Learning Objectives

- **Learn how to add Visualizations to your plots**
- **Create a line charts**
- **Use multiple line charts**
- **Generate an area chart**

definition

Assumptions

- Learners are comfortable working around Jupyter and Matplotlib.

Limitations

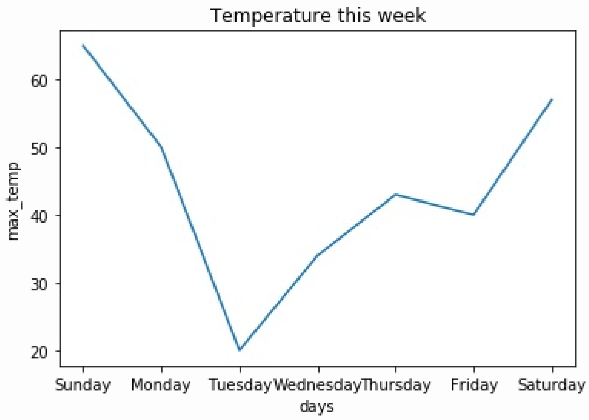
In this assignment, we only work with the Matplotlib library.
* In this section we will cover visualization functions function using bar and line plots which we already covered in the last module to start creating charts right away.

Line Charts

Creating Line Charts

Line graphs are used to track changes over time. When the changes are small its better to use line graphs, as opposed to bar charts.

```
plt.plot(Xaxis,Yaxis)
```



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Labeling the Chart Data

Given the data below:

```
days=
        ["Sunday","Monday","Tuesday","Wednesday","Thursday","Fri
        day","Saturday"]
max_temp=[65,50,20,34,43,40,57]
```

```python

plt.plot(days,max_temp)
plt.title('Temperature this week')
plt.xlabel('days')
plt.ylabel('max_temp')
plt.show()

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## Labeling the Chart Data

Labeling is necessary for understanding the chart
dimensions. However, we can change it such that there are no
labels on the x-axis and y-axis. Remove the two lines below
and re-plot the graph.

plt.xlabel('days')
plt.ylabel('max_temp')
```

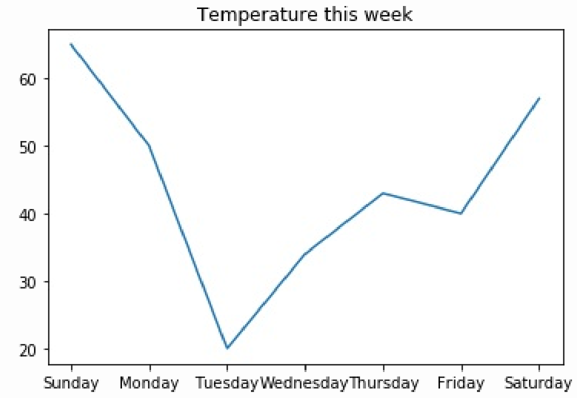

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Multiple Line Charts

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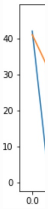

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Customizing multi-lines

To make our chart more descriptive and easier to read. We are going to make sure to add two key arguments. These two arguments are labels and colors for the lines we are plotting.

```
a= random.sample(range(50), 20)
b = random.sample(range(50), 20)
c=random.sample(range(25), 20)
plt.plot(a,label= "line 1" )
plt.plot(b, color="green")
plt.plot(c, color="red",label="line 3",linestyle=":")
plt.legend(loc="upper left")
plt.show()
```

By default, the legend command shows the legend on the upper right. However, like in the example above we can choose the location where it is represented.

Area chart

An area chart puts together the ideas of a line chart and bar chart to show how groups of numeric values change.

Creating an area Charts

The following are the two main ways to build an area chart in Matplotlib.

```
plt.fill_between(x, y)
plot.show()
```

or

```
plt.stackplot(x, y)
plot.show()
```

For our data this time we will use a class data

```
groups2= ['freshman','sophmore','junior','senior']
total=[40,31,15,14]
total2=[60,40,33,18]
```

The basic syntax is:

```
plt.fill_between(groups2, total,total2)
plt.show()
```

or

```
plt.stackplot(groups2, total,total2)
plt.show()
```

Note: Depending on the information you are looking for, you will choose between one of the two. If you are looking for aggregate or stacked data for a group use the `stackplot`