

# Introduction to Data Visualization with Matplotlib

INTRODUCTION TO DATA VISUALIZATION WITH MATPLOTLIB



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# Data visualization

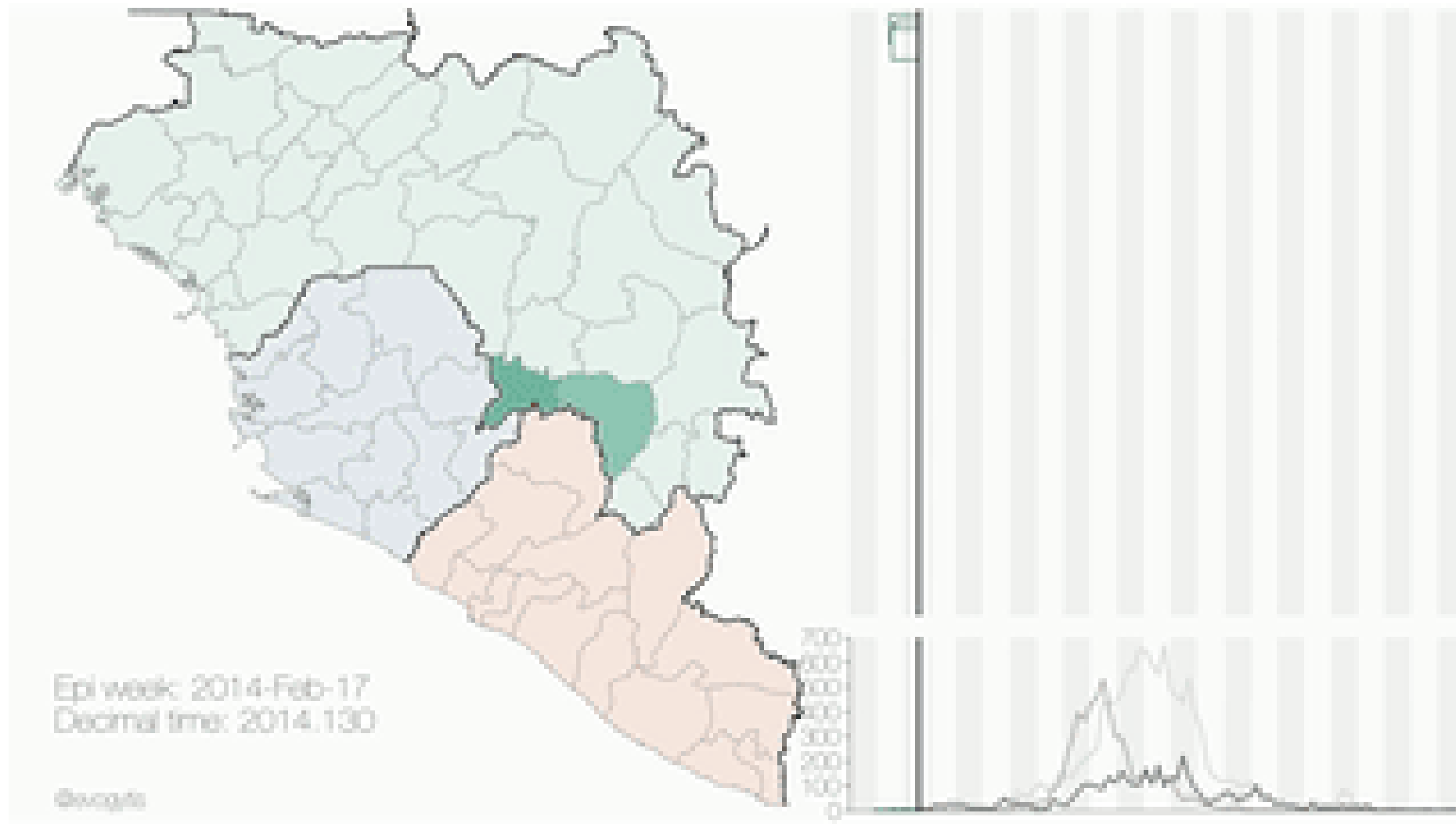
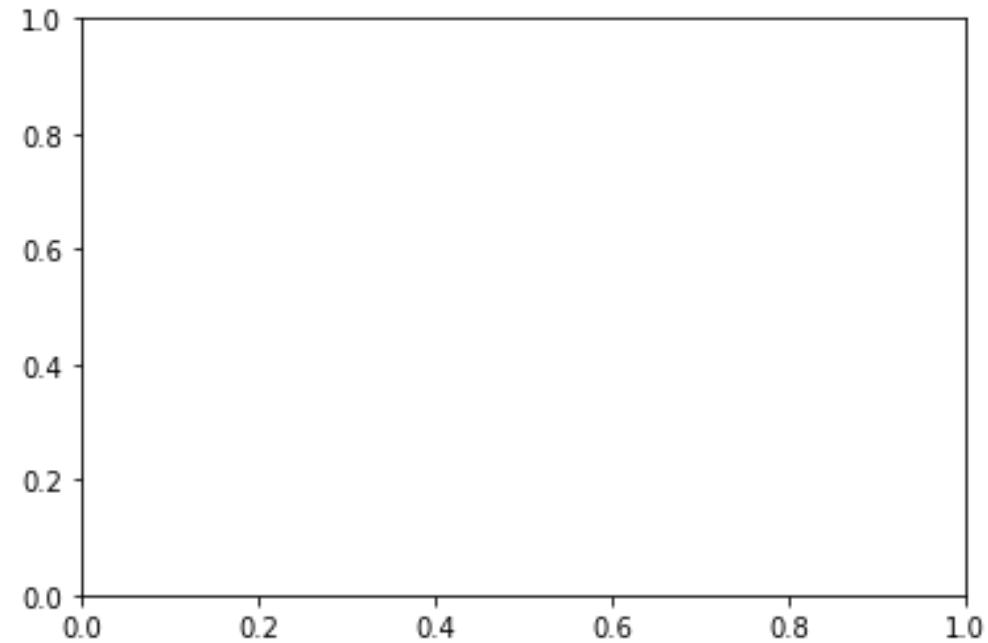


Image credit: [Gytis Dudas](#) and [Andrew Rambaut](#)

# Introducing the pyplot interface

```
import matplotlib.pyplot as plt  
fig, ax = plt.subplots()  
plt.show()
```



# Adding data to axes

```
seattle_weather["MONTH"]
```

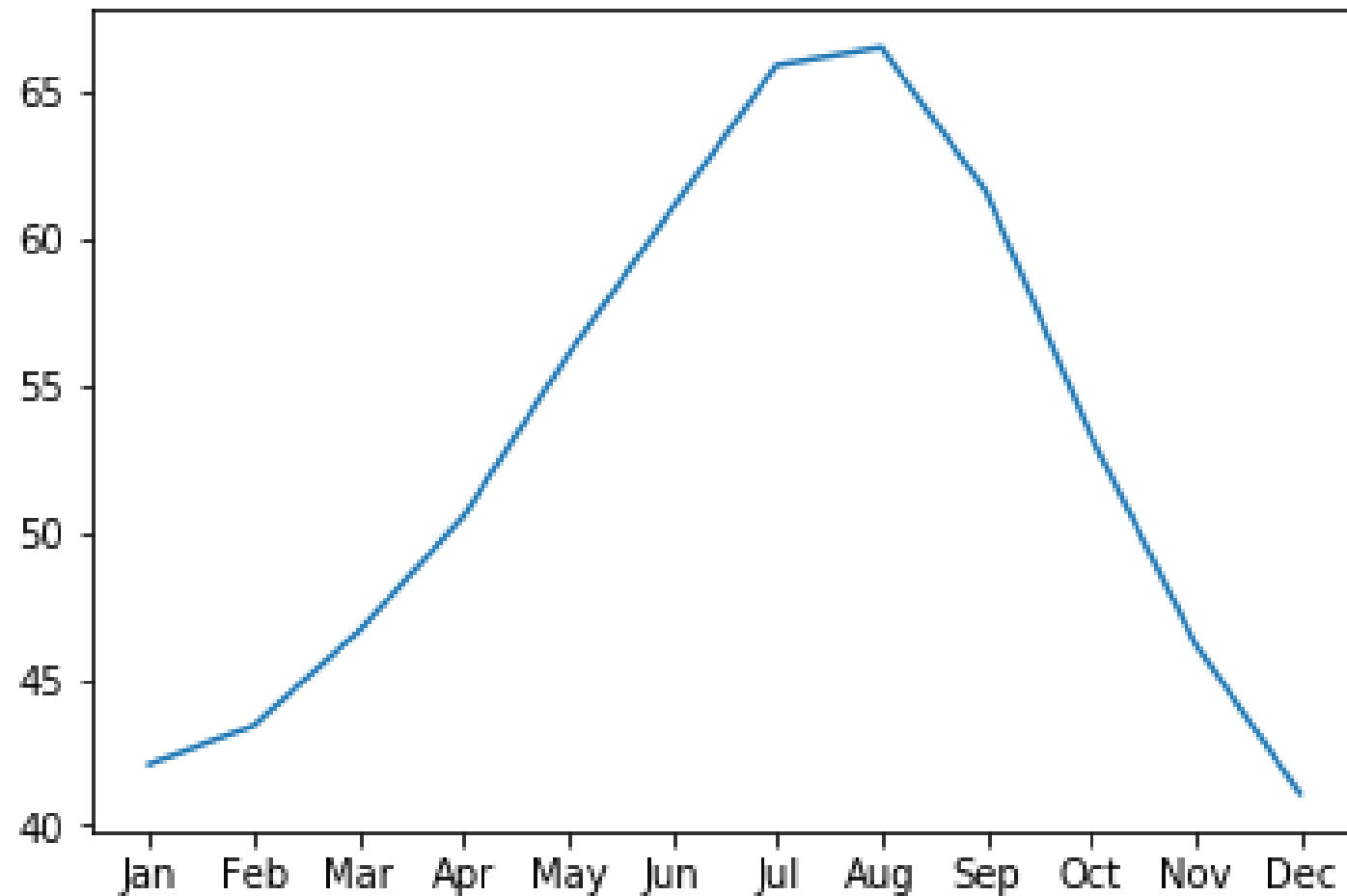
```
DATE
1    Jan
2    Feb
3    Mar
4    Apr
5    May
6    Jun
7    Jul
8    Aug
9    Sep
10   Oct
11   Nov
12   Dec
Name: MONTH, dtype: object
```

```
seattle_weather["MLY-TAVG-NORMAL"]
```

```
1    42.1
2    43.4
3    46.6
4    50.5
5    56.0
6    61.0
7    65.9
8    66.5
9    61.6
10   53.3
11   46.2
12   41.1
Name: MLY-TAVG-NORMAL, dtype: float64
```

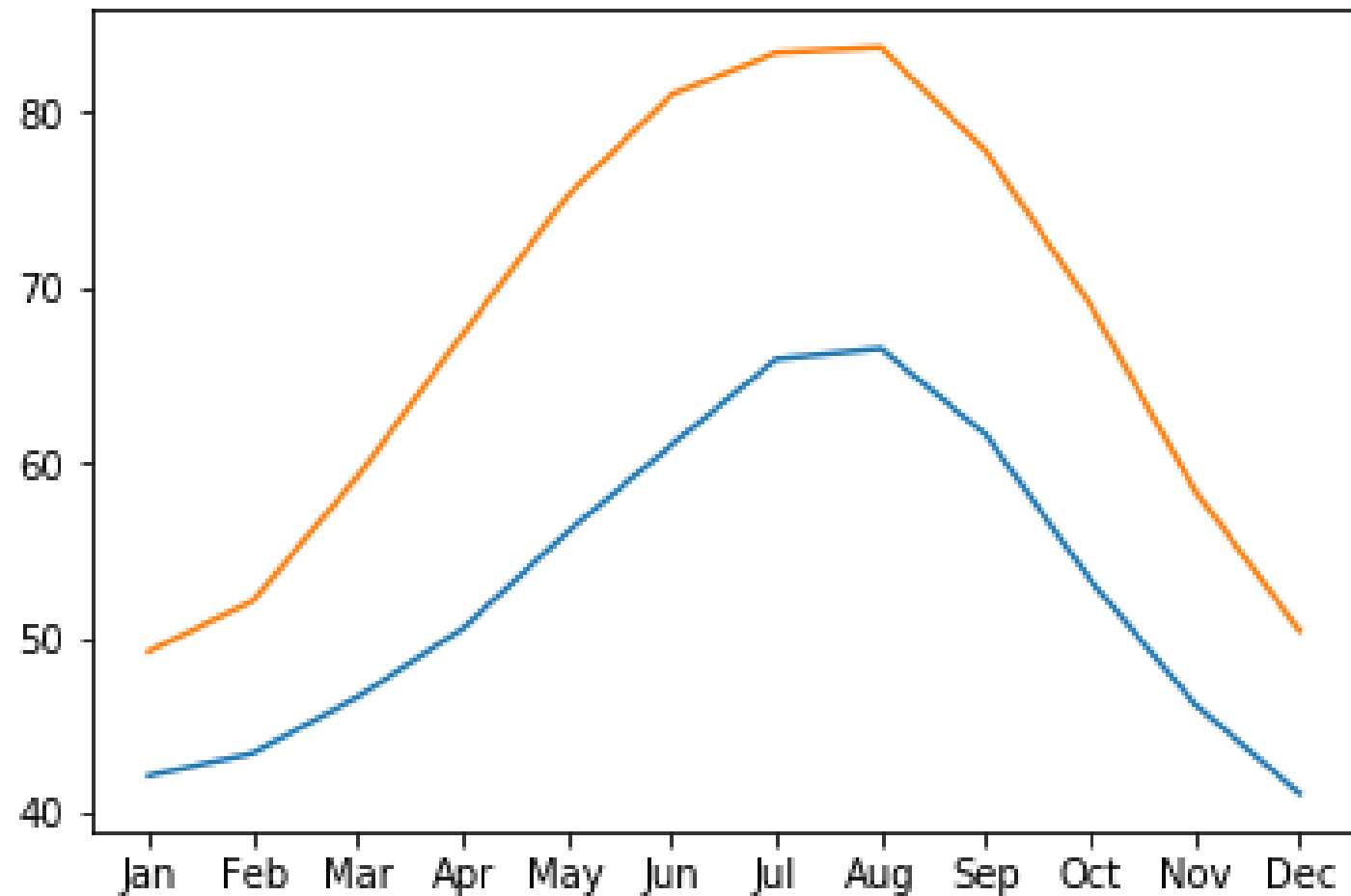
# Adding data to axes

```
ax.plot(seattle_weather["MONTH"], seattle_weather["MLY-TAVG-NORMAL"])\nplt.show()
```



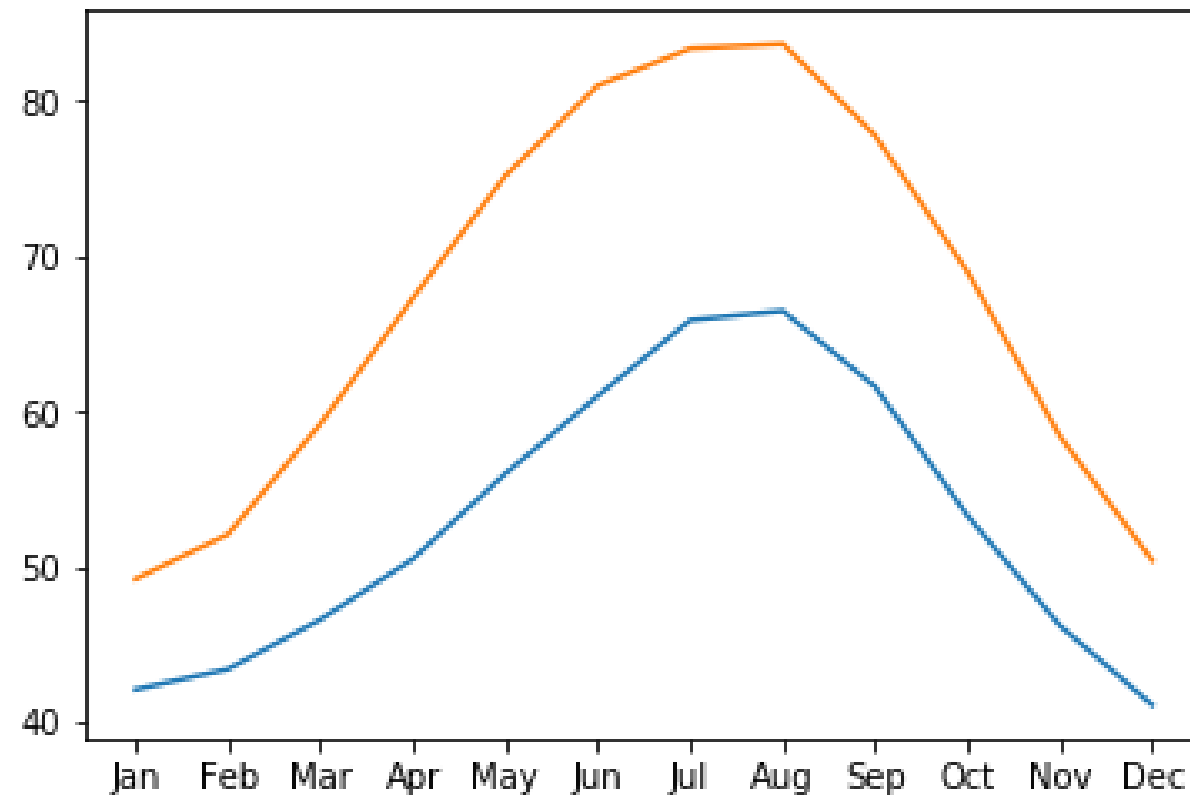
# Adding more data

```
ax.plot(austin_weather["MONTH"], austin_weather["MLY-TAVG-NORMAL"])\nplt.show()
```



# Putting it all together

```
fig, ax = plt.subplots()
ax.plot(seattle_weather["MONTH"], seattle_weather["MLY-TAVG-NORMAL"])
ax.plot(austin_weather["MONTH"], austin_weather["MLY-TAVG-NORMAL"])
plt.show()
```



# Practice making a figure!

INTRODUCTION TO DATA VISUALIZATION WITH MATPLOTLIB



# Customizing your plots

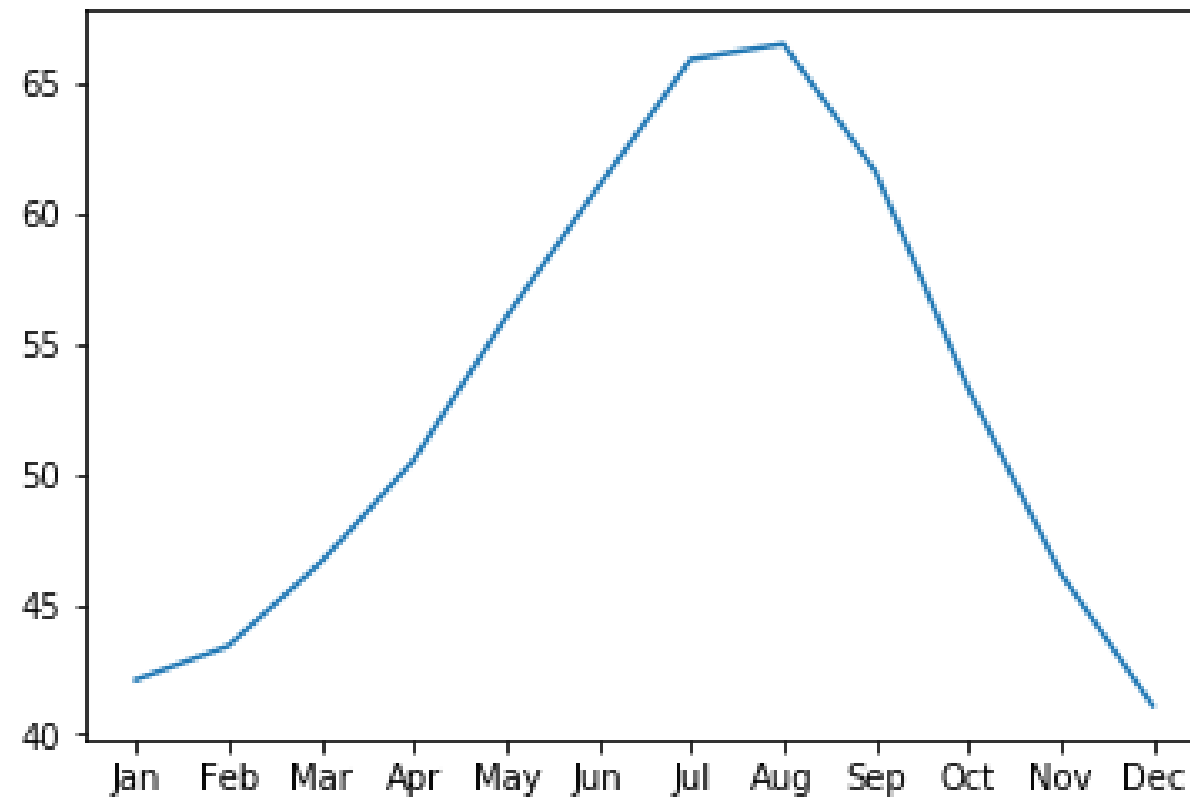
INTRODUCTION TO DATA VISUALIZATION WITH MATPLOTLIB



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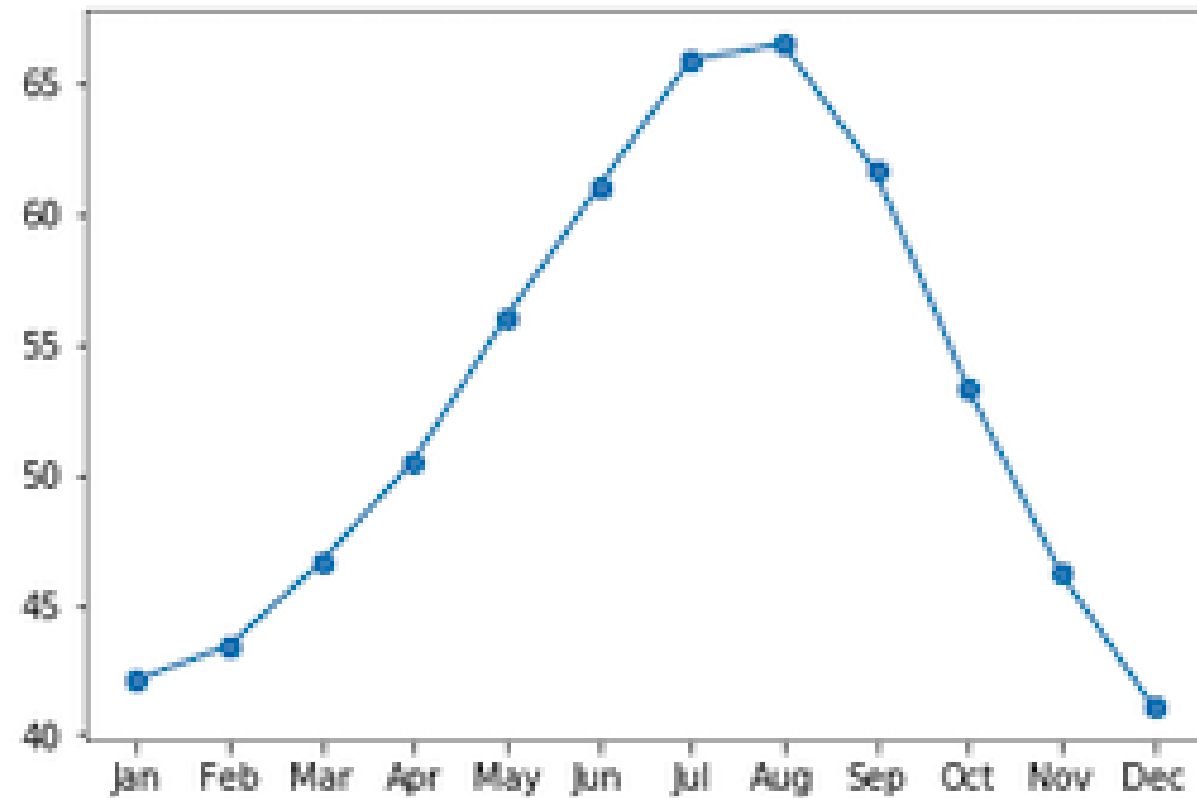
# Customizing data appearance

```
ax.plot(seattle_weather["MONTH"],  
        seattle_weather["MLY-PRCP-NORMAL"])  
plt.show()
```



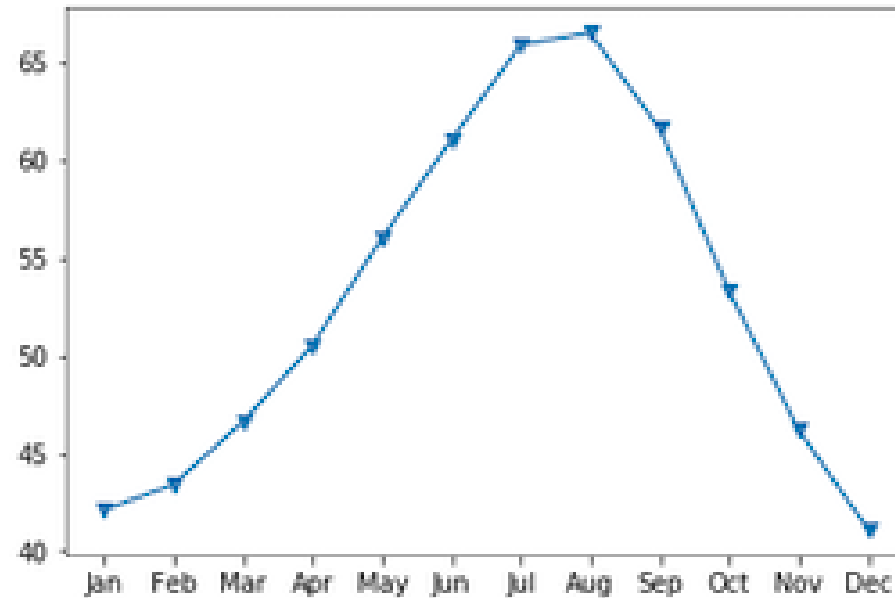
# Adding markers

```
ax.plot(seattle_weather["MONTH"],  
        seattle_weather["MLY-PRCP-NORMAL"],  
        marker="o")  
plt.show()
```



# Choosing markers

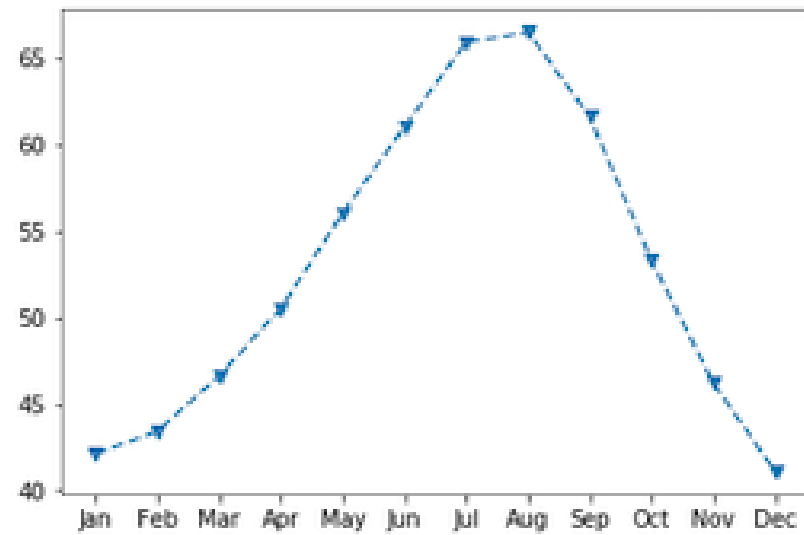
```
ax.plot(seattle_weather["MONTH"],  
        seattle_weather["MLY-PRCP-NORMAL"],  
        marker="v")  
plt.show()
```



[https://matplotlib.org/api/markers\\_api.html](https://matplotlib.org/api/markers_api.html)

# Setting the linestyle

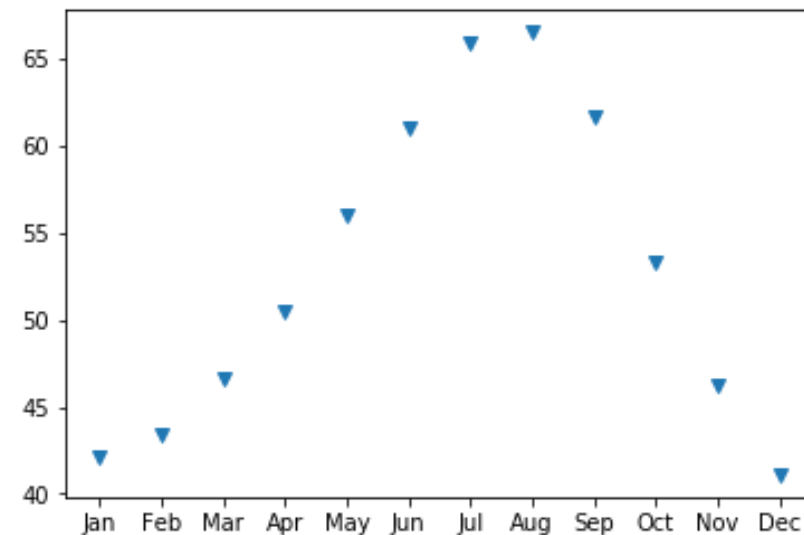
```
fig, ax = plt.subplots()
ax.plot(seattle_weather["MONTH"],
        seattle_weather["MLY-TAVG-NORMAL"],
        marker="v", linestyle="--")
plt.show()
```



[https://matplotlib.org/gallery/lines\\_bars\\_and\\_markers/line\\_styles\\_reference.html](https://matplotlib.org/gallery/lines_bars_and_markers/line_styles_reference.html)

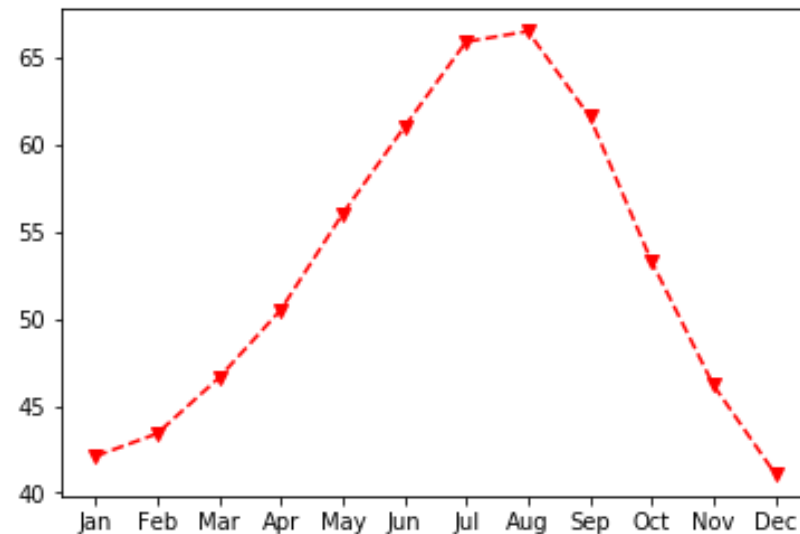
# Eliminating lines with linestyle

```
fig, ax = plt.subplots()
ax.plot(seattle_weather["MONTH"],
        seattle_weather["MLY-TAVG-NORMAL"],
        marker="v", linestyle="None")
plt.show()
```



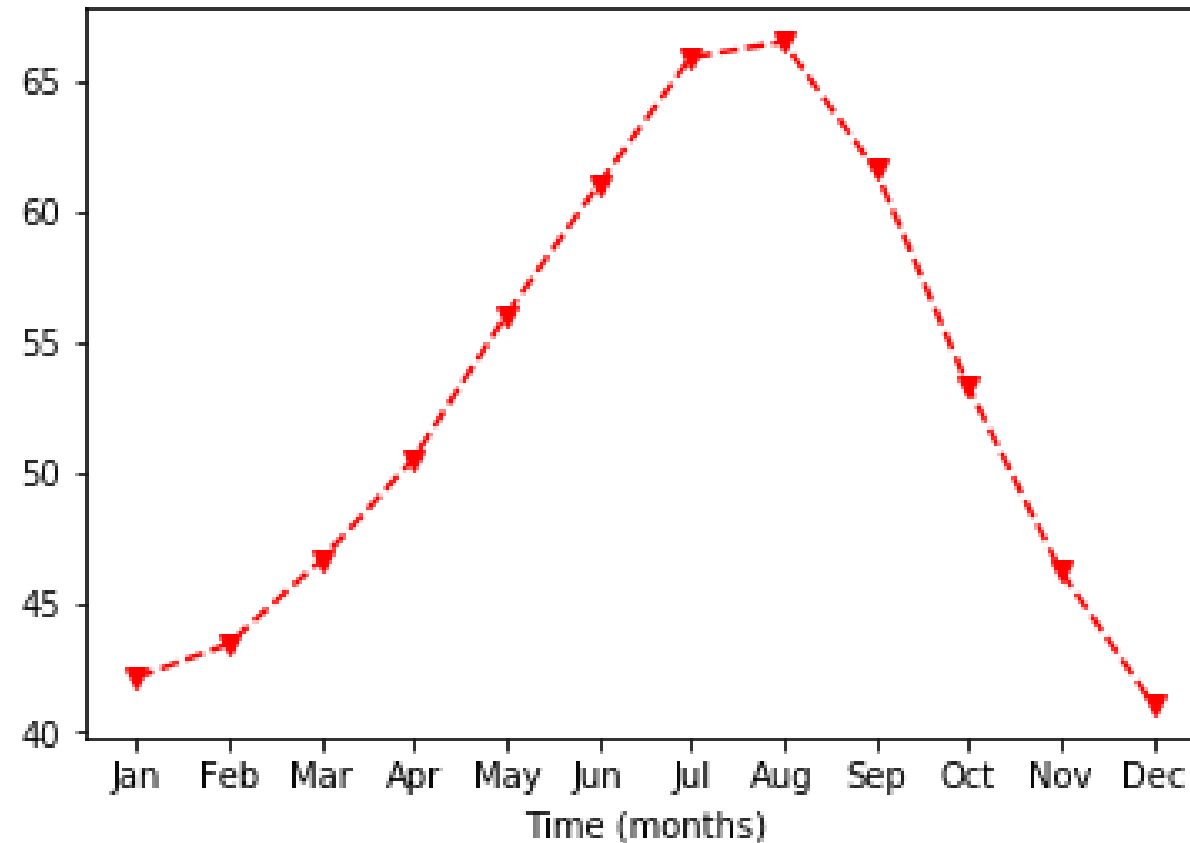
# Choosing color

```
fig, ax = plt.subplots()
ax.plot(seattle_weather["MONTH"],
        seattle_weather["MLY-TAVG-NORMAL"],
        marker="v", linestyle="--", color="r")
plt.show()
```



# Customizing the axes labels

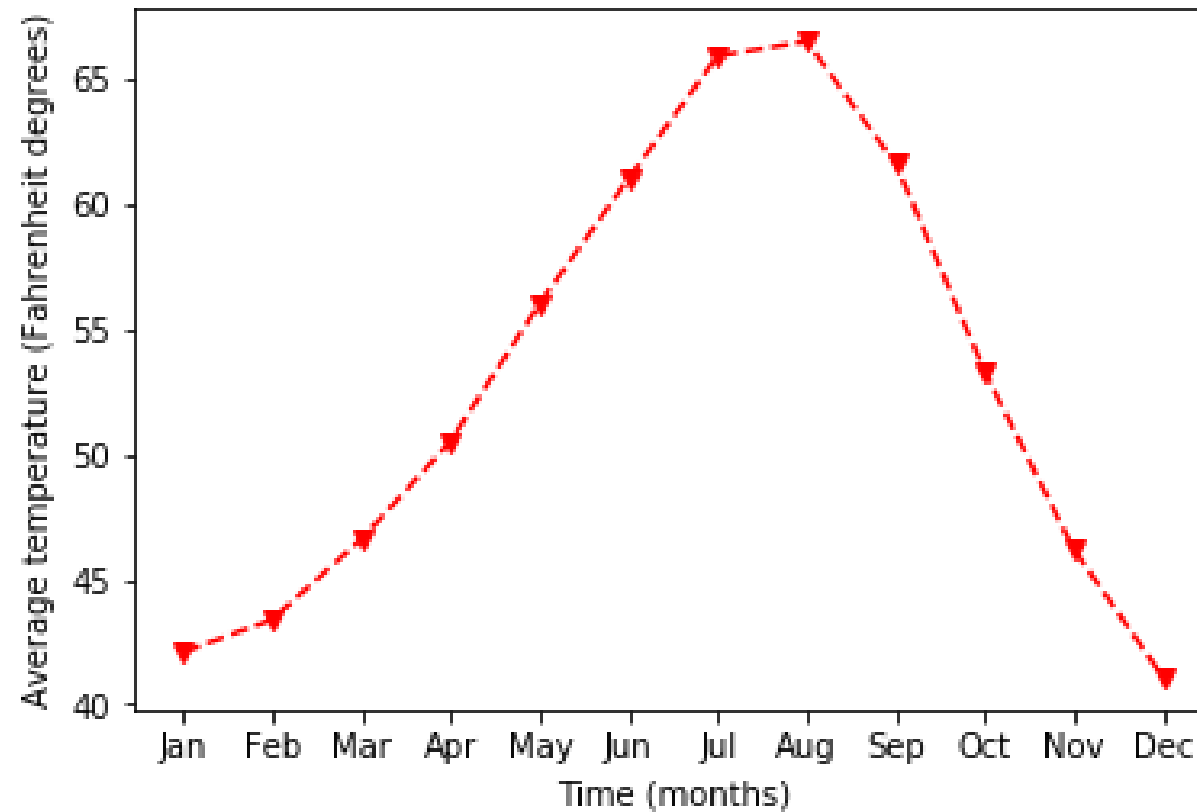
```
ax.set_xlabel("Time (months)")  
plt.show()
```





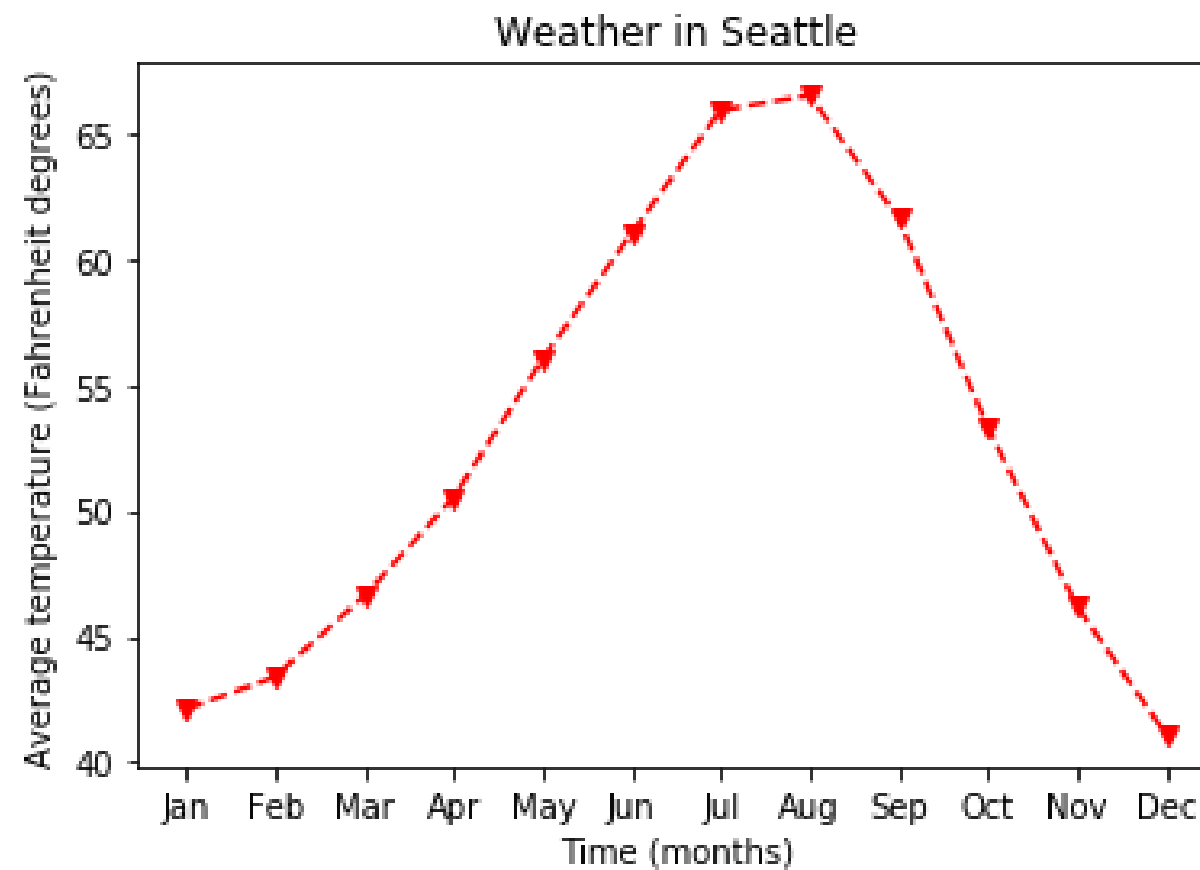
# Setting the y axis label

```
ax.set_xlabel("Time (months)")  
ax.set_ylabel("Average temperature (Fahrenheit degrees)")  
plt.show()
```



# Adding a title

```
ax.set_title("Weather in Seattle")  
plt.show()
```

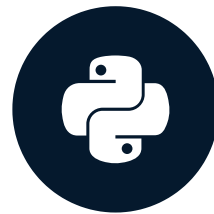


# Practice customizing your plots!

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# Small multiples

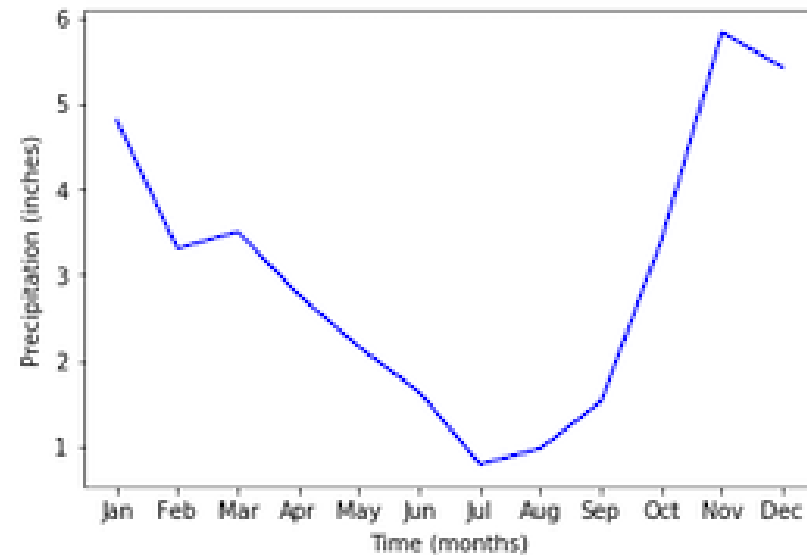
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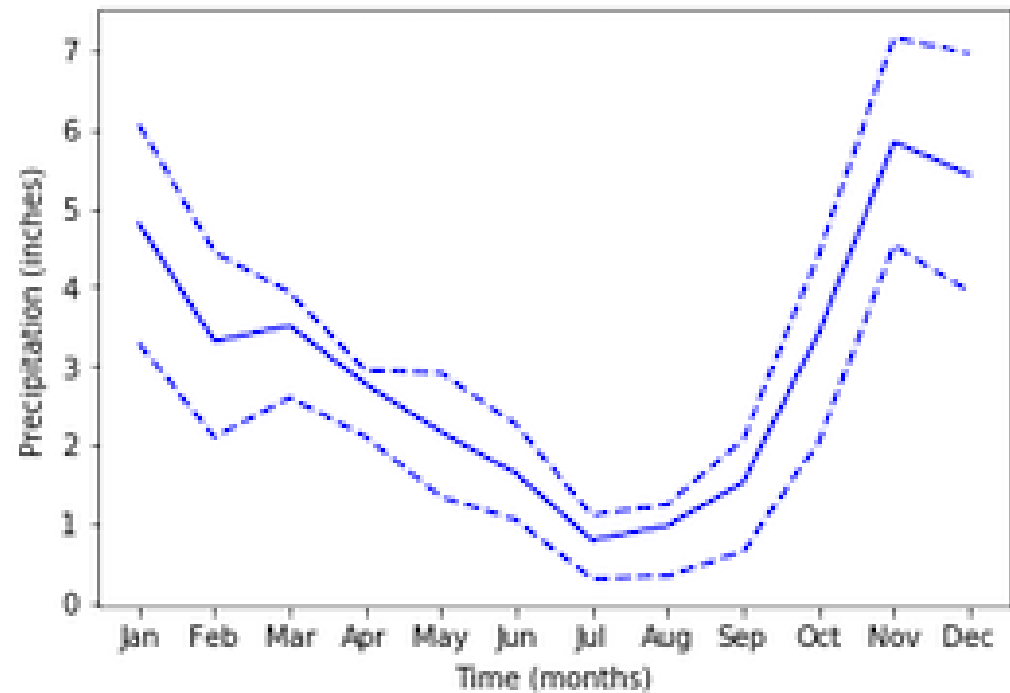
# Adding data

```
ax.plot(seattle_weather["MONTH"],  
        seattle_weather["MLY-PRCP-NORMAL"],  
        color='b')  
ax.set_xlabel("Time (months)")  
ax.set_ylabel("Precipitation (inches)")  
plt.show()
```



# Adding more data

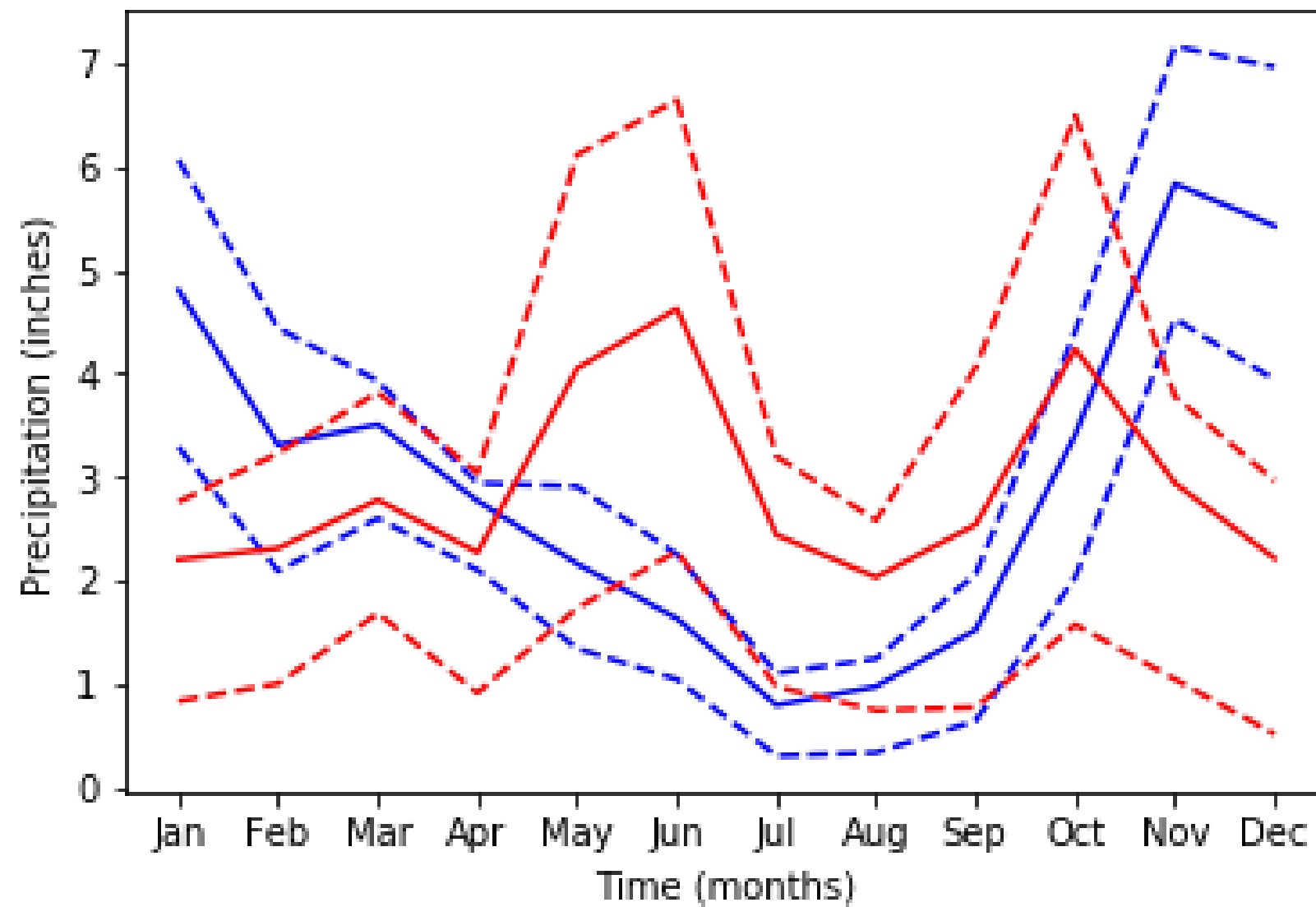
```
ax.plot(seattle_weather["MONTH"], seattle_weather["MLY-PRCP-25PCTL"],  
        linestyle='--', color='b')  
ax.plot(seattle_weather["MONTH"], seattle_weather["MLY-PRCP-75PCTL"],  
        linestyle='--', color='b')  
plt.show()
```



# And more data

```
ax.plot(austin_weather["MONTH"], austin_weather["MLY-PRCP-NORMAL"],  
        color='r')  
ax.plot(austin_weather["MONTH"], austin_weather["MLY-PRCP-25PCTL"],  
        linestyle='--', color='r')  
ax.plot(austin_weather["MONTH"], austin_weather["MLY-PRCP-75PCTL"],  
        linestyle='--', color='r')  
plt.show()
```

# Too much data!

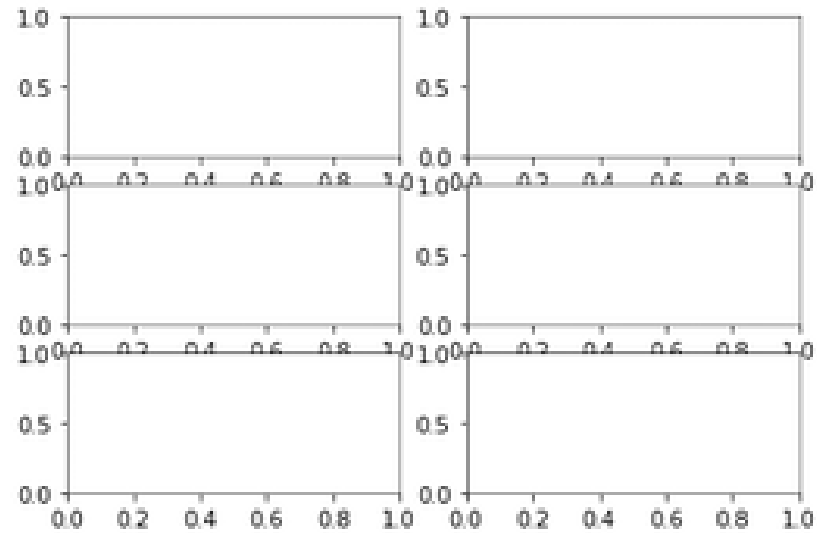




# Small multiples with plt.subplots

```
fig, ax = plt.subplots()
```

```
fig, ax = plt.subplots(3, 2)  
plt.show()
```

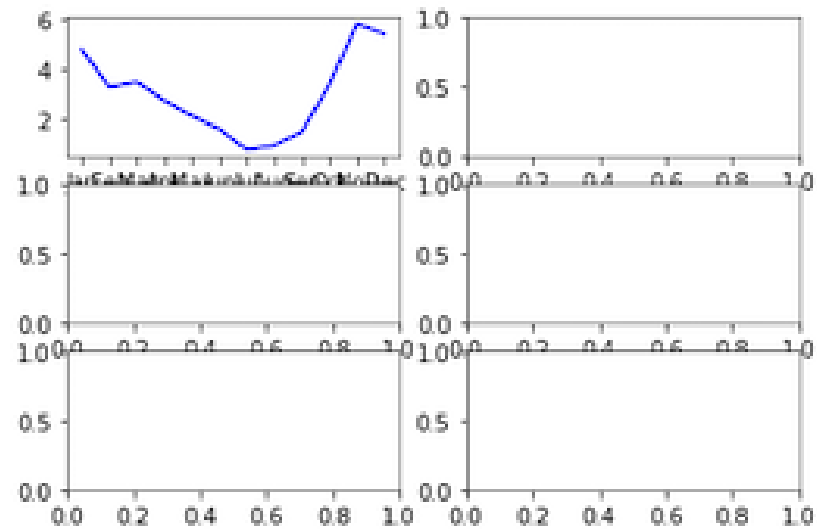


# Adding data to subplots

```
ax.shape
```

```
(3, 2)
```

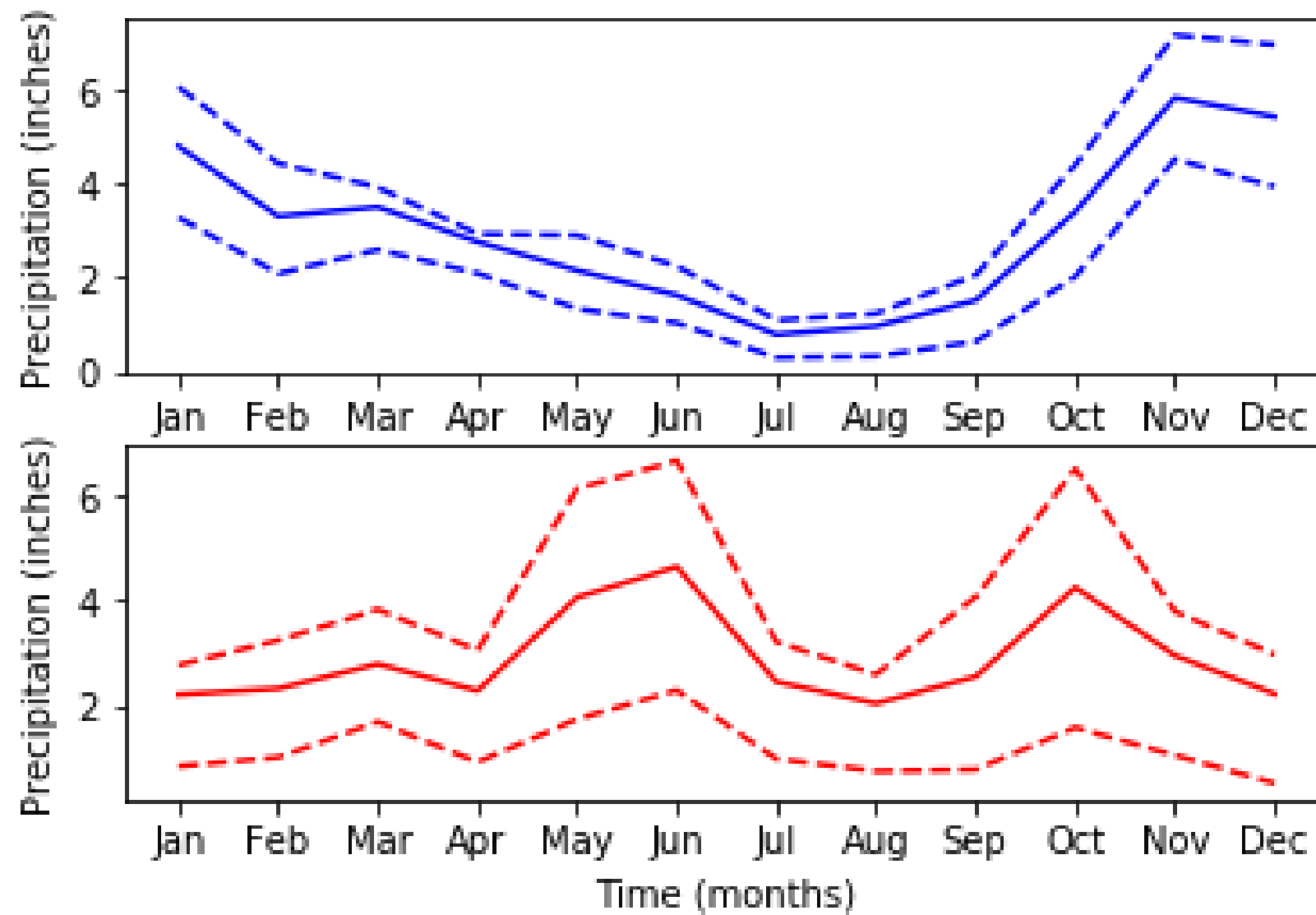
```
ax[0, 0].plot(seattle_weather["MONTH"],  
              seattle_weather["MLY-PRCP-NORMAL"],  
              color='b')  
  
plt.show()
```



# Subplots with data

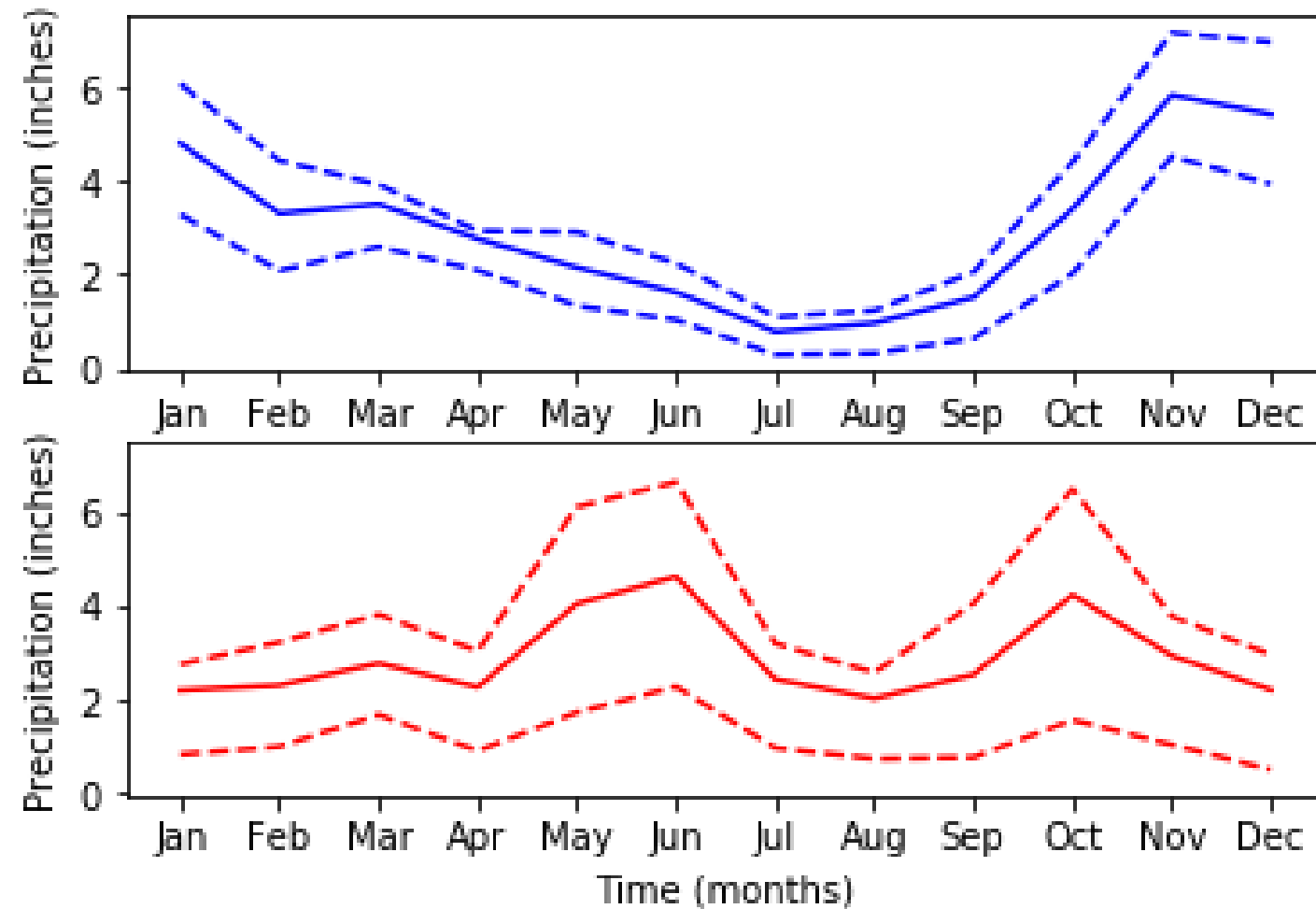
```
fig, ax = plt.subplots(2, 1)
ax[0].plot(seattle_weather["MONTH"], seattle_weather["MLY-PRCP-NORMAL"],
           color='b')
ax[0].plot(seattle_weather["MONTH"], seattle_weather["MLY-PRCP-25PCTL"],
           linestyle='--', color='b')
ax[0].plot(seattle_weather["MONTH"], seattle_weather["MLY-PRCP-75PCTL"],
           linestyle='--', color='b')
ax[1].plot(austin_weather["MONTH"], austin_weather["MLY-PRCP-NORMAL"],
           color='r')
ax[1].plot(austin_weather["MONTH"], austin_weather["MLY-PRCP-25PCTL"],
           linestyle='--', color='r')
ax[1].plot(austin_weather["MONTH"], austin_weather["MLY-PRCP-75PCTL"],
           linestyle='--', color='r')
ax[0].set_ylabel("Precipitation (inches)")
ax[1].set_ylabel("Precipitation (inches)")
ax[1].set_xlabel("Time (months)")
plt.show()
```

# Subplots with data



# Sharing the y-axis range

```
fig, ax = plt.subplots(2, 1, sharey=True)
```



# Practice making subplots!

INTRODUCTION TO DATA VISUALIZATION WITH MATPLOTLIB