:00	10.440	19.1	58.959058	295.0	None	None	
19	2022-05-23T21:00:00+00:00	11.520	19.7	57.979868	294.0	None	None	
20	2022-05-23T22:00:00+00:00	12.960	19.5	59.961070	287.0	None	None	
21	2022-05-23T23:00:00+00:00	12.960	19.0	60.963333	293.0	None	None	
22	2022-05-24T00:00:00+00:00	11.880	18.6	61.970067	289.0	None	None	
23	2022-05-24T01:00:00+00:00	NaN	NaN	NaN	NaN	None	None	
24	2022-05-24T02:00:00+00:00	9.360	16.8	66.966703	291.0	None	None	
25	2022-05-24T03:00:00+00:00	7.920	15.5	71.983043	301.0	None	None	
26	2022-05-24T04:00:00+00:00	5.400	13.9	78.015818	302.0	None	None	

Query to retrieve highest and lowest temperatures



Query to retrieve all clear days

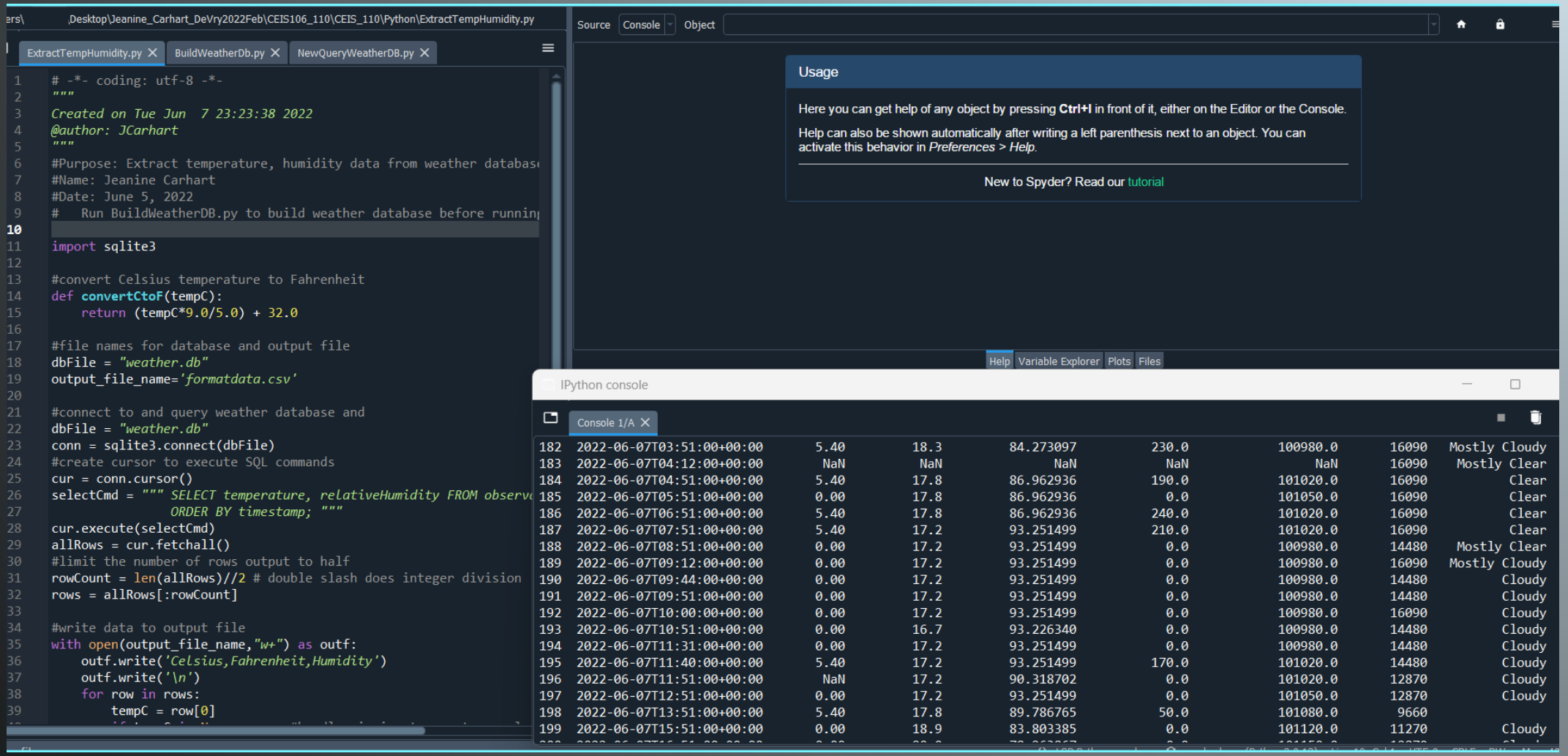
Console 1/A

```
In [8]: runfile('C:/Users/       /Desktop/Jeanine Carhart  DeVry Feb 2022/CEIS 106 & 110/CEIS 110/Python/BuildWeatherDb.py',
wdir='C:/Users/       /Desktop/Jeanine Carhart  DeVry Feb 2022/CEIS 106 & 110/CEIS 110/Python')
Preparing database...
Database prepared
Getting weather data...
Inserting rows...
163 rows inserted
Database load complete!

In [9]: runfile('C:/Users/       /Desktop/Jeanine Carhart  DeVry Feb 2022/CEIS 106 & 110/CEIS 110/Python/QueryWeatherDB.py',
wdir='C:/Users/       /Desktop/Jeanine Carhart  DeVry Feb 2022/CEIS 106 & 110/CEIS 110/Python')
Empty DataFrame
Columns: [temperature, windSpeed, textDescription]
Index: []

In [10]: runfile('C:/Users/       /Desktop/Jeanine Carhart  DeVry Feb 2022/CEIS 106 & 110/CEIS 110/Python/BuildWeatherDb.py',
wdir='C:/Users/       /Desktop/Jeanine Carhart  DeVry Feb 2022/CEIS 106 & 110/CEIS 110/Python')
Preparing database...
Database prepared
Getting weather data...
Inserting rows...
163 rows inserted
Database load complete!

In [11]: runfile('C:/Users/       /Desktop/Jeanine Carhart  DeVry Feb 2022/CEIS 106 & 110/CEIS 110/Python/QueryWeatherDB.py',
wdir='C:/Users/       /Desktop/Jeanine Carhart  DeVry Feb 2022/CEIS 106 & 110/CEIS 110/Python')
Empty DataFrame
Columns: [temperature, windSpeed, textDescription]
Index: []

In [12]:
```

Module 5

Querying and Manipulating Data with SQL and Python

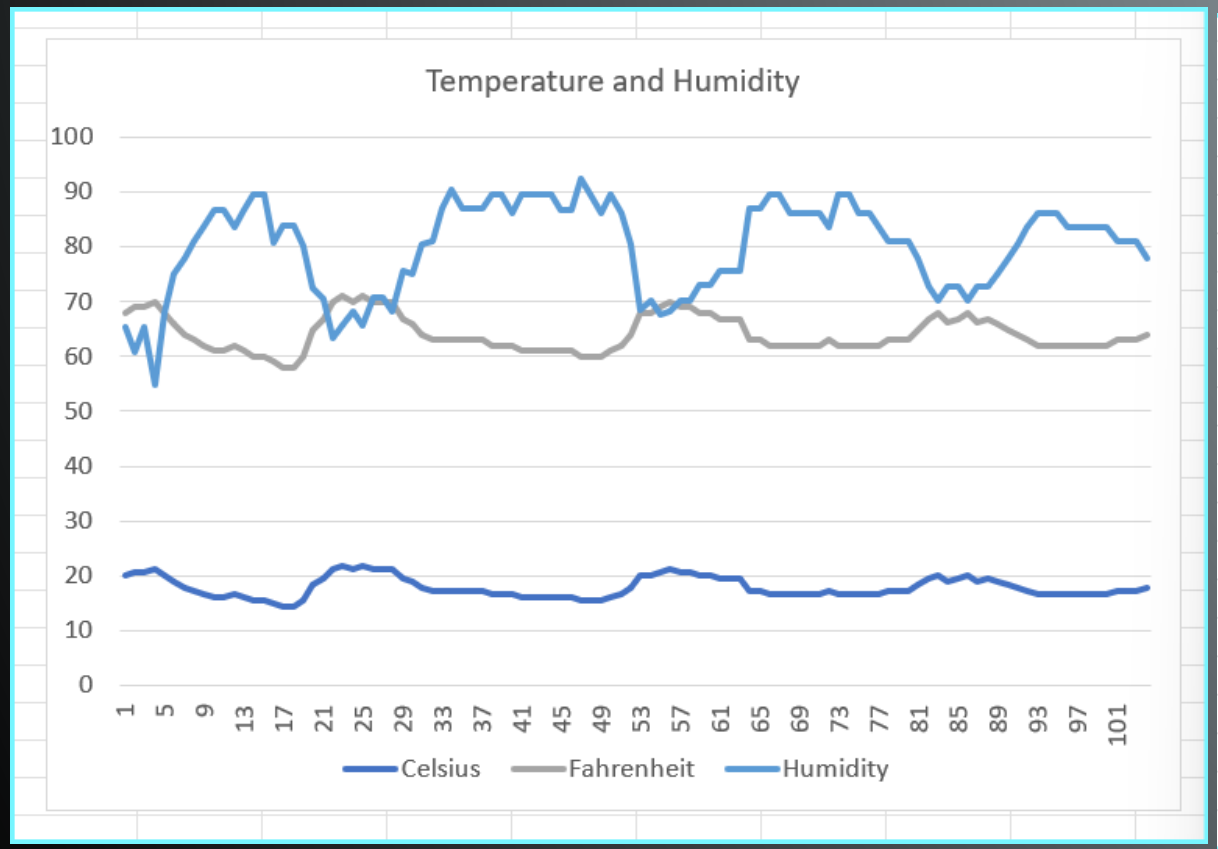
Python code: ExtractTempHumidity.py

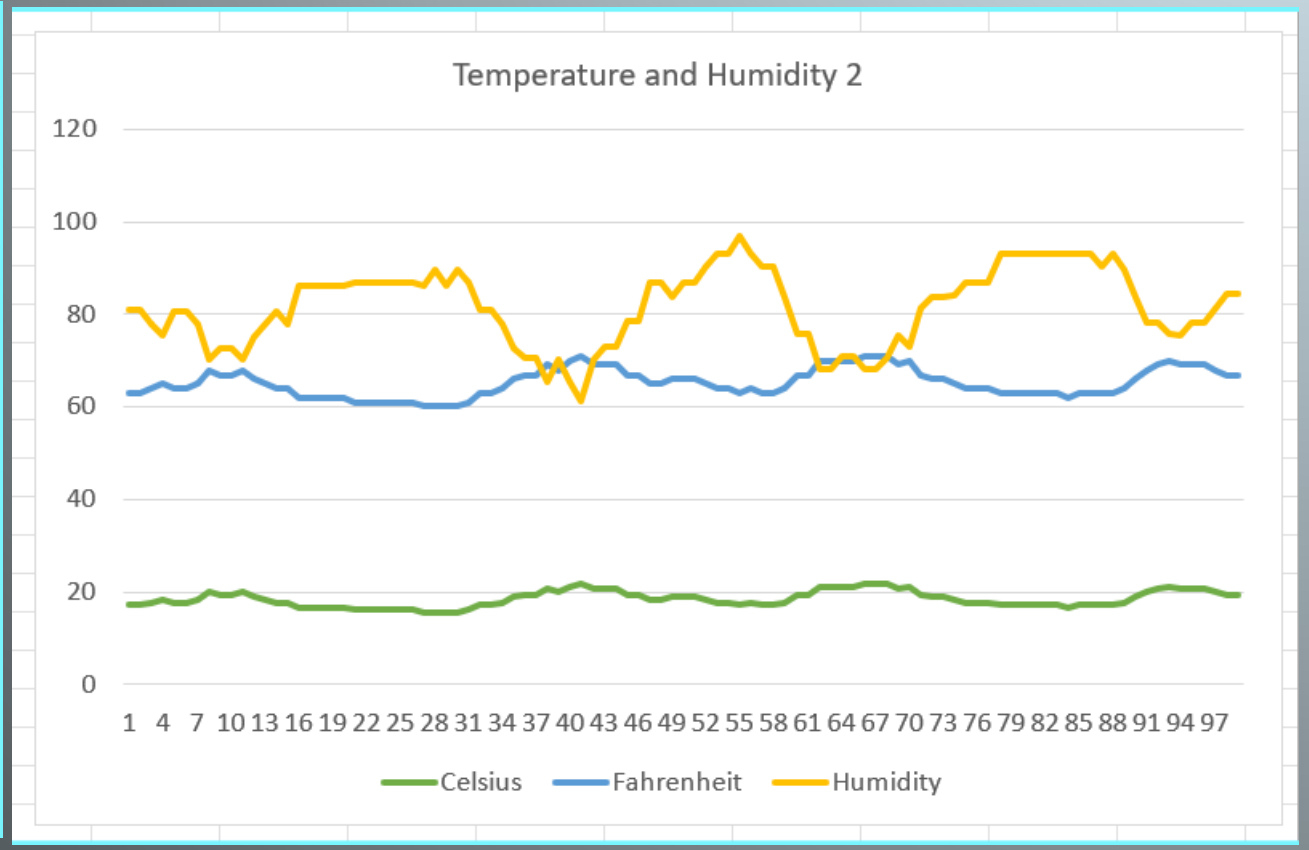


Retrieve and Convert Data to CSV Format

A	B	C
Celsius	Fahrenheit	Humidity
20	68	65.33508183
20.6	69.08	60.93509447
20.6	69.08	65.46328848
21.1	69.98	54.96814752
20	68	67.93498729
18.9	66.02	75.13736573
17.8	64.04	77.93714995
17.2	62.96	80.94462547
16.7	62.06	83.55048294
16.1	60.98	86.80249244
16.1	60.98	86.80249244
16.7	62.06	83.55048294
16.1	60.98	86.80249244
15.6	60.08	89.62111213
15.6	60.08	89.62111213
15	59	80.65022333
14.4	57.92	83.83170254
14.4	57.92	83.83170254
15.6	60.08	80.202282
18.3	64.94	72.63605068
19.4	66.92	70.51195827
21.1	69.98	63.48053948
21.7	71.06	65.69668793
21.1	69.98	68.15622481
21.7	71.06	65.69668793
21.1	69.98	70.83212646
21.1	69.98	70.83212646

Temperature and Humidity Chart



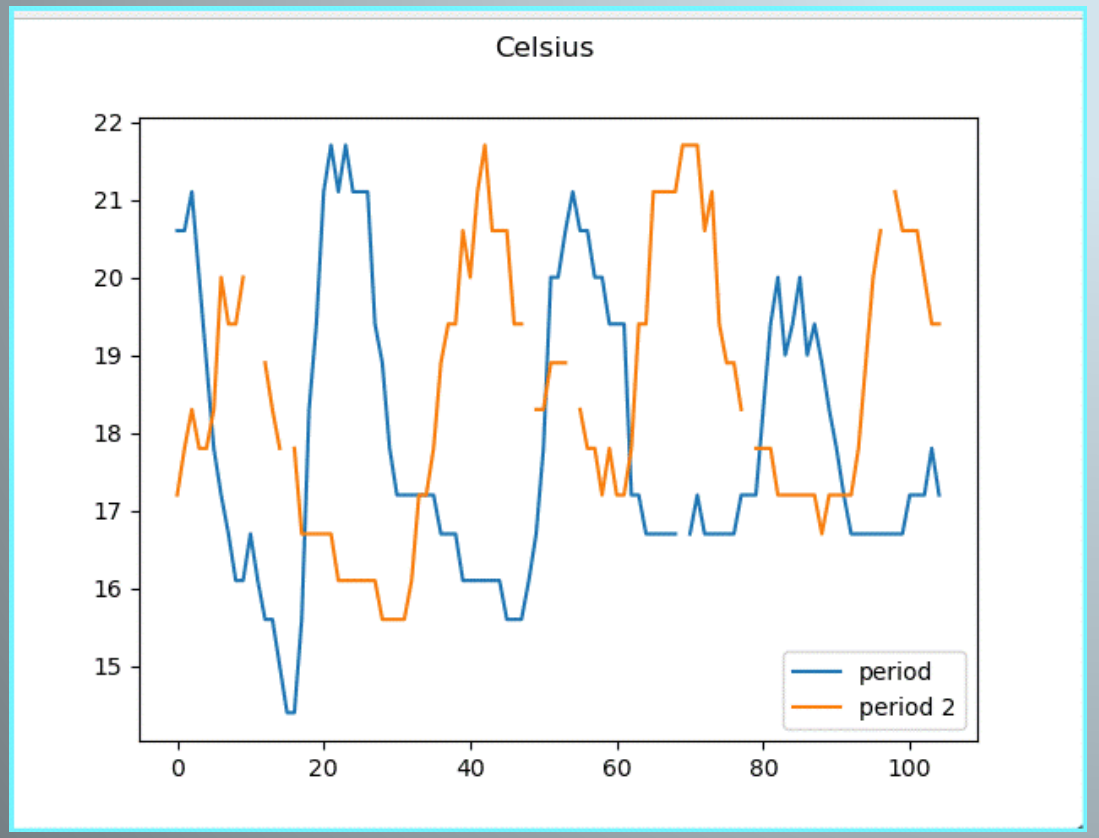


Module 6

Develop Graphical Models and Interpret Results

Plot #1

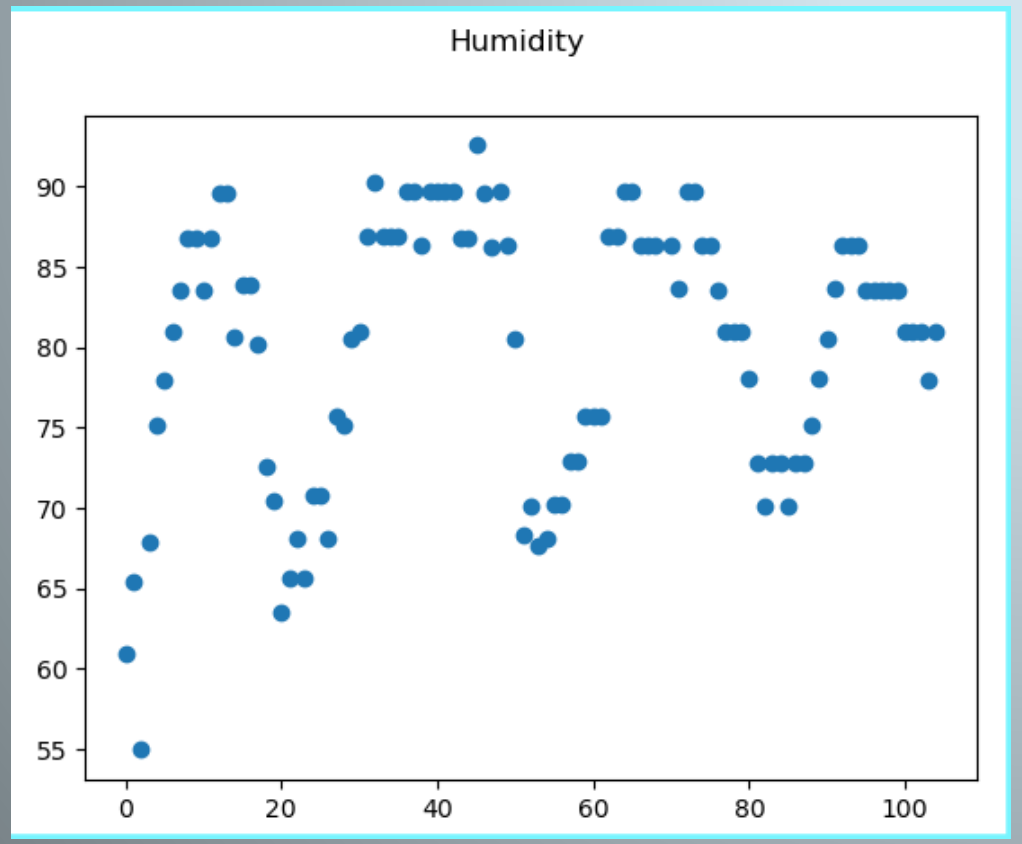
Plot and Code




```
#Purpose: Create a histogram of celsius data comparing the first and second periods

#Name:  Jeanine Carhart
#Date:  June 12, 2022

import pandas as pd
import matplotlib.pyplot as plt
df1 =pd.read_csv("formatdata.csv") #baseline data is period 1 (older)
df2 =pd.read_csv("formatdata2.csv") #data for period 2 (more recent)
plt.figure(); df1.Celsius.plot(label='period'); df2.Celsius.plot(label='period 2');
plt.legend(loc='best');plt.suptitle('Celsius')
plt.show()
```

Plot #2

Create a plot from your own question



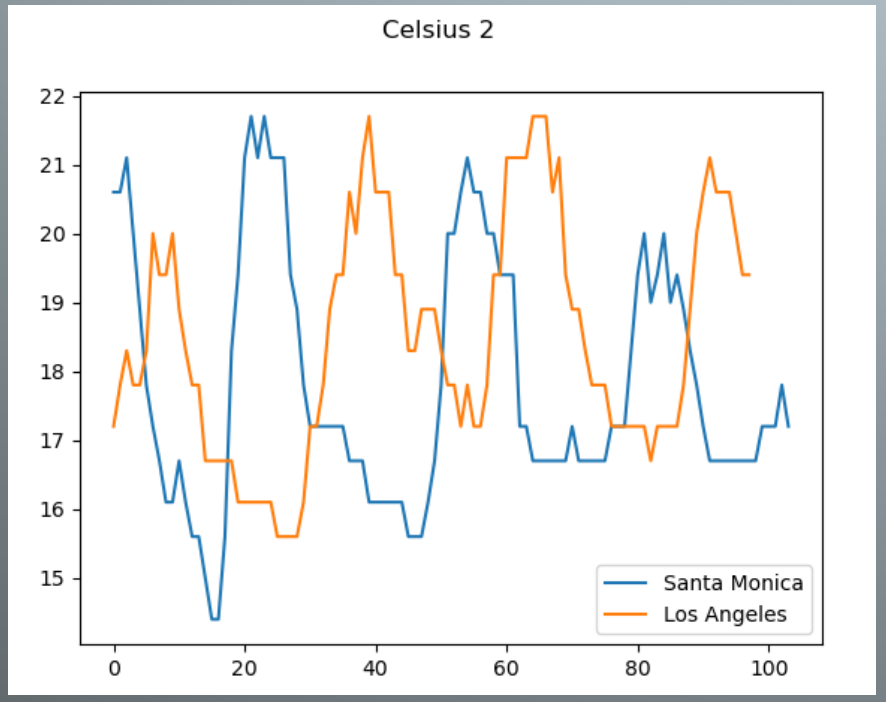

```
#Purpose: Create a scatter plot of humidity data from the first and second period

#Name:  Jeanine Carhart
#Date:  June 12, 2022

import pandas as pd
import matplotlib.pyplot as plt
df1 =pd.read_csv("formatdata.csv")
df2 =pd.read_csv("formatdata2.csv")
plt.scatter(df1.index.values,df1['Humidity']);plt.suptitle('Humidity')
plt.show()
```

Analysis

Are temperatures similar in Santa Monica and Los Angeles?

HistogramOfCelsius2_Week6.py

```
#Purpose: Create a histogram of celsius data comparing the first and second periods

#Name:  Jeanine Carhart
#Date:  June 12, 2022

import pandas as pd
import matplotlib.pyplot as plt
df1 =pd.read_csv("formatdata.csv") #baseline data is period 1 (older)
df2 =pd.read_csv("formatdata3.csv") #data for period 2 (more recent)
plt.figure(); df1.Celsius.plot(label='Santa Monica'); df2.Celsius.plot(label='Los Angeles');
plt.legend(loc='best');plt.suptitle('Celsius 2')
plt.show()
```



Answer: Yes

Prediction

Develop a prediction based on the data. What variations in temperature and humidity do you expect over the next few hours or days? How would humidity change if temperature goes up or down?

Santa Monica is on the ocean and has less traffic and streets which increases the heat, however, the ocean breeze reduces the temperature and increases humidity.

Santa Monica: Average humidity for May and June 2022: 82% Average temperature: 64°F

Los Angeles is more populous than Santa Monica, has more traffic and streets, and is a little bit further away from the ocean, resulting in higher temperatures, but cools down in the evenings. At this time of year, however, the temperatures between Los Angeles and Santa Monica vary slightly.

Los Angeles: Average humidity for May and June 2022: 74% Average temperature: 66°F

Challenges

Challenges

Remembering the commands is challenging.

Practice will help.

Figuring out how to undo a mistake took some work to figure out.

Planning the time for writing code will take some time.

Career Skills

Career Skills

Attention to detail: When the code isn't working, it can come down to a missing period or comma. The details are very important.

Persistence: This is needed if the missing period in the code is ever going to be found.

Research and analytical skills: Very important for interpreting the results of analyzing data.

Conclusion

Why Learn Python?

- Accessible for beginning programmers
- Simple syntax
- Valuable skill set
- Software quality
- Program portability
- Developer productivity promotion
- Libraries support
- Component Integration
- Free
- Powerful
- Easy to use
- Portable

LESSONS LEARNED

- ✓ Python is a Valuable Skill
- ✓ Creating programs
- ✓ Design and Library Setup
- ✓ Create Flowcharts
- ✓ Software Inventory
- ✓ Build a Database
- ✓ Work with Python Console
- ✓ Work with Weather Database
- ✓ Query to Retrieve Columns and Rows
- ✓ Query to Retrieve High/Low Temperatures
- ✓ Query to Retrieve Clear Days
- ✓ Query and Manipulate SQL and Python Data
- ✓ Query the Database with SQL
- ✓ Develop Graphical Models and Interpret Results
- ✓ Create Plots and Predict Results

Challenges

- Remembering the commands are challenging
- Careful coding can reduce the time spent finding errors
- Manage the time needed for writing code

Career Skills

- Attention to detail
- Persistence
- Research and analytical skills