

# MATLAB and Python Weather Plotting

## Contents

MATLAB and Python Weather Plotting .....	1
Tutorial 1: MATLAB Plot Daily Weather in Scottsbluff .....	1
Assignment 1: Weather Plots with MATLAB .....	4
Tutorial 2: Python Plot Daily Weather in Scottsbluff .....	4
Assignment 2: Weather Plots with Python .....	6
Assignment Submission.....	6

Time required: 90 minutes

1. Save Python code in a Google Colab Notebook.
2. Save MATLAB code in a MATLAB file.

## Tutorial 1: MATLAB Plot Daily Weather in Scottsbluff

We are going to work with some daily weather data from NOAA (National Oceanic and Atmospheric Administration).

1. Go to: <https://www.ncdc.noaa.gov/cdo-web/search>
2. Select **Weather Observation Type/Dataset**
3. **Select Dataset:** Daily Summaries.
4. **Select Date Range:** 2025, Jan to 2025, Mar 30 or the latest available date.
5. **Search For:** ZIP Codes
6. **Enter a Search Term:** 69361 (or a different Zip Code if you wish.)
7. Click **Search**.
8. You will go to a screen with a list of weather stations. **Scottsbluff, NE 69361** →  
Click **Add To Cart**.
9. Click the **Cart (Free Data)**.

10. **Select Cart Options → Custom GHCN-Daily CSV** (You can check and change the date range here if you wish.

11. Click **Continue**.

12. Custom Options: Daily Summaries → Select data types for customer output: **Air Temperature**. Click Continue.

13. You will get a page that says **Review Order**.

REQUESTED DATA REVIEW	
Dataset	Daily Summaries
Order Start Date	2024-01-01 00:00
Order End Date	2024-03-29 23:59
Output Format	Custom GHCN-Daily CSV
Data Types	TAVG, TMAX, TMIN
Custom Flag(s)	Station Name
Units	Standard
Stations/ Locations	SCOTTSBLUFF W B HEILIG FIELD AIRPORT, NE US (Station ID: GHCND:USW00024028)

14. Enter your email address to receive the link to your data.

15. **Submit Order**.

16. You should get a confirmation email that your order is being processed.

17. In a couple of minutes: You should get an email with a Download link.

18. Into the same folder as your MATLAB program, Download the file as:  
**noaa\_scottsbluff\_2025.csv**

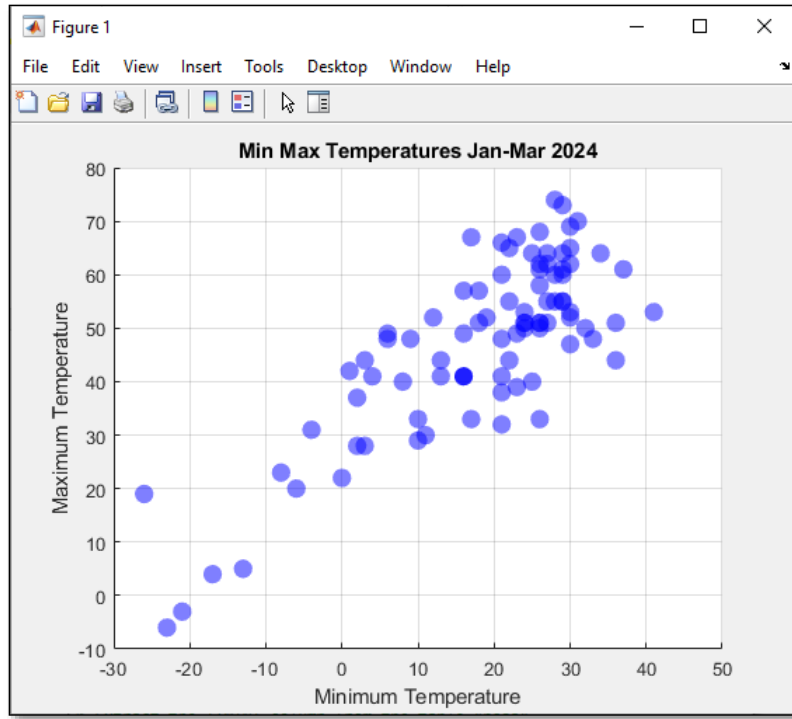
19. Create the following MATLAB program as **NOAAScottsbluffDaily.m**

```

1  % Read the data from the CSV file "noaa_scottsbluff_2024.csv"
2  % into a table named "noaa", % interpreting text data as strings.
3  noaa = readtable("noaa_scottsbluff_2024.csv","TextType","string");
4
5  % Display the first few rows of the table "noaa".
6  head(noaa)
7
8  % Extract the 'TMAX' column from the table "noaa"
9  % and assign it to the variable "temp_max".
10 temp_max = noaa.TMAX;
11
12 % Extract the 'TMIN' column from the table "noaa"
13 % and assign it to the variable "temp_min".
14 temp_min = noaa.TMIN;
15
16 % Create a scatter plot with "temp_min" as the x-values,
17 % "temp_max" as the y-values, % marker size of 100,
18 % filled markers in blue color with transparency set to 50%.
19 scatter(temp_min, temp_max, 100, "blue", "filled", "MarkerFaceAlpha", .5)
20
21 % Display the grid on the plot.
22 grid on
23
24 % Set the title of the plot to "Min Max Temperatures Jan-Mar 2024".
25 title("Min Max Temperatures Jan-Mar 2024")
26
27 % Set the label for the x-axis as "Minimum Temperature".
28 xlabel("Minimum Temperature")
29
30 % Set the label for the y-axis as "Maximum Temperature".
31 ylabel("Maximum Temperature")

```

Example run:



## Assignment 1: Weather Plots with MATLAB

1. Create a line plot showing the TMIN and TMAX temperatures on the same plot.
2. Create a bar plot showing the TMIN and TMAX temperatures on the same plot.
3. Create a line plot showing the TAVG.
4. Create a bar plot showing the TAVG.

## Tutorial 2: Python Plot Daily Weather in Scottsbluff

1. In Google Colab → Create a Notebook named: **Wk12PythonNOAAScottsbluffDaily**
2. Enter the following code. The link is available below for copying and pasting.

```
import pandas as pd
import matplotlib.pyplot as plt

# Read the data from the CSV file "noaa_scottsbluff_2024.csv" into a DataFrame named "noaa".
noaa = pd.read_csv(
    "https://raw.githubusercontent.com/itinstructor/JupyterNotebooks/main/Datasets/noaa_scottsbluff_2024.csv"
)
```

[https://github.com/itainstructor/JupyterNotebooks/blob/main/Datasets/Weather/noaa\\_scotts\\_bluff\\_2024.csv](https://github.com/itainstructor/JupyterNotebooks/blob/main/Datasets/Weather/noaa_scotts_bluff_2024.csv)

```
# Display the first few rows of the DataFrame "noaa".
print(noaa.head())

# Extract the 'TMAX' column from the DataFrame "noaa"
# assign it to the variable "temp_max".
temp_max = noaa['TMAX']

# Extract the 'TMIN' column from the DataFrame "noaa"
# assign it to the variable "temp_min".
temp_min = noaa['TMIN']

# Create a scatter plot with "temp_min" as the x-values,
# "temp_max" as the y-values, marker size of 100,
# filled markers in blue color with transparency set to 0.5.
plt.scatter(temp_min, temp_max, s=100, c="blue", alpha=0.5)

# Display the grid on the plot
plt.grid(True)

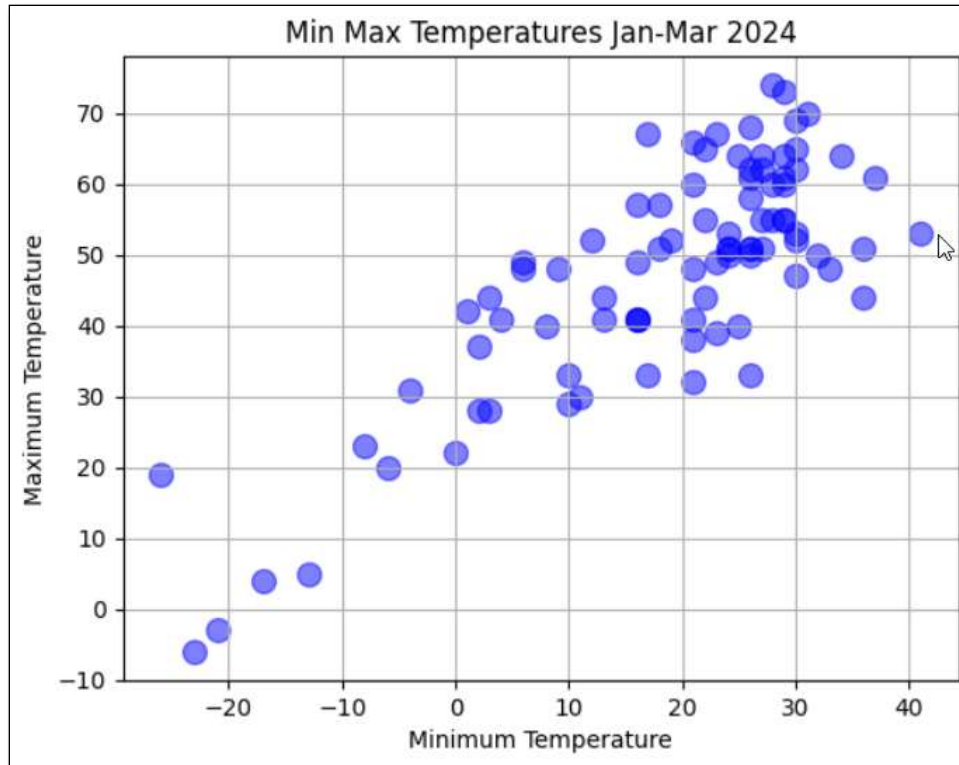
# Set the title of the plot to "Min Max Temperatures Jan-Mar 2024".
plt.title("Min Max Temperatures Jan-Mar 2024")

# Set the label for the x-axis as "Minimum Temperature".
plt.xlabel("Minimum Temperature")

# Set the label for the y-axis as "Maximum Temperature".
plt.ylabel("Maximum Temperature")

# Display the plot.
plt.show()
```

Example run:



## Assignment 2: Weather Plots with Python

Use the previous Python assignment and add this to it.

1. Create a line plot showing the TMIN and TMAX temperatures on the same plot.
2. Create a bar plot showing the TMIN and TMAX temperatures on the same plot.
3. Create a line plot showing the TAVG.
4. Create a bar plot showing the TAVG.

---

### Assignment Submission

1. Insert a shared link to your Google Colab notebook that anyone can open.
2. Attach a screenshot of the Command Window showing the successful execution of each script.
3. Attach all to the assignment in Blackboard.