# Python Matplotlib

Matplotlib is a python library used for data visualization

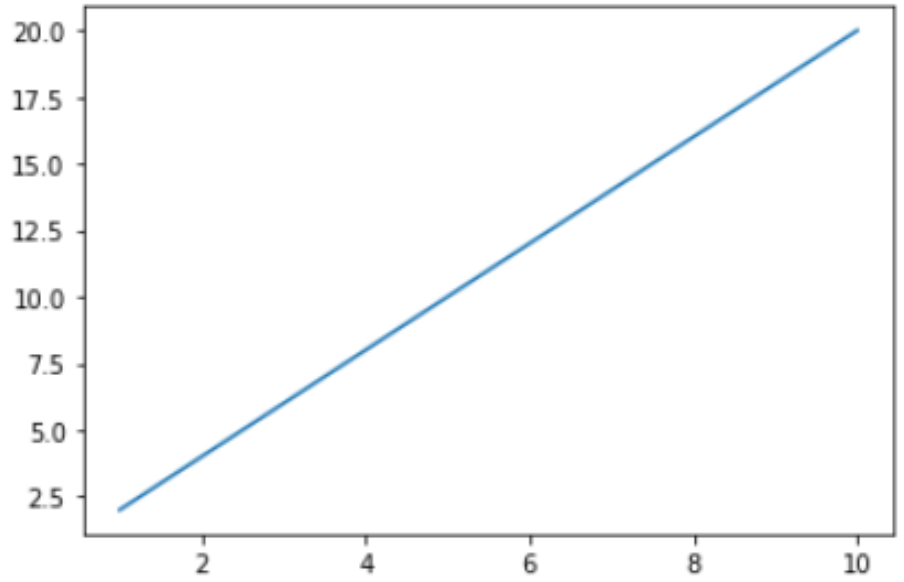
# Line Plot

```
In [1]: import numpy as np
        from matplotlib import pyplot as plt
```

```
In [2]: x=np.arange(1,11)
        x
Out[2]: array([ 1,  2,  3,  4,  5,  6,  7,  8,  9, 10])
```

```
In [4]: y= 2*x
        y
Out[4]: array([ 2,  4,  6,  8, 10, 12, 14, 16, 18, 20])
```

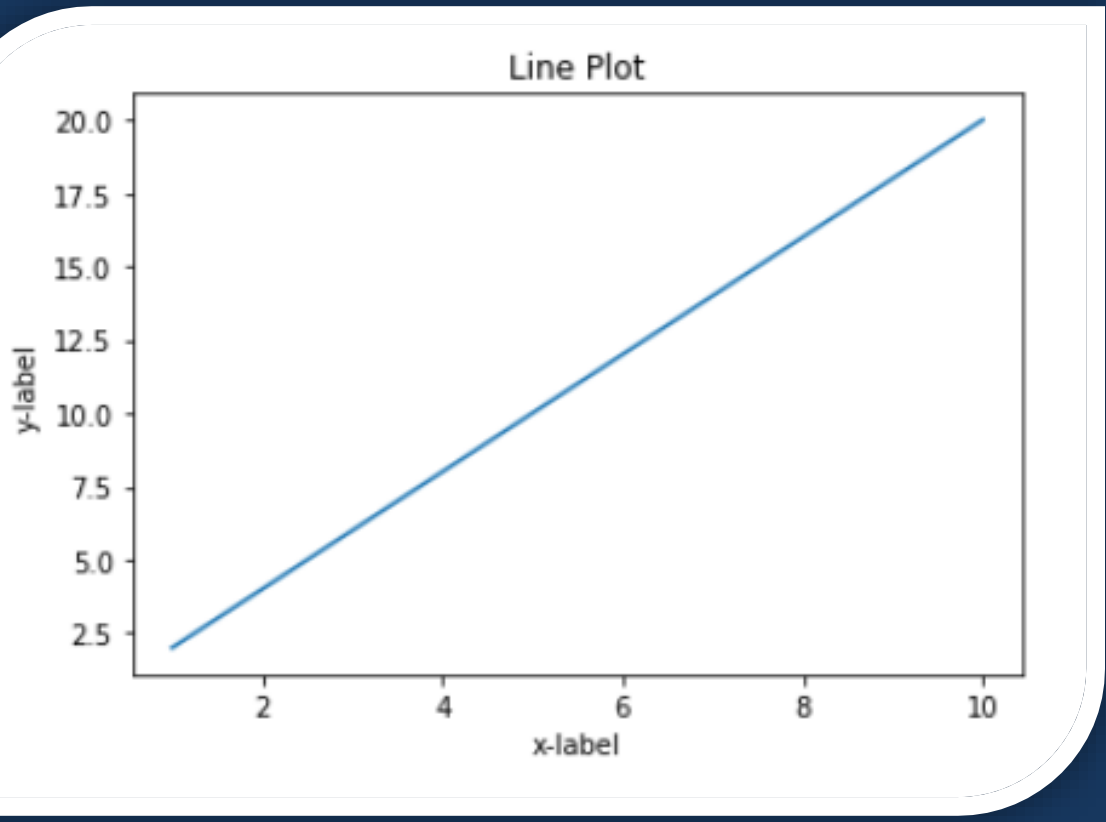
```
In [6]: plt.plot(x,y)
        plt.show()
```



# Line Plot

Adding Title and Labels

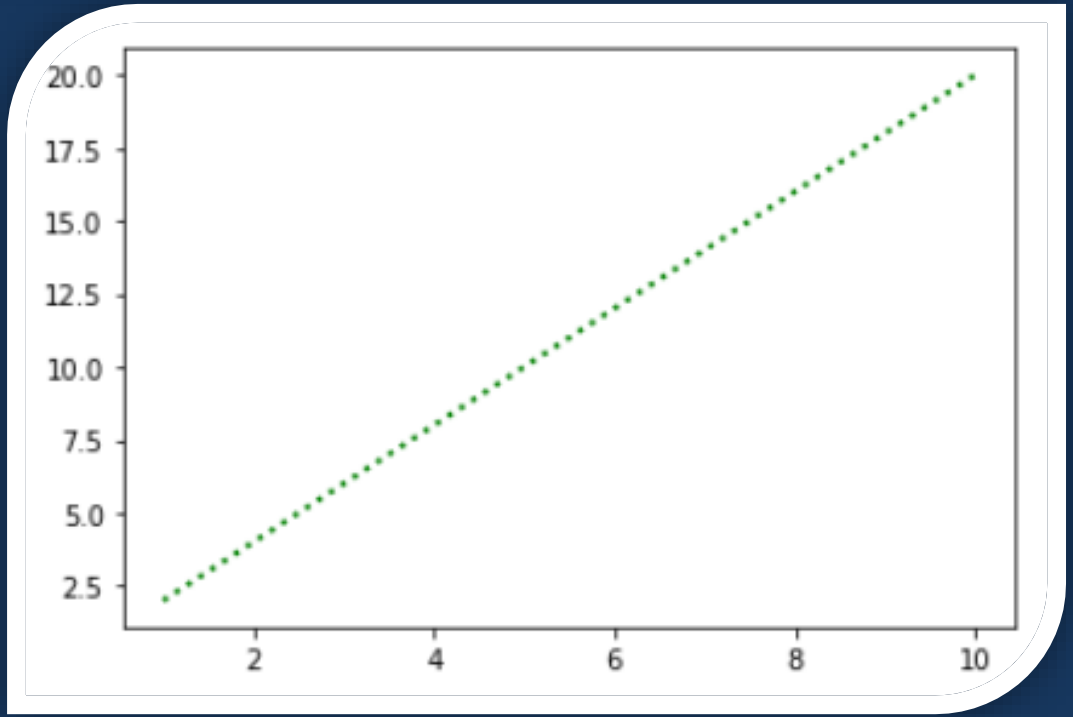
```
In [8]: plt.plot(x,y)
        plt.title("Line Plot")
        plt.xlabel("x-label")
        plt.ylabel("y-label")
        plt.show()
```



# Line Plot

Changing Line Aesthetics

```
In [10]: plt.plot(x,y,color='g',linestyle=':',linewidth=2)
         plt.show()
```



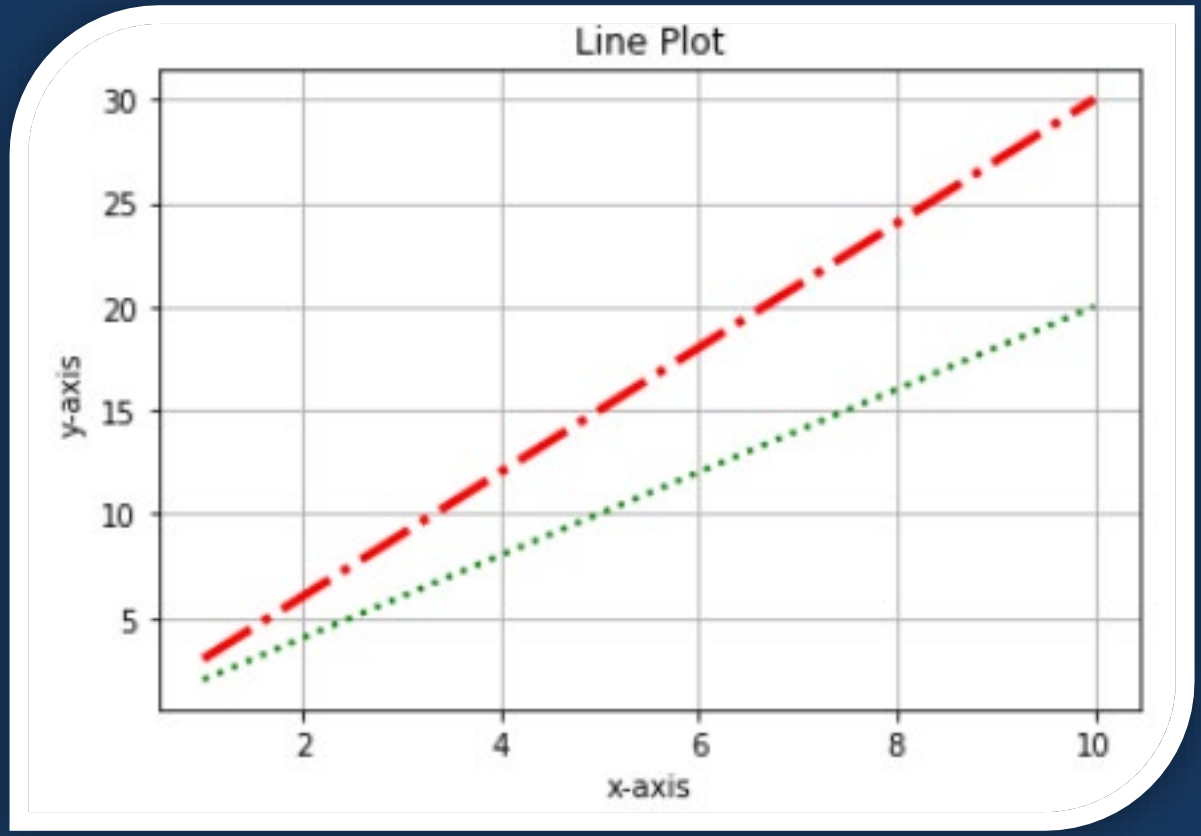
# Line Plot

Adding two lines in the same plot

```
In [2]: x=np.arange(1,11)
        y1=2*x
        y2=3*x
```

```
In [11]: plt.plot(x,y1,color='g',linestyle=':',linewidth=2)
         plt.plot(x,y2,color='r',linestyle='-.',linewidth=3)
         plt.title("Line Plot")
         plt.xlabel("x-axis")
         plt.ylabel("y-axis")
         plt.grid(True)
         plt.show()
```

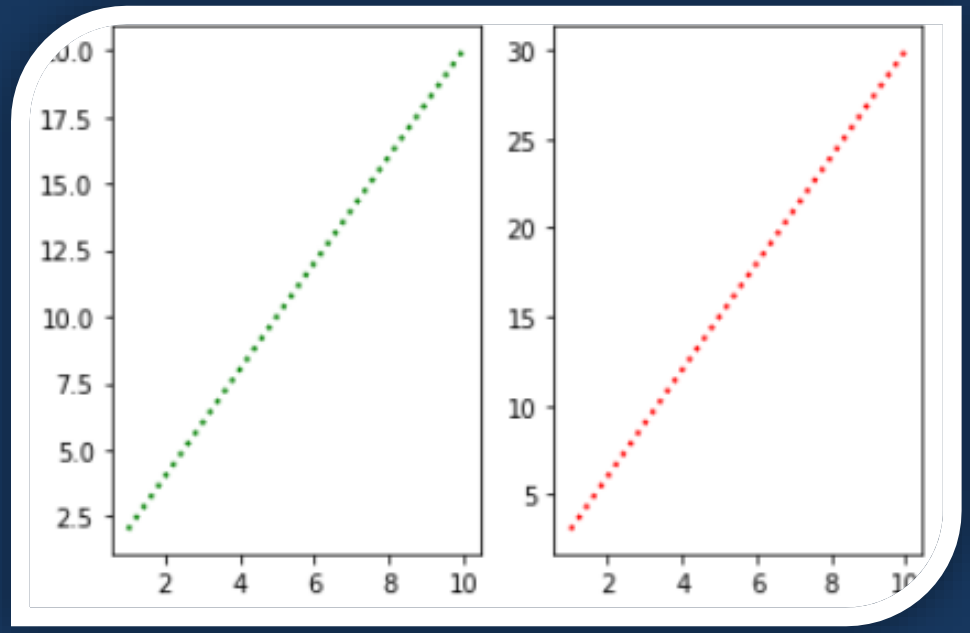
# Line Plot



# Line Plot

Adding sub-plots

```
x=np.arange(1,11)
y1=2*x
y2=3*x

plt.subplot(1,2,1)
plt.plot(x,y1,color='g',linestyle=':',linewidth=2)

plt.subplot(1,2,2)
plt.plot(x,y2,color='r',linestyle=':',linewidth=2)

plt.show()
```

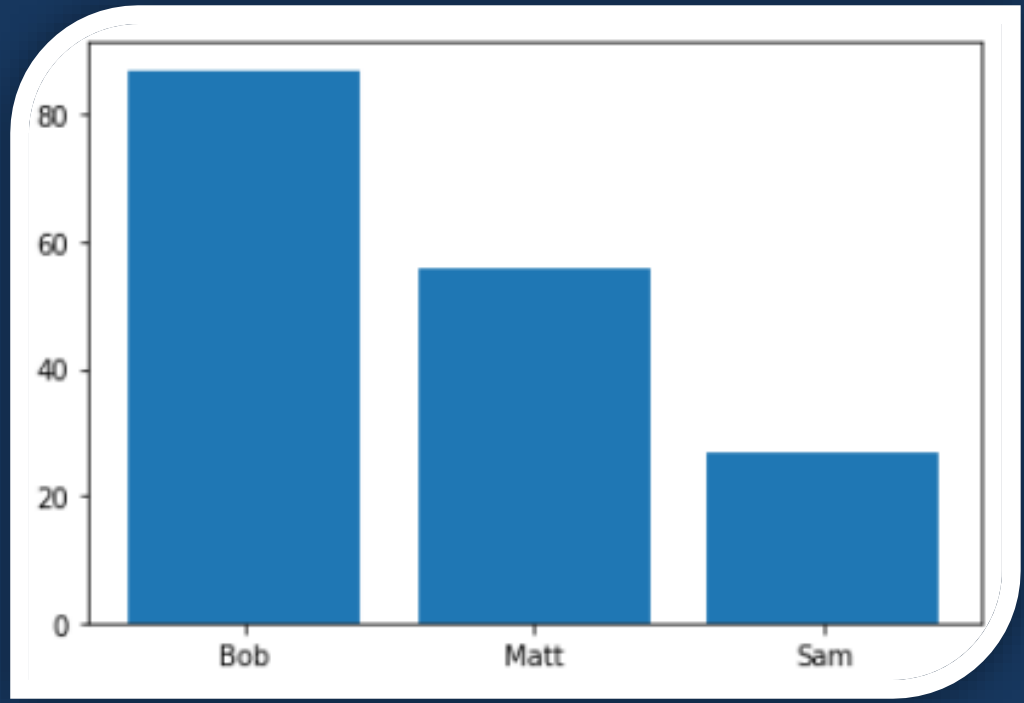


# Bar Plot

```
[39]: student = {"Bob":87,"Matt":56,"Sam":27}
```

```
In [40]: names = list(student.keys())
         values = list(student.values())
```

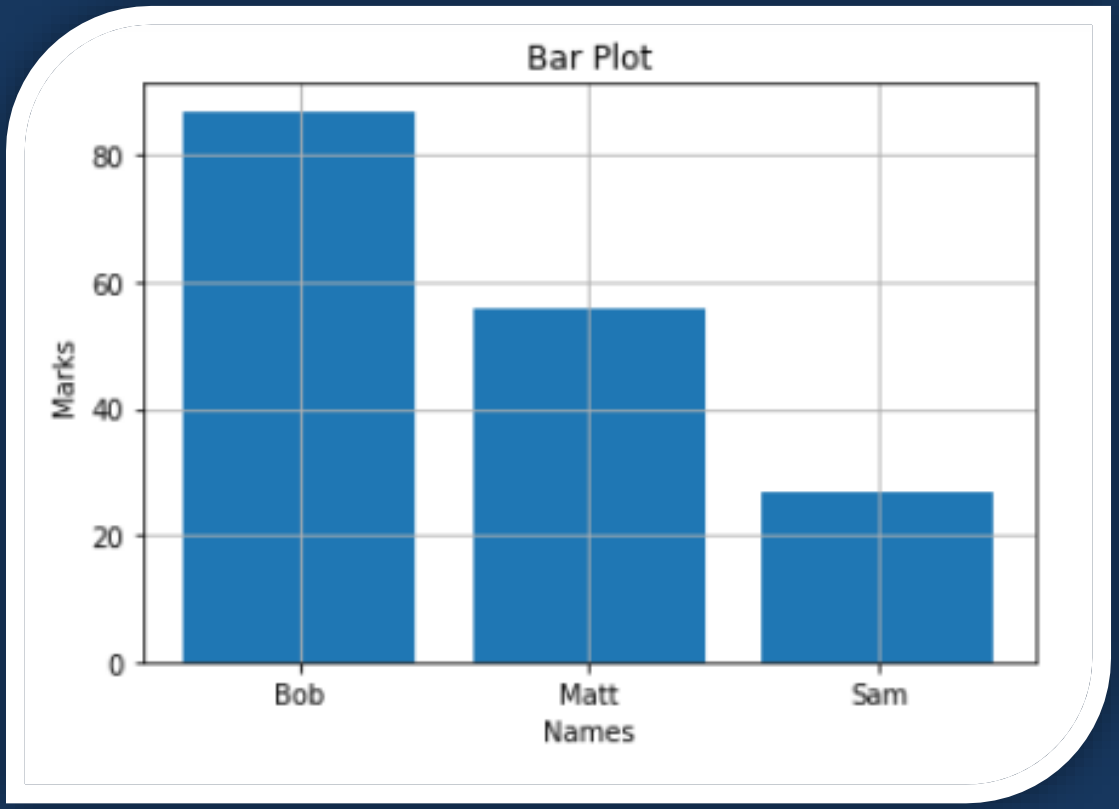
```
In [42]: plt.bar(names,values)
         plt.show()
```



# Bar Plot

Adding Title and Labels

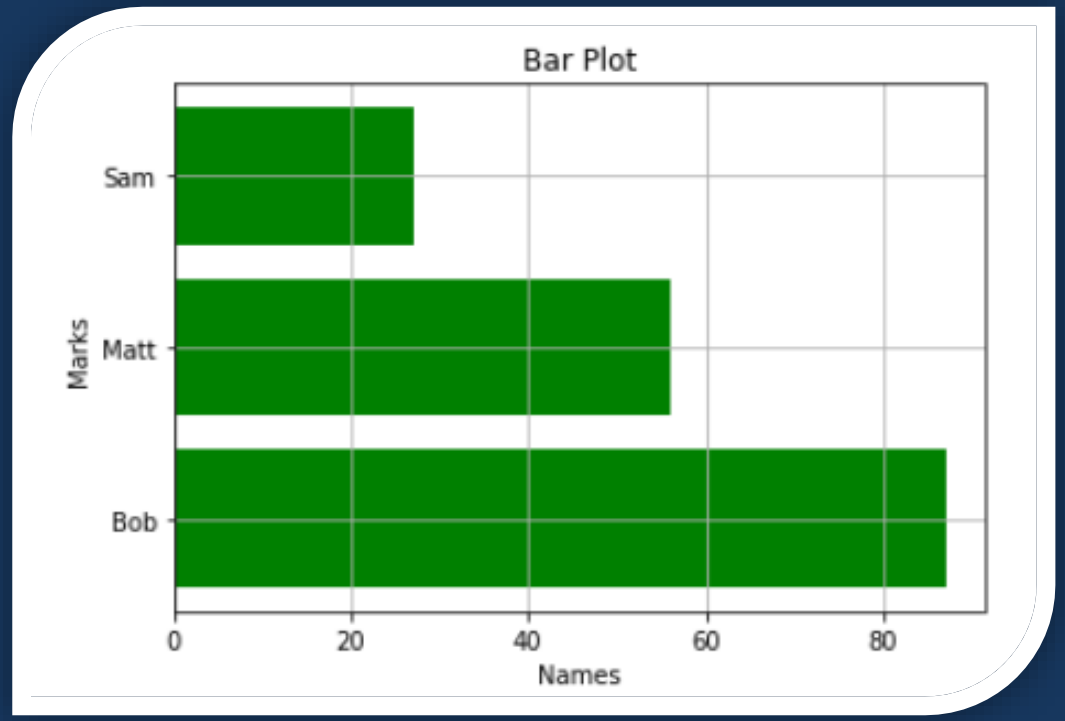
```
In [16]: plt.bar(names,values)
         plt.title("Bar Plot")
         plt.xlabel("Names")
         plt.ylabel("Marks")
         plt.grid(True)
         plt.show()
```



# Horizontal Bar Plot

Horizontal Bar Plot

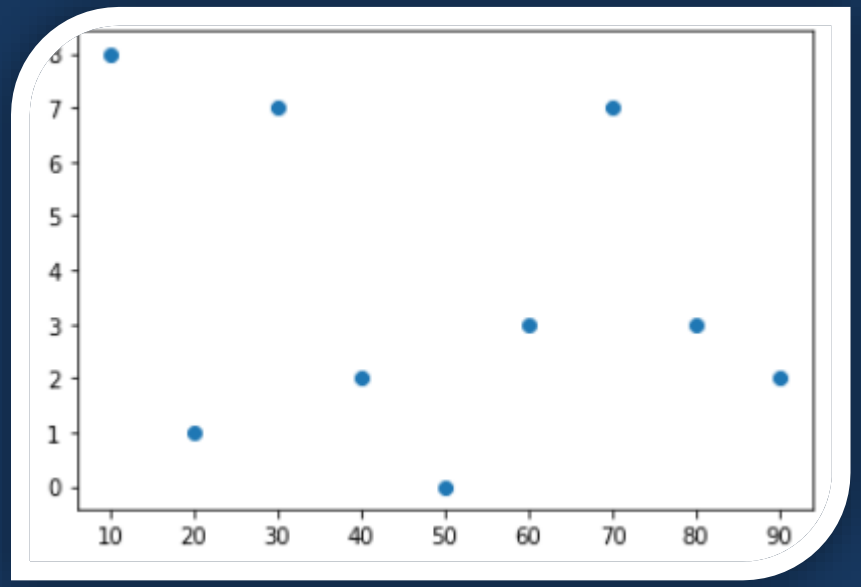
```
In [44]: plt.barh(names,values,color='g')
         plt.title("Bar Plot")
         plt.xlabel("Names")
         plt.ylabel("Marks")
         plt.grid(True)
         plt.show()
```



# Scatter Plot

Creating a basic scatter-plot

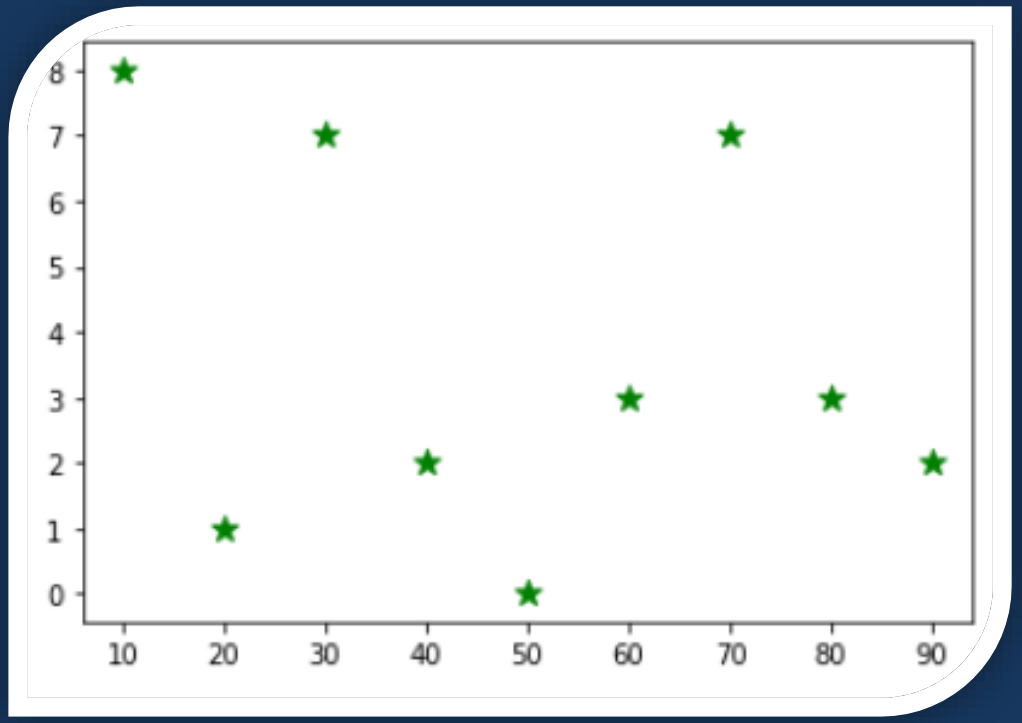
```
x=[10,20,30,40,50,60,70,80,90]
a=[8,1,7,2,0,3,7,3,2]

plt.scatter(x,a)
plt.show()
```



# Scatter Plot

Changing Mark Aesthetics

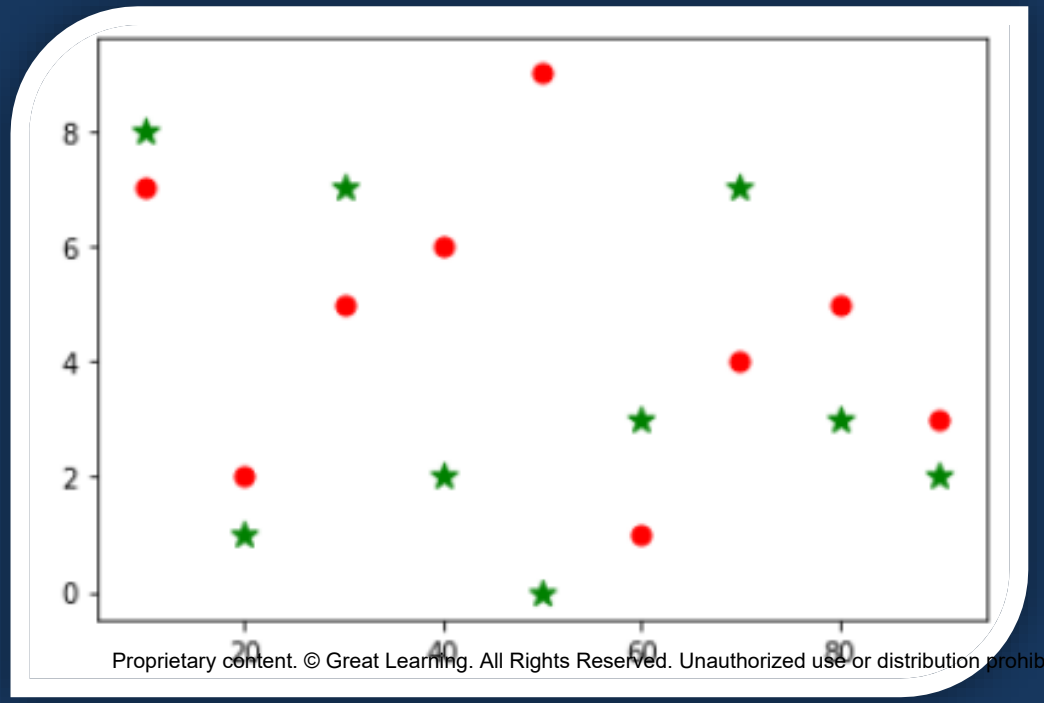
```
In [7]: x=[10,20,30,40,50,60,70,80,90]
        a=[8,1,7,2,0,3,7,3,2]
        plt.scatter(x,a,marker="*",c="g",s=100)
        plt.show()
```



# Scatter Plot

Adding two markers in the same plot

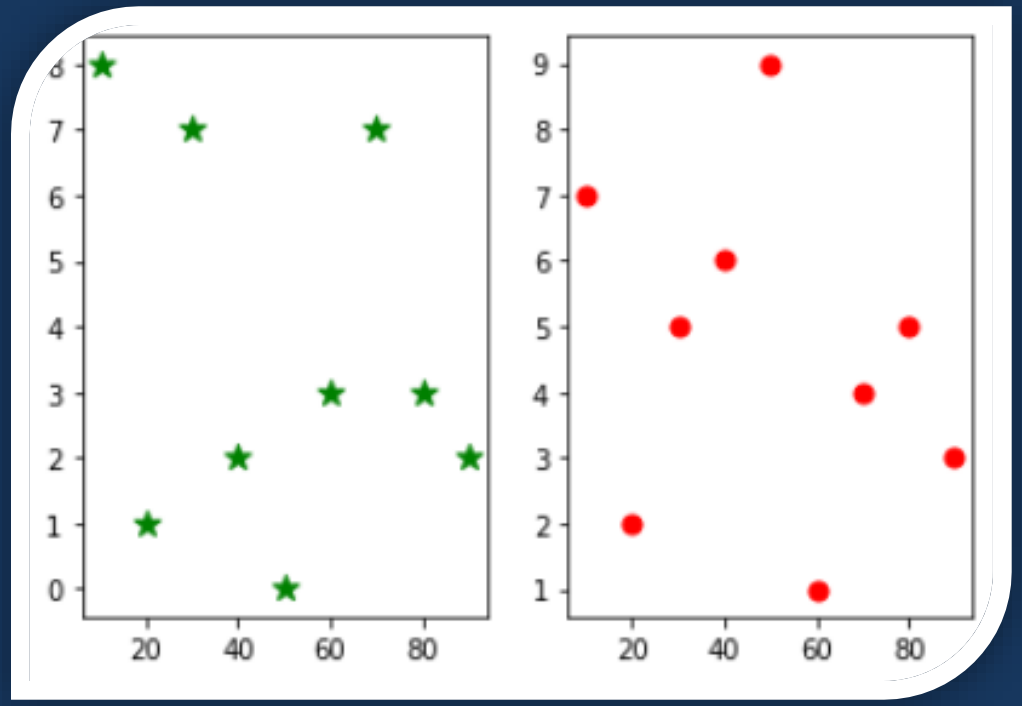
```
In [10]: x=[10,20,30,40,50,60,70,80,90]
         a=[8,1,7,2,0,3,7,3,2]
         b=[7,2,5,6,9,1,4,5,3]
         plt.scatter(x,a,marker="*",c="g",s=100)
         plt.scatter(x,b,marker=".",c="r",s=200)
         plt.show()
```



# Scatter Plot

Adding sub-plots

```
x=[10,20,30,40,50,60,70,80,90]
a=[8,1,7,2,0,3,7,3,2]
b=[7,2,5,6,9,1,4,5,3]

plt.subplot(1,2,1)
plt.scatter(x,a,marker="*",c="g",s=100)

plt.subplot(1,2,2)
plt.scatter(x,b,marker=".",c="r",s=200)
plt.show()
```



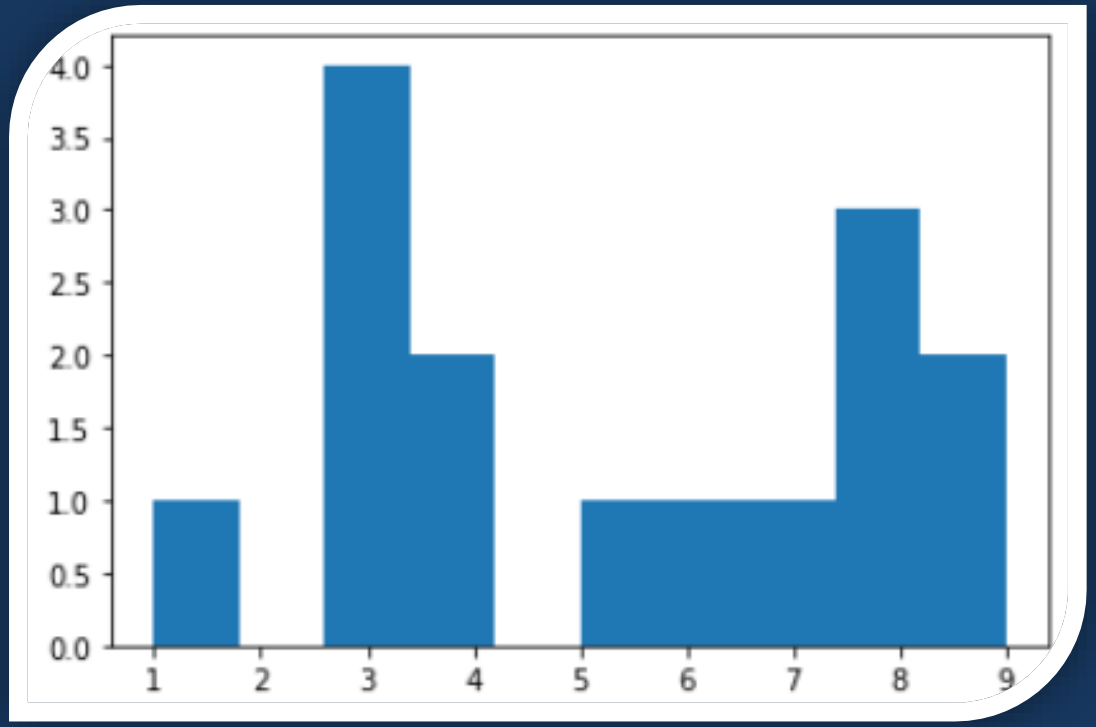
# Histogram

Creating data

```
data = [1,3,3,3,3,9,9,5,4,4,8,8,8,6,7]
```

Making Histogram

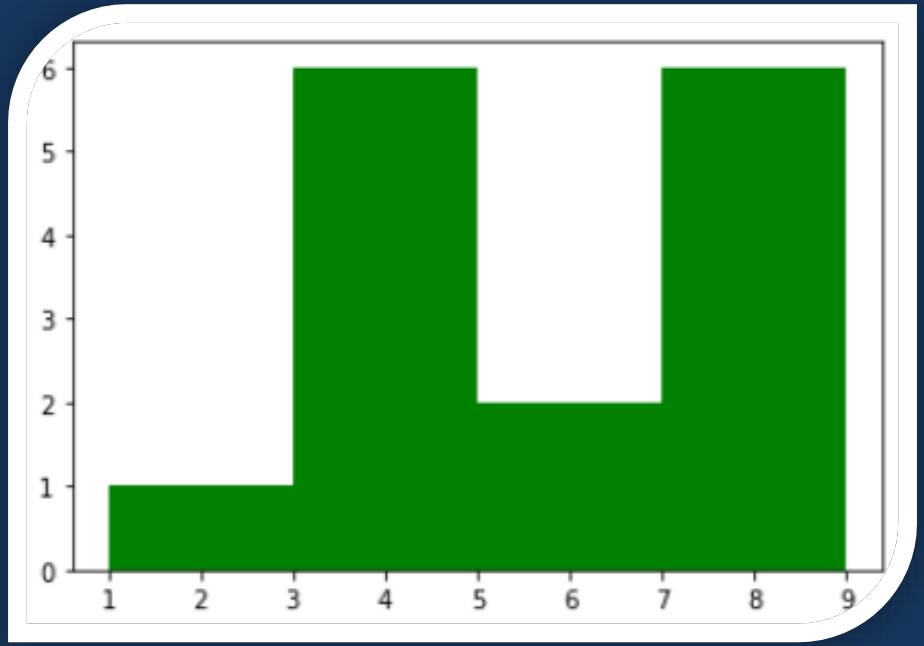
```
plt.hist(data)
plt.show()
```



# Histogram

Changing Aesthetics

```
In [24]: plt.hist(data,color="g",bins=4)
         plt.show()
```

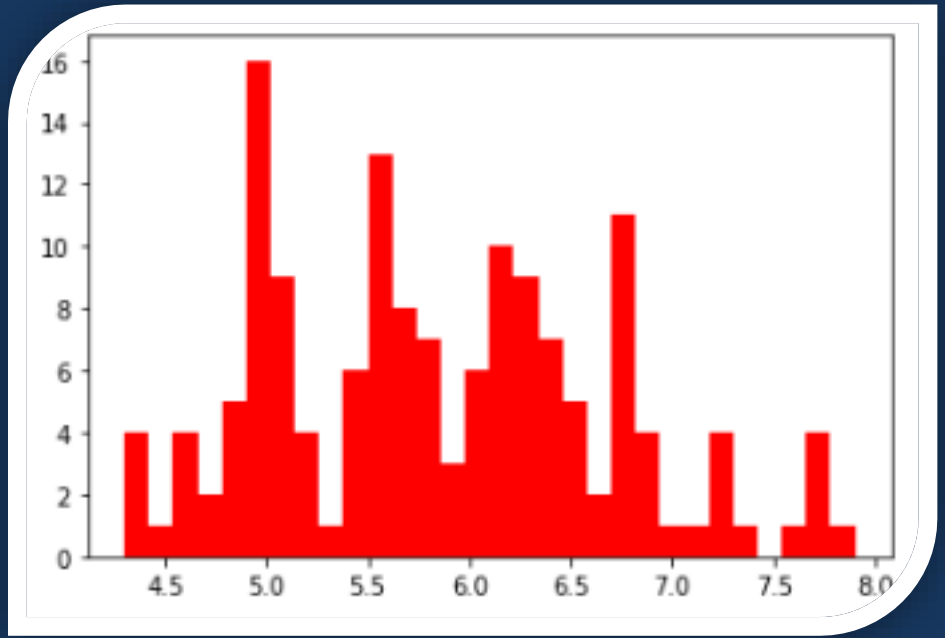


# Histogram

Working with a dataset

```
iris=pd.read_csv('iris.csv')
iris.head()
```

```
plt.hist(iris['Sepal.Length'],bins=30,color="r")
plt.show()
```



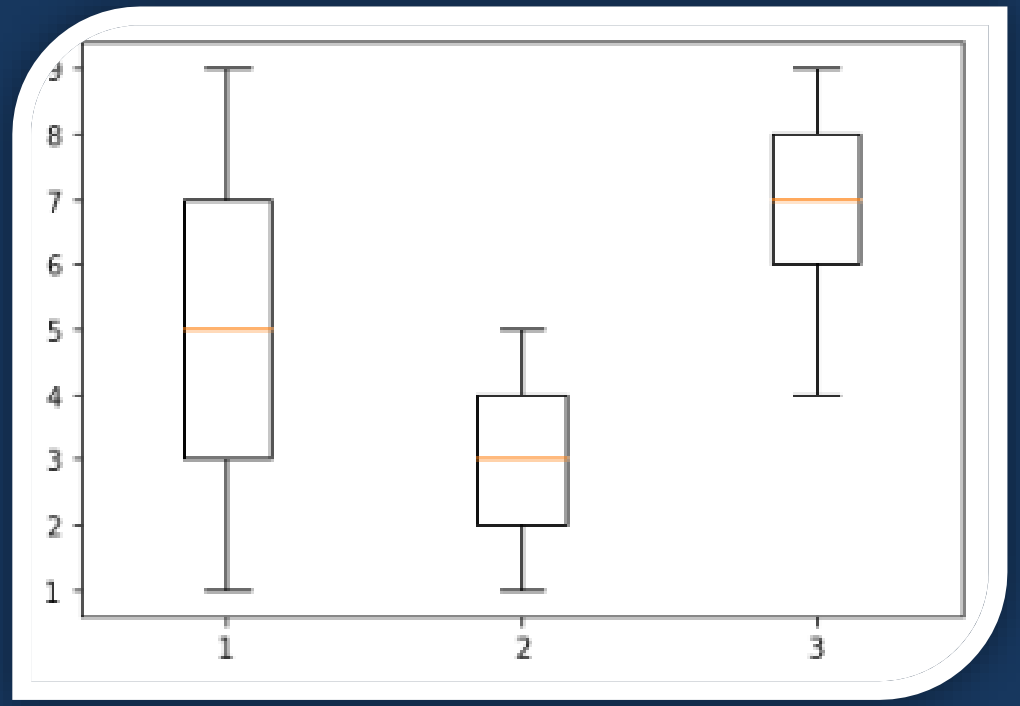
# Box-Plot

Creating data

```
one = [1,2,3,4,5,6,7,8,9]
two = [1,2,3,4,5,4,3,2,1]
three = [6,7,8,9,8,7,6,5,4]

data =  list([one,two,three])
```

Making Plot

```
plt.boxplot(data)
plt.show()
```



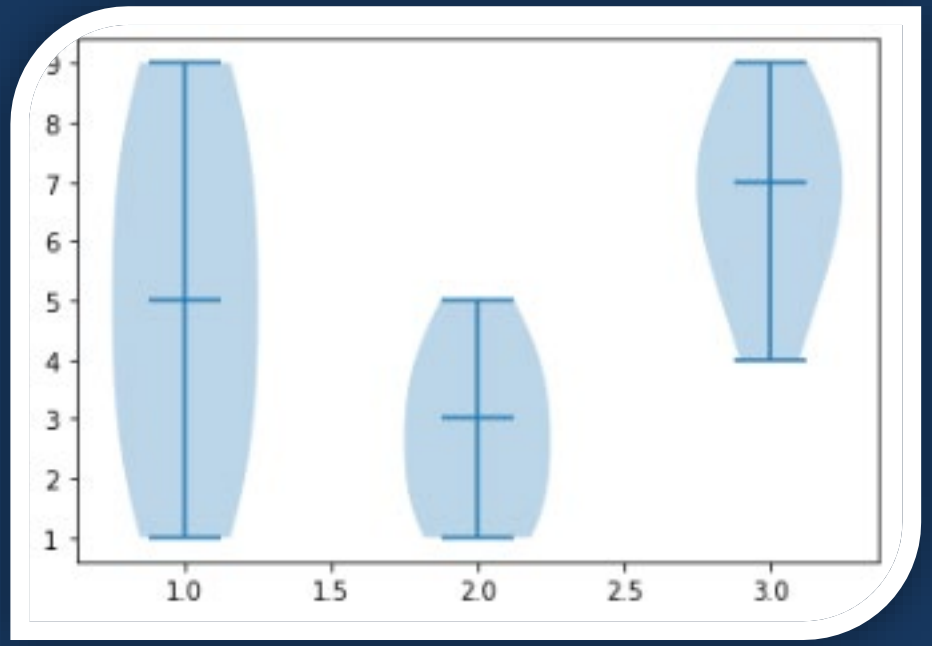
# Violin-Plot

Creating data

```
one = [1,2,3,4,5,6,7,8,9]
two = [1,2,3,4,5,4,3,2,1]
three = [6,7,8,9,8,7,6,5,4]

data =  list([one,two,three])
```

Making Plot

```
plt.violinplot(data,showmedians=True)
plt.show()
```



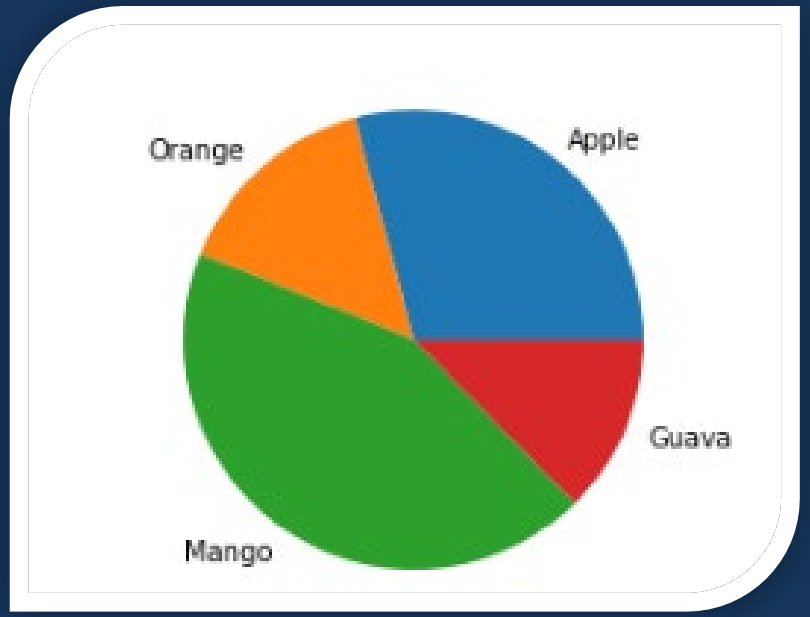
# Pie-Chart

Creating data

```
fruit = ['Apple','Orange','Mango','Guava']
quantity = [67,34,100,29]
```

Making Plot

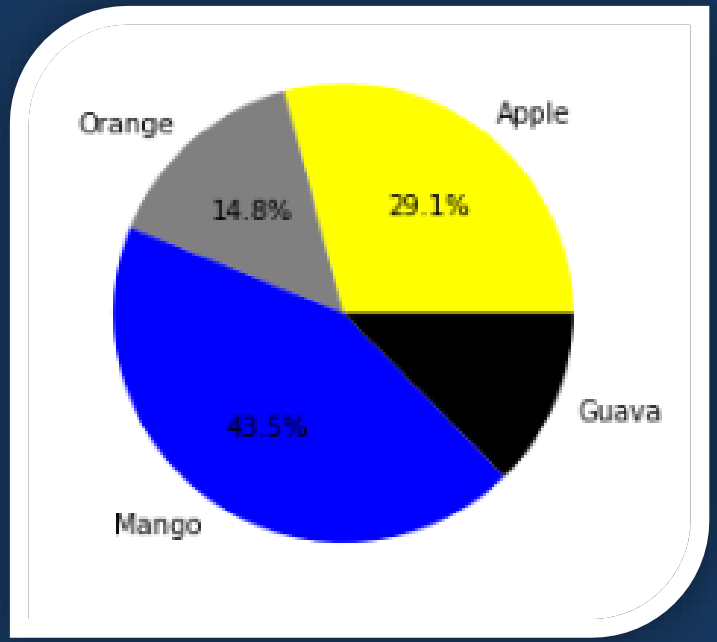
```
plt.pie(quantity,labels=fruit)
plt.show()
```



# Pie-Chart

Changing Aesthetics

```
plt.pie(quantity,labels=fruit,autopct='%0.1f%%'
        ,colors=['yellow','grey','blue','black'])
plt.show()
```



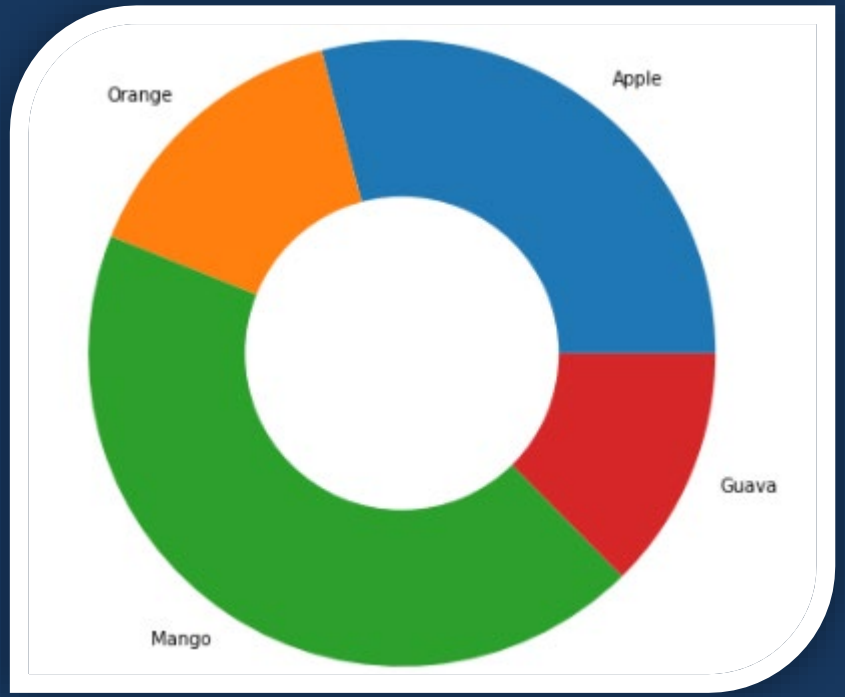
# DoughNut-Chart

Creating Data

```
fruit = ['Apple','Orange','Mango','Guava']
quantity = [67,34,100,29]
```

Making Plot

```
plt.pie(quantity,labels=fruit,radius=2)
plt.pie([1],colors=['w'],radius=1)
plt.show()
```



# SeaBorn Line Plot

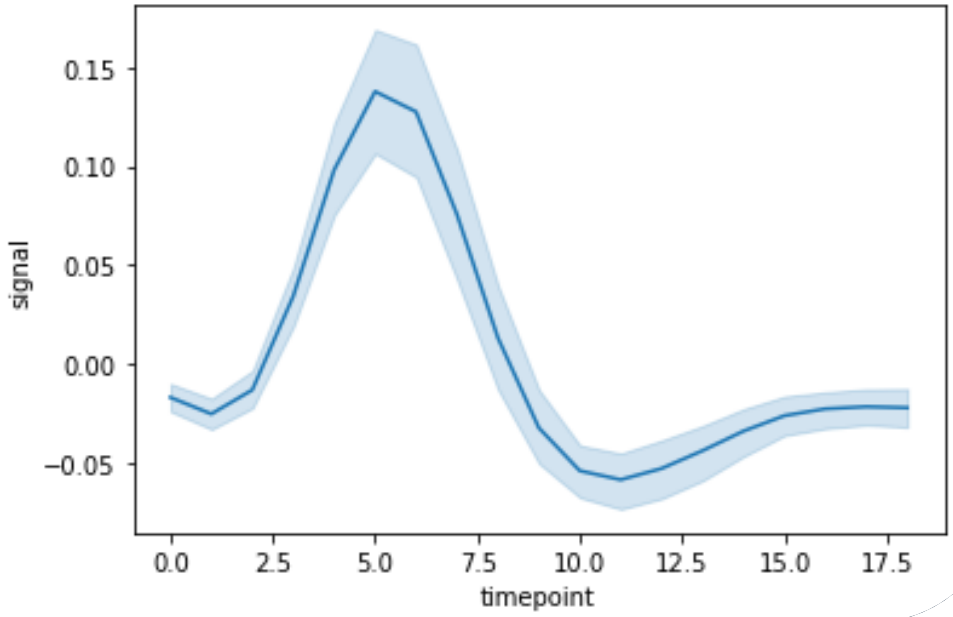
```
In [10]: import seaborn as sns
         from matplotlib import pyplot as plt
```

```
In [18]: fmri = sns.load_dataset("fmri")
         fmri.head()
```

Out[18]:

| | subject | timepoint | event | region | signal |
|---|---|---|---|---|---|
| 0 | s13 | 18 | stim | parietal | -0.017552 |
| 1 | s5 | 14 | stim | parietal | -0.080883 |
| 2 | s12 | 18 | stim | parietal | -0.081033 |
| 3 | s11 | 18 | stim | parietal | -0.046134 |
| 4 | s10 | 18 | stim | parietal | -0.037970 |

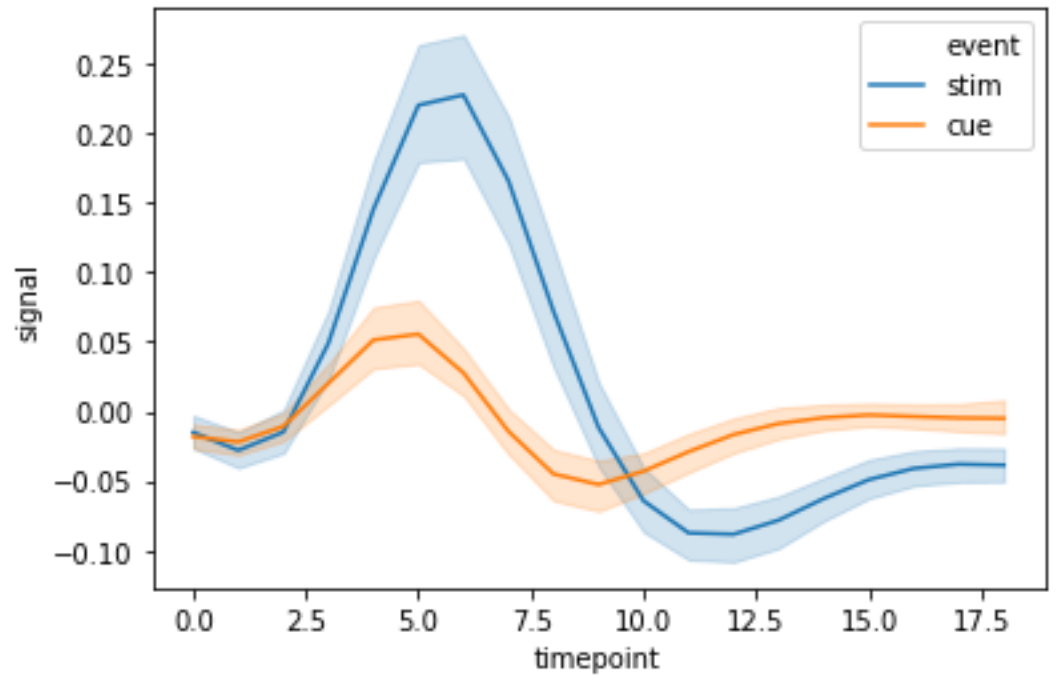
```
in [20]: sns.lineplot(x="timepoint", y="signal", data=fmri)
         plt.show()
```



# SeaBorn Line Plot

Grouping data with ‘hue’

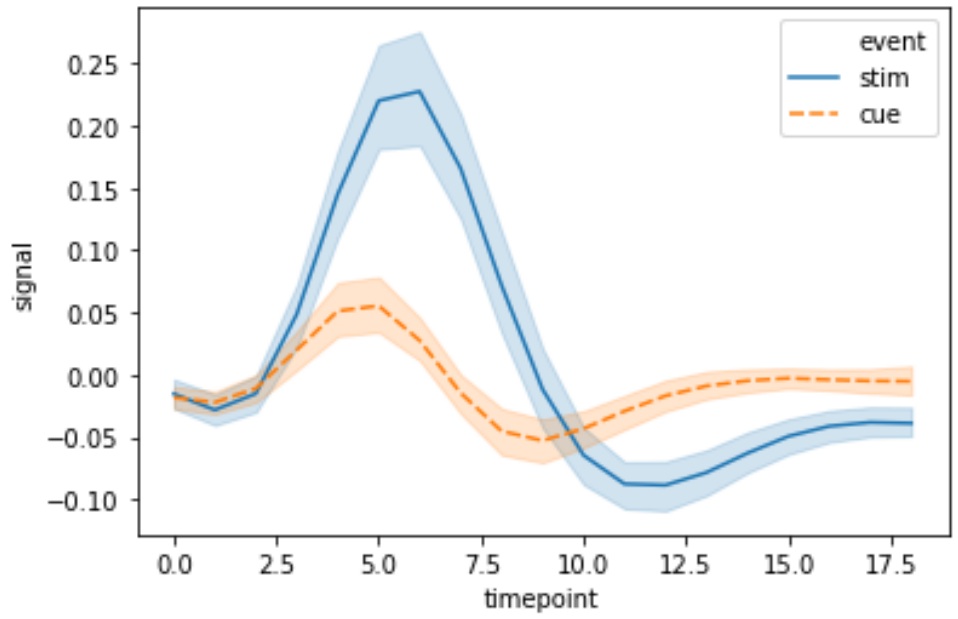
```
In [21]: sns.lineplot(x="timepoint", y="signal", data=fmri,hue="event")
         plt.show()
```



# SeaBorn Line Plot

Adding Styles

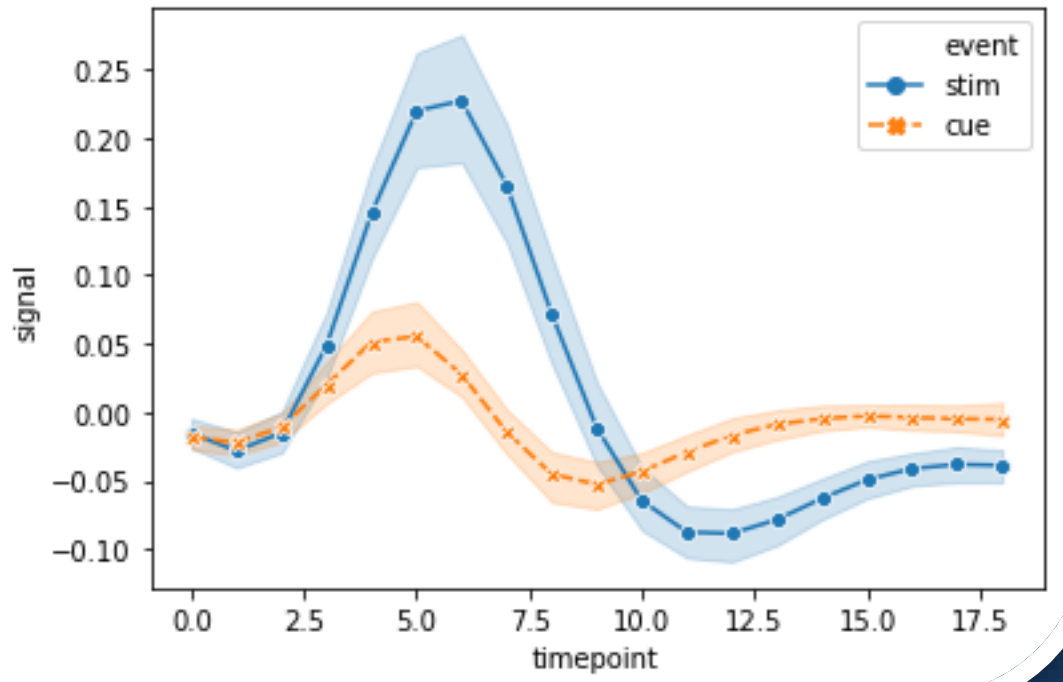
```
In [22]: sns.lineplot(x="timepoint", y="signal", data=fmri,hue="event",style="event")
         plt.show()
```



# SeaBorn Line Plot

Adding Markers

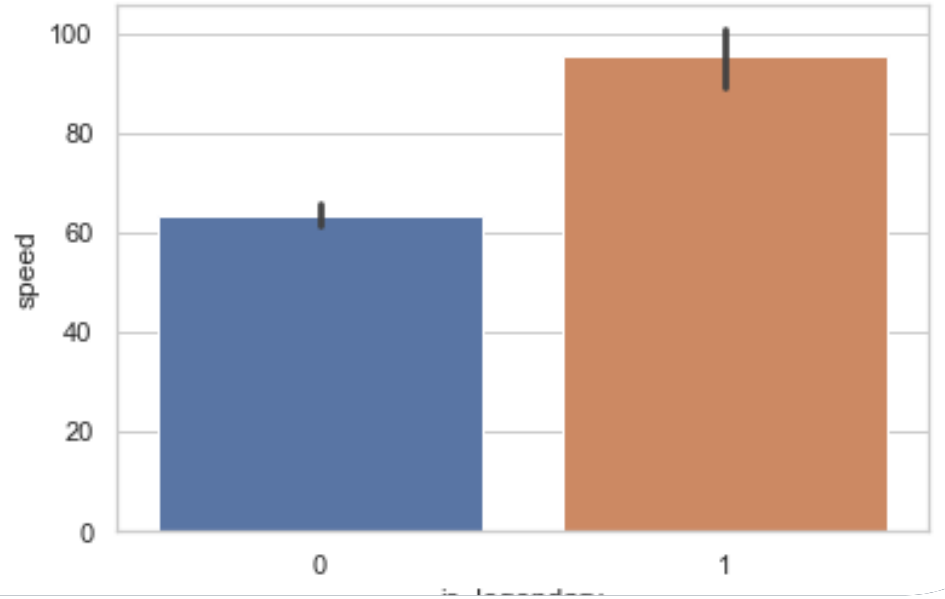
```
[24]: sns.lineplot(x="timepoint", y="signal",
                   hue="event", style="event",
                   markers=True, data=fmri)
      plt.show()
```



# SeaBorn Bar Plot

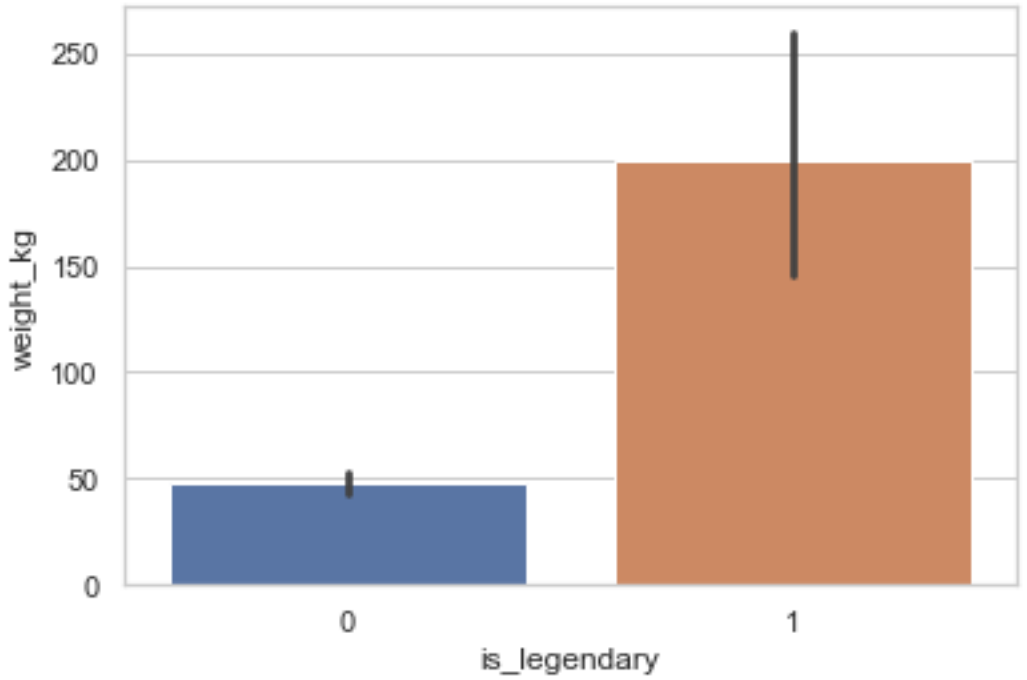
```
In [29]: import pandas as pd
         sns.set(style="whitegrid")
         pokemon=pd.read_csv('pokemon.csv')
```

```
In [31]: sns.barplot(x="is_legendary", y="speed", data=pokemon)
         plt.show()
```



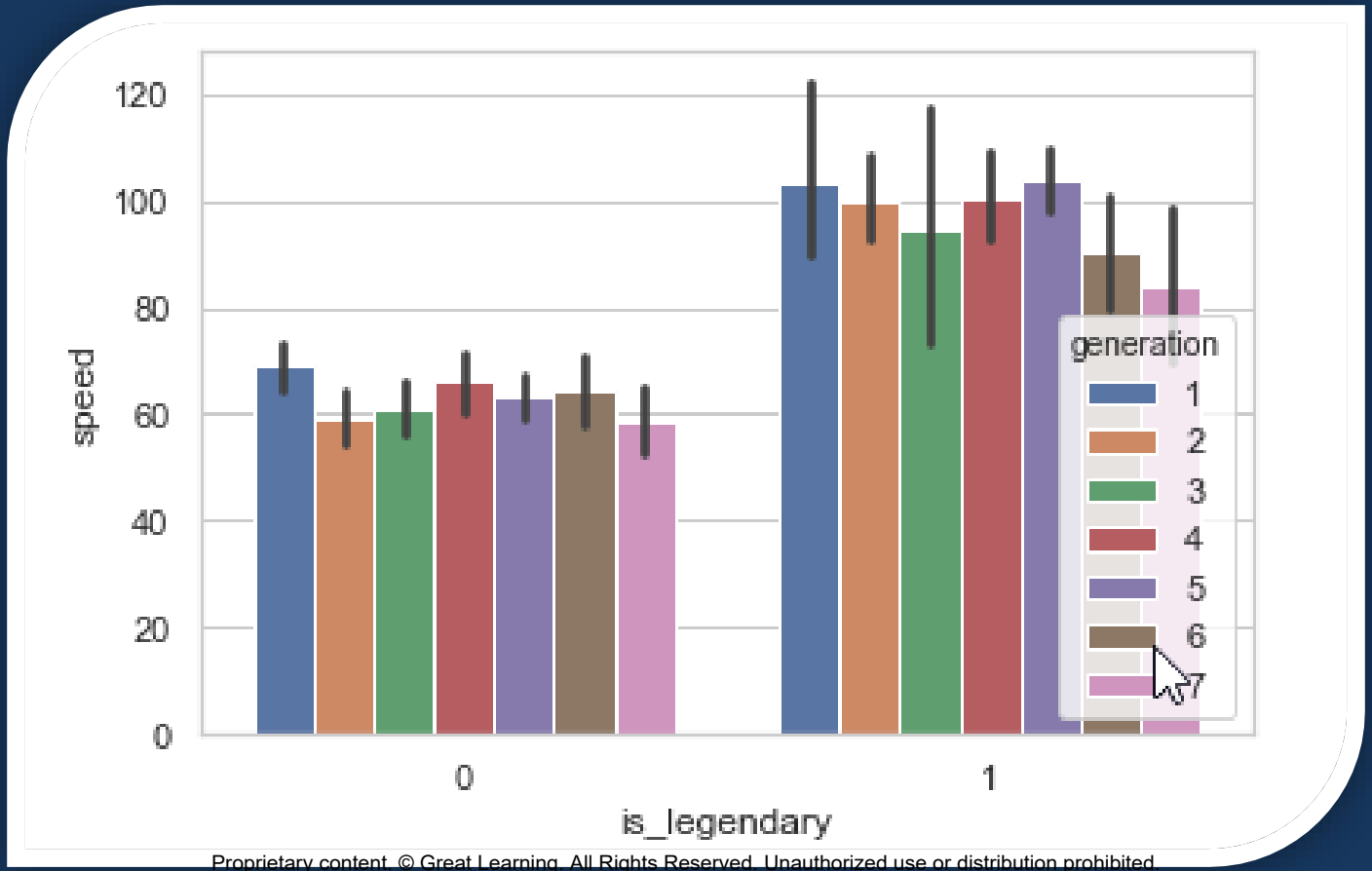
# SeaBorn Bar Plot

```
n [43]: sns.barplot(x="is_legendary", y="weight_kg",data=pokemon)
        plt.show()
```



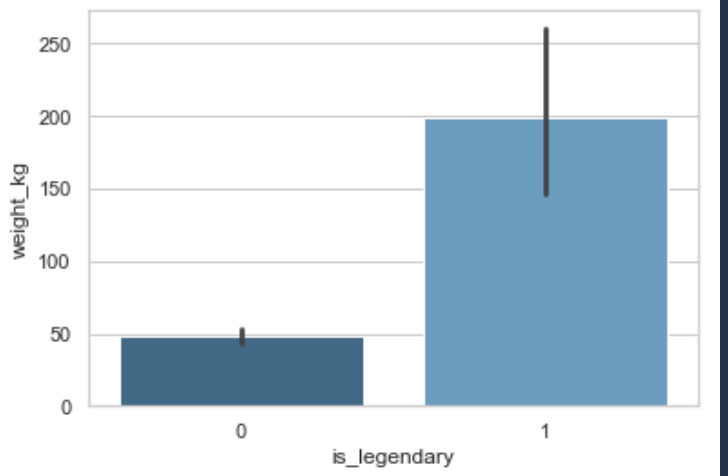
# SeaBorn Bar Plot

```
In [32]: sns.barplot(x="is_legendary", y="speed", hue="generation",data=pokemon)
         plt.show()
```

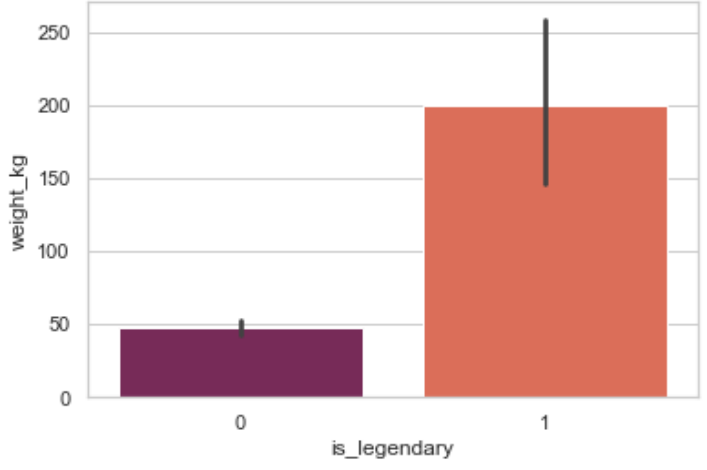


# SeaBorn Bar Plot

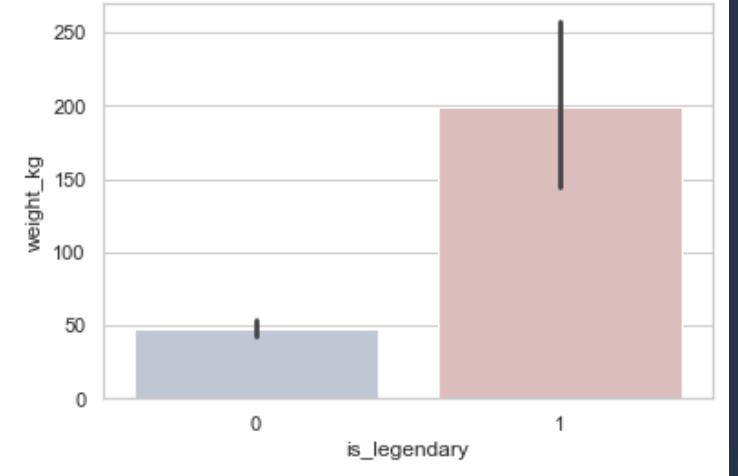
```
sns.barplot(x="is_legendary", y="weight_kg",
            data=pokemon,palette='Blues_d')
plt.show()
```




```
sns.barplot(x="is_legendary", y="weight_kg",
            data=pokemon,palette='rocket')
plt.show()
```

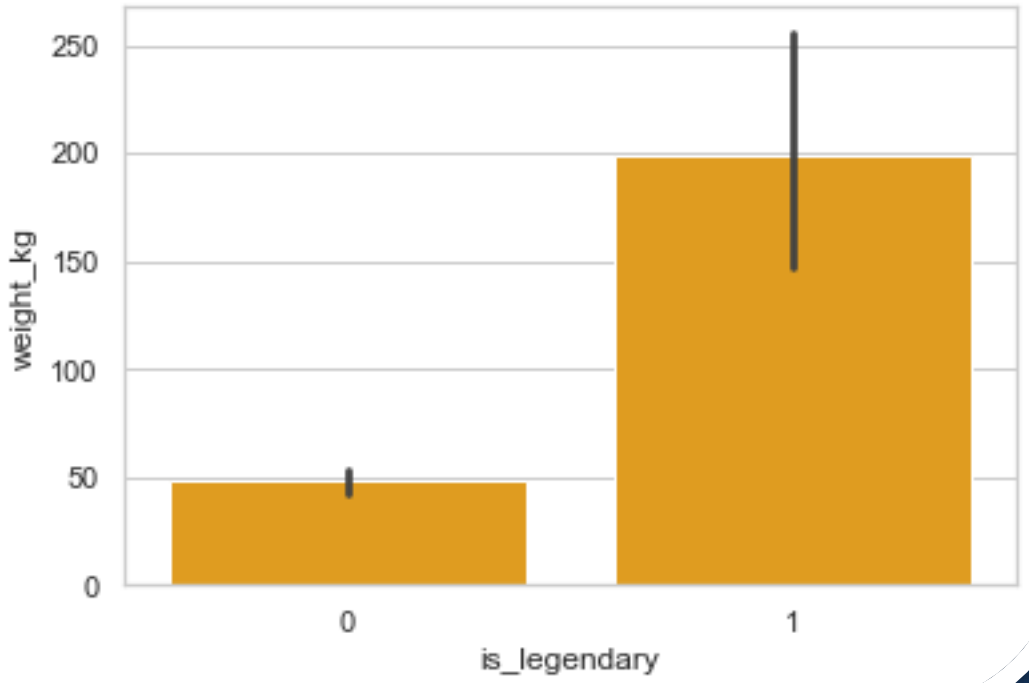



```
sns.barplot(x="is_legendary", y="weight_kg",
            data=pokemon,palette='vlag')
plt.show()
```



# SeaBorn Bar Plot

```
In [50]: sns.barplot(x="is_legendary", y="weight_kg",
                     data=pokemon,color="orange")
         plt.show()
```

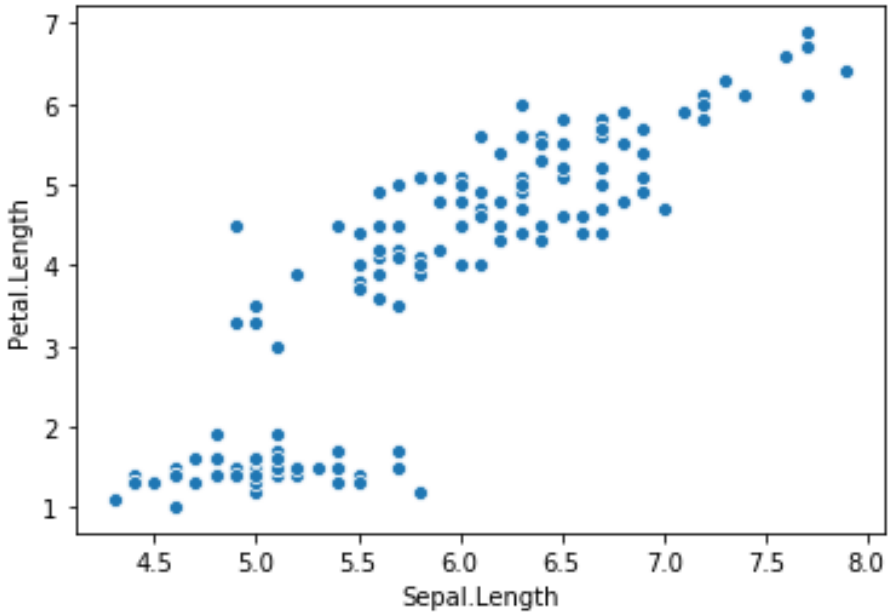


# SeaBorn Scatterplot

```
In [5]: iris = pd.read_csv('iris.csv')
        iris.head()
```

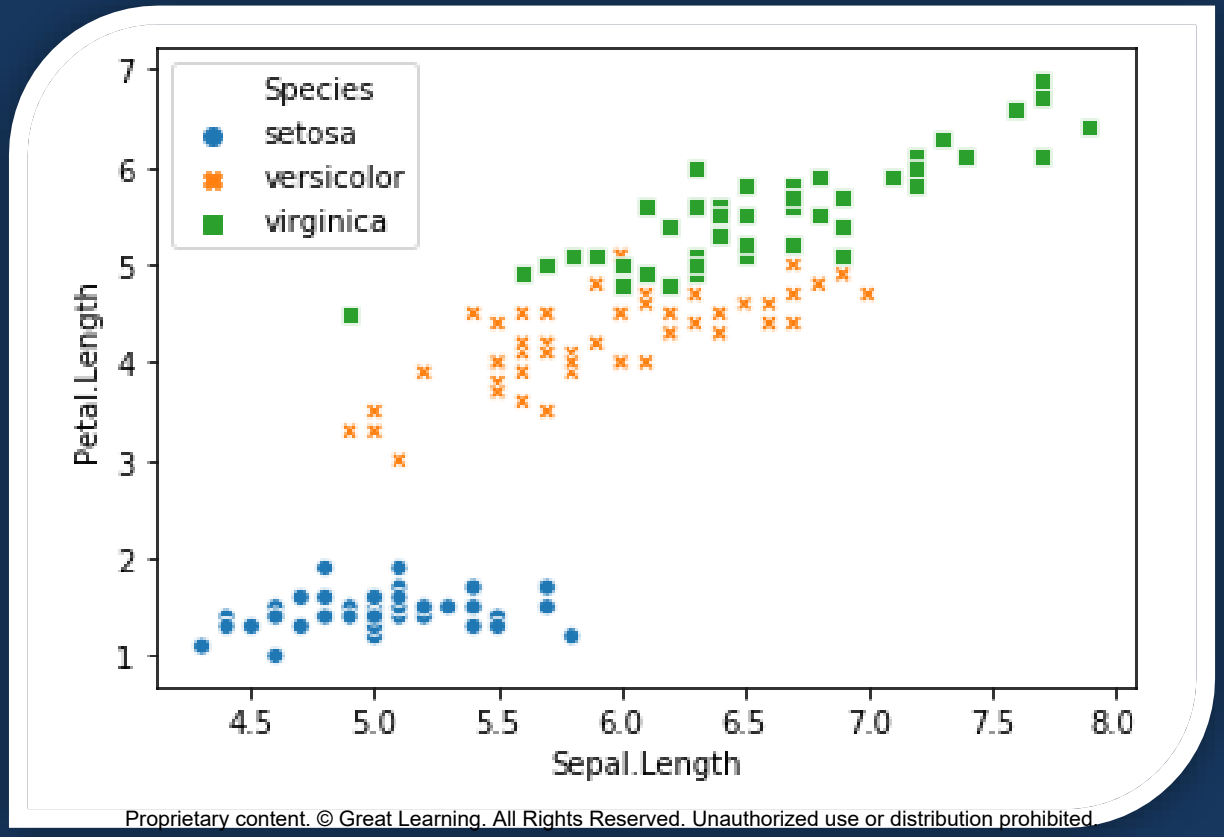
| | Sepal.Length | Sepal.Width | Petal.Length | Petal.Width | Species |
|---|---|---|---|---|---|
| 0 | 5.1 | 3.5 | 1.4 | 0.2 | setosa |
| 1 | 4.9 | 3.0 | 1.4 | 0.2 | setosa |
| 2 | 4.7 | 3.2 | 1.3 | 0.2 | setosa |
| 3 | 4.6 | 3.1 | 1.5 | 0.2 | setosa |
| 4 | 5.0 | 3.6 | 1.4 | 0.2 | setosa |

```
sns.scatterplot(x="Sepal.Length", y="Petal.Length", data=iris)
plt.show()
```



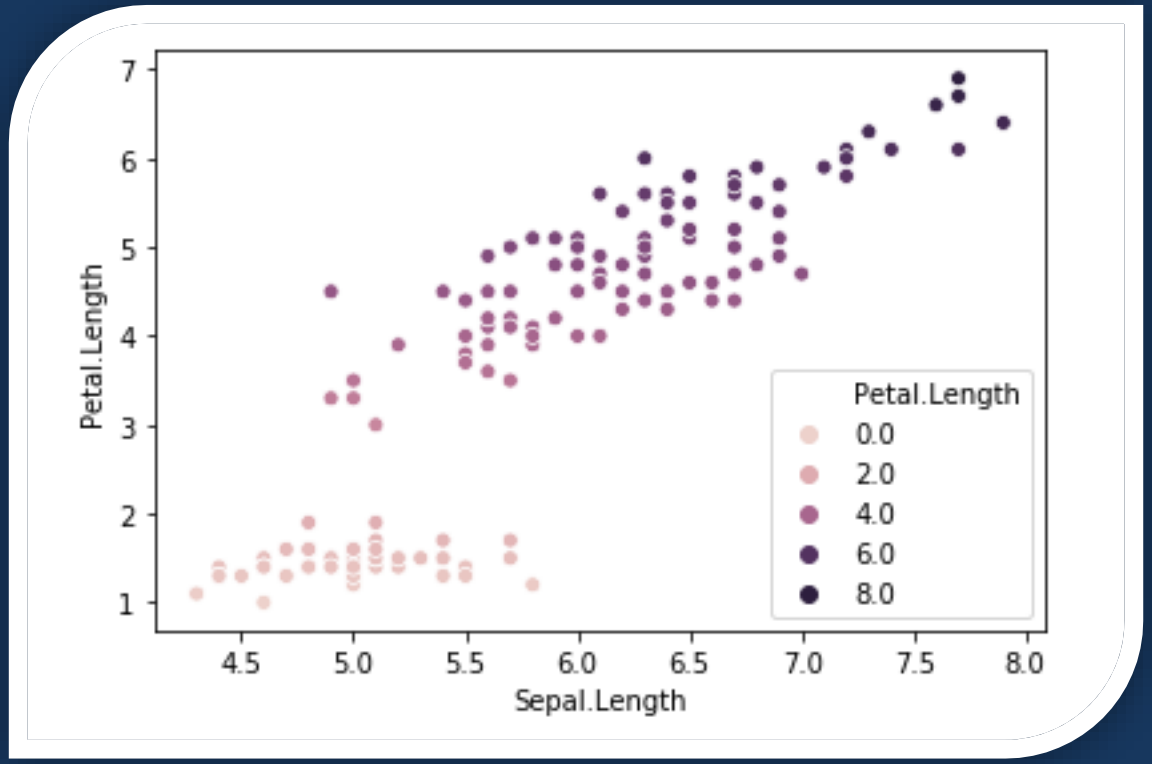
# SeaBorn Scatterplot

```
sns.scatterplot(x="Sepal.Length", y="Petal.Length", data=iris,hue="Species",style="Species")
plt.show()
```



# SeaBorn Scatterplot

```
sns.scatterplot(x='Sepal.Length',y='Petal.Length',data=iris,hue='Petal.Length')
```

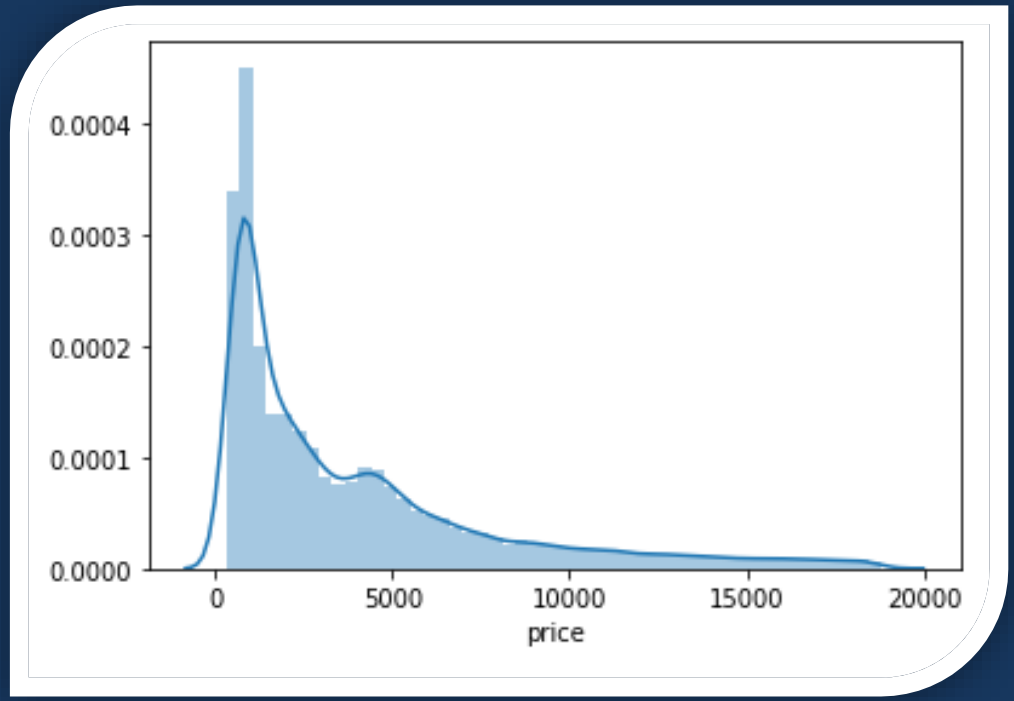


# SeaBorn Histogram/Distplot

```
diamonds = pd.read_csv('diamonds.csv')
diamonds.head()
```

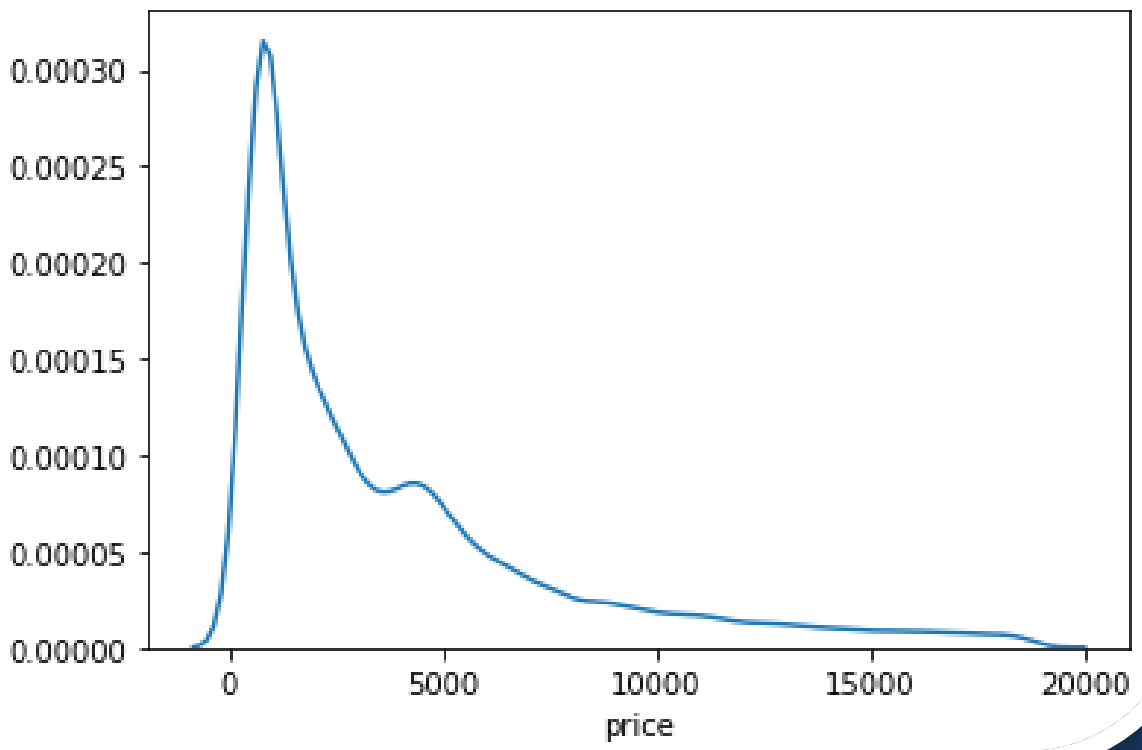
| | carat | cut | color | clarity | depth | table | price | x | y | z |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.23 | Ideal | E | SI2 | 61.5 | 55.0 | 326 | 3.95 | 3.98 | 2.43 |
| 1 | 0.21 | Premium | E | SI1 | 59.8 | 61.0 | 326 | 3.89 | 3.84 | 2.31 |
| 2 | 0.23 | Good | E | VS1 | 56.9 | 65.0 | 327 | 4.05 | 4.07 | 2.31 |
| 3 | 0.29 | Premium | I | VS2 | 62.4 | 58.0 | 334 | 4.20 | 4.23 | 2.63 |
| 4 | 0.31 | Good | J | SI2 | 63.3 | 58.0 | 335 | 4.34 | 4.35 | 2.75 |

```
sns.distplot(diamonds['price'])
plt.show()
```



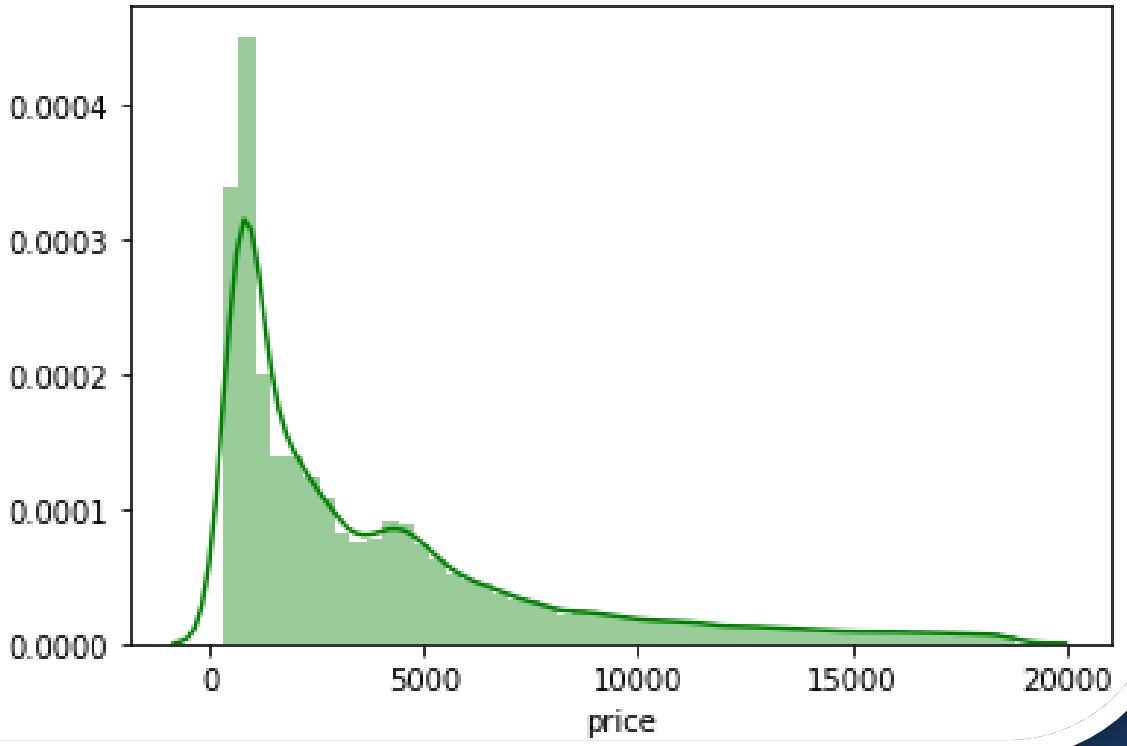
# SeaBorn Histogram/Distplot

```
sns.distplot(diamonds['price'],hist=False)
plt.show()
```



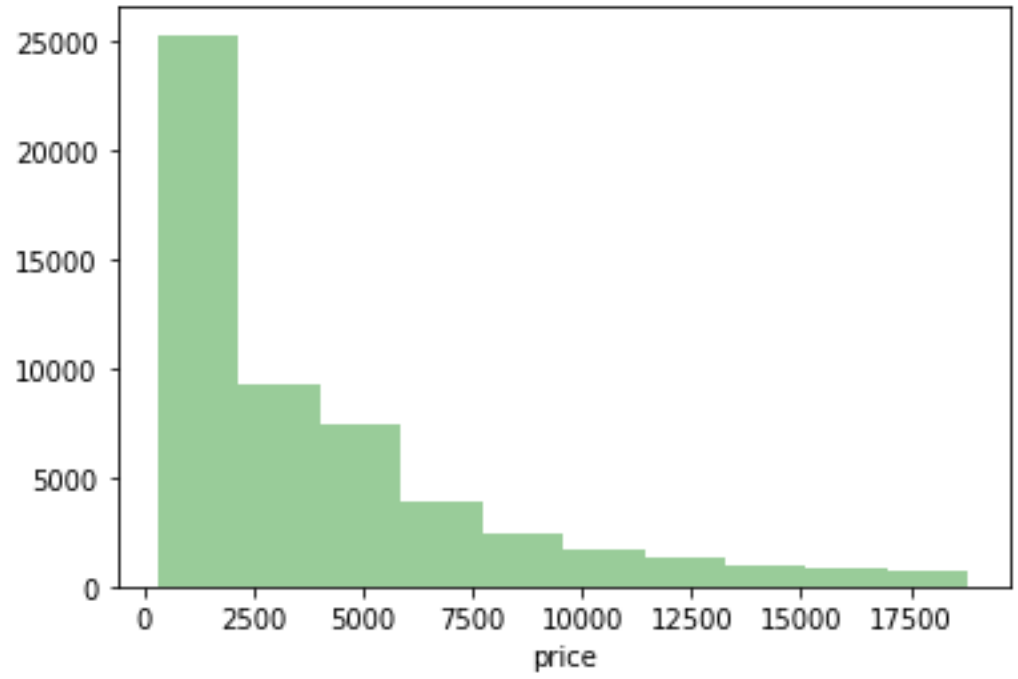
# SeaBorn Histogram/Distplot

```
sns.distplot(diamonds['price'],color="green")
plt.show()
```



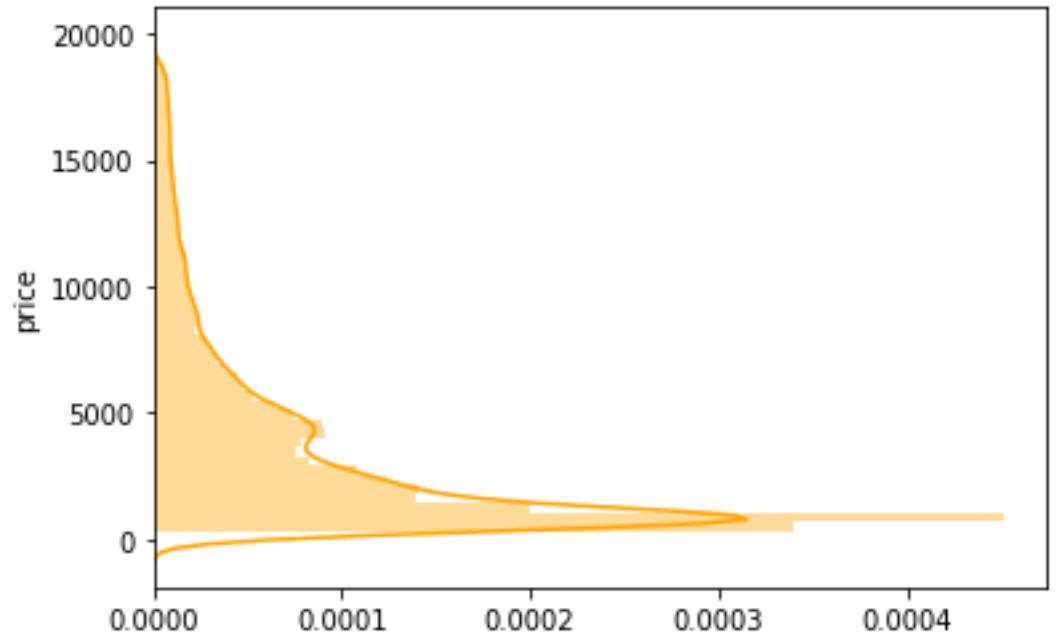
# SeaBorn Histogram/Distplot

```
sns.distplot(diamonds['price'],color="green",bins=10,kde=False)
plt.show()
```



# SeaBorn Histogram/Distplot

```
sns.distplot(diamonds['price'],color="orange",vertical=True)
plt.show()
```

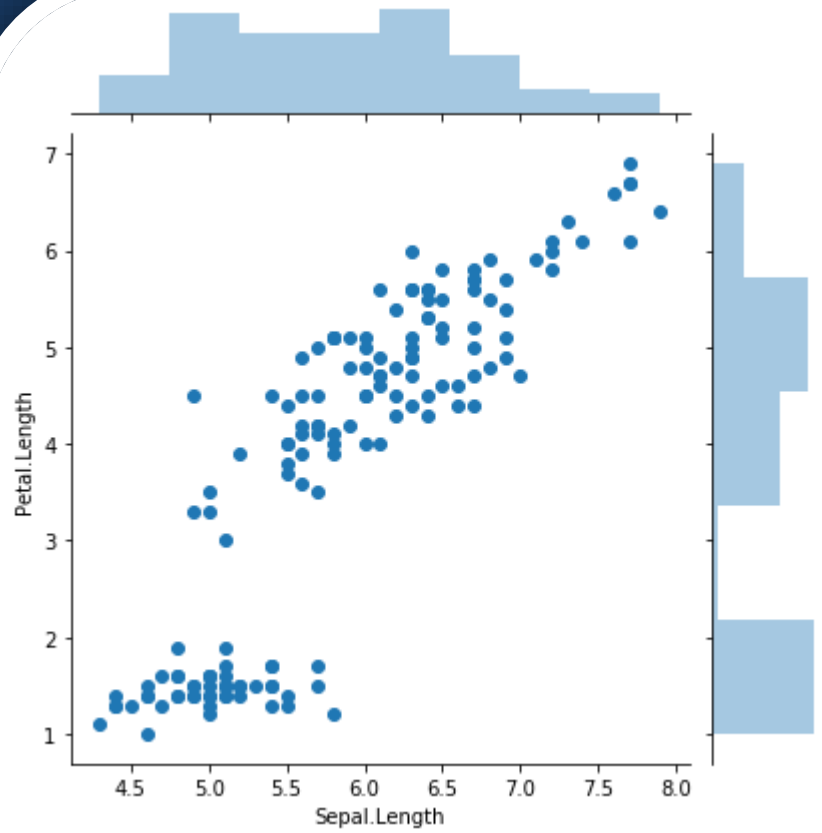


# SeaBorn JointPlot

```
In [5]: iris = pd.read_csv('iris.csv')
        iris.head()
```

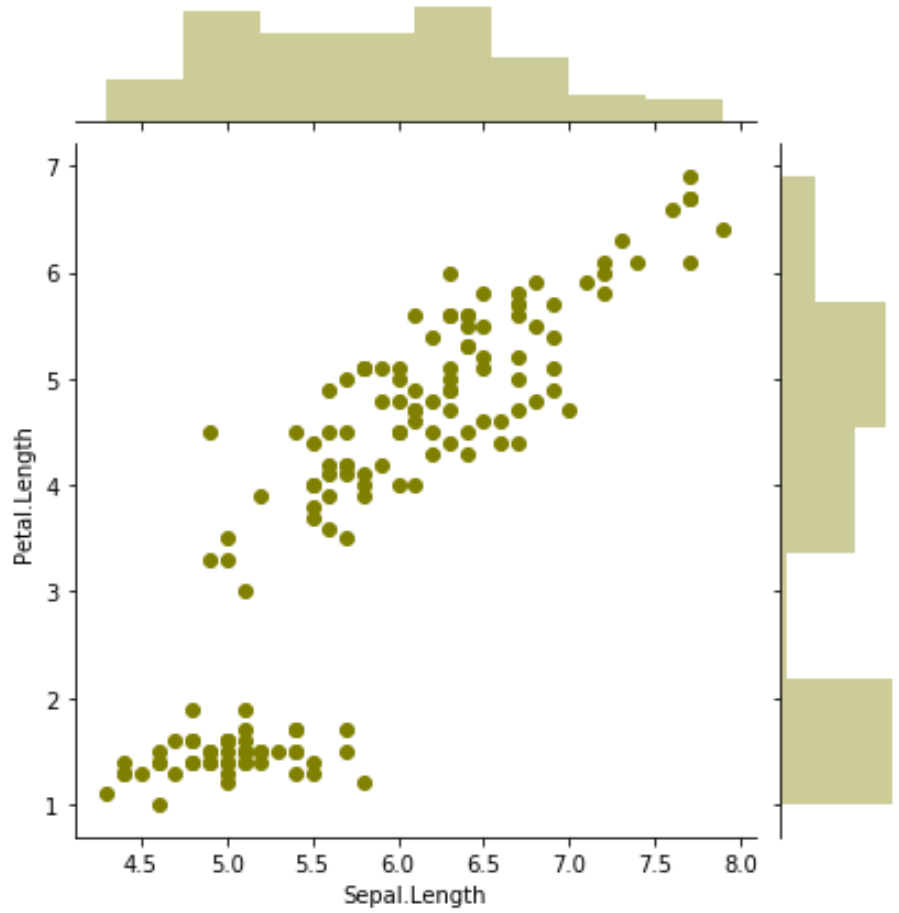
| | Sepal.Length | Sepal.Width | Petal.Length | Petal.Width | Species |
|---|---|---|---|---|---|
| 0 | 5.1 | 3.5 | 1.4 | 0.2 | setosa |
| 1 | 4.9 | 3.0 | 1.4 | 0.2 | setosa |
| 2 | 4.7 | 3.2 | 1.3 | 0.2 | setosa |
| 3 | 4.6 | 3.1 | 1.5 | 0.2 | setosa |
| 4 | 5.0 | 3.6 | 1.4 | 0.2 | setosa |

```
sns.jointplot(x='Sepal.Length',y='Petal.Length',data=iris)
plt.show()
```



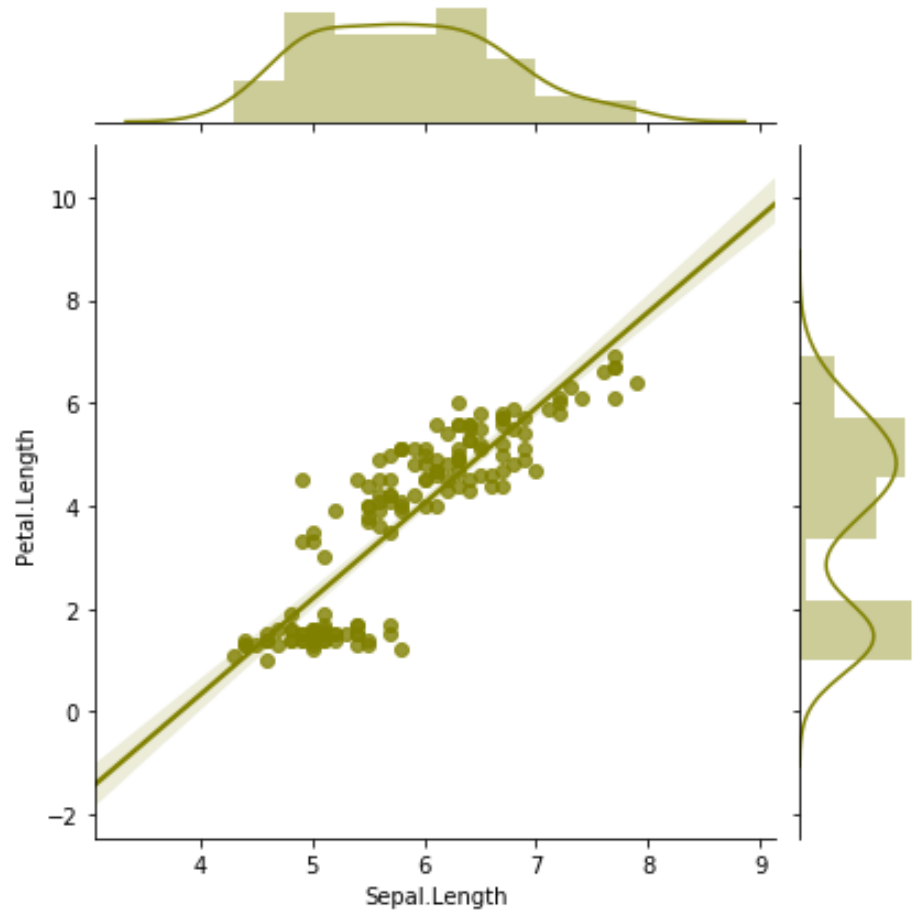
# SeaBorn JointPlot

```
[62]: sns.jointplot(x='Sepal.Length',y='Petal.Length',data=iris,color="olive")
plt.show()
```



# SeaBorn JointPlot

```
s.jointplot(x='Sepal.Length',y='Petal.Length',data=iris,color="olive",kind="reg")
plt.show()
```

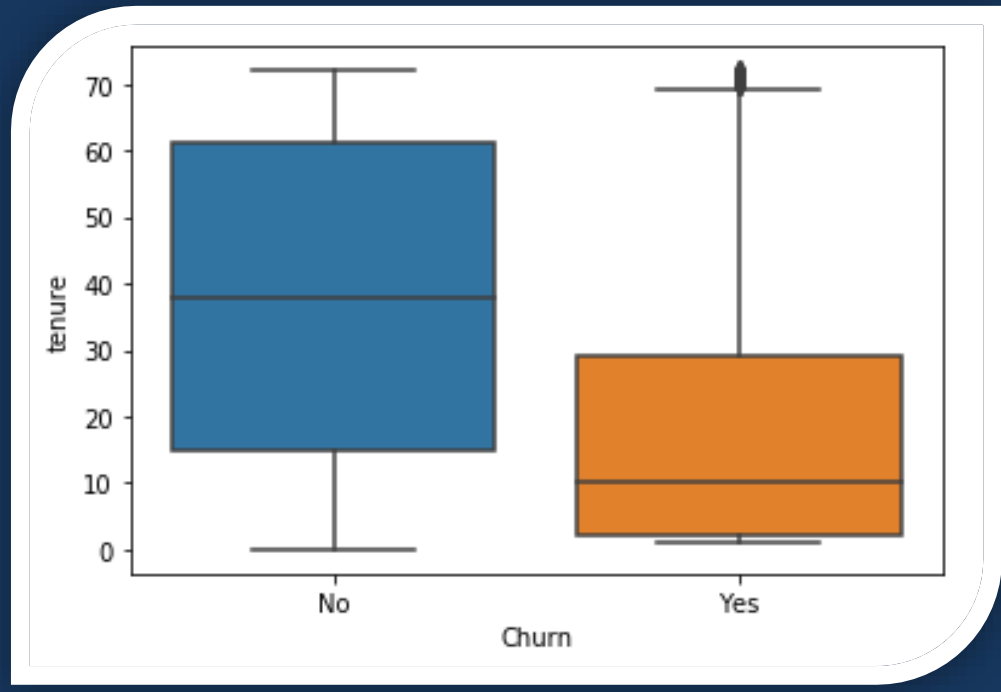


# SeaBorn BoxPlot

```
churn = pd.read_csv('churn.csv')
churn.head()
```

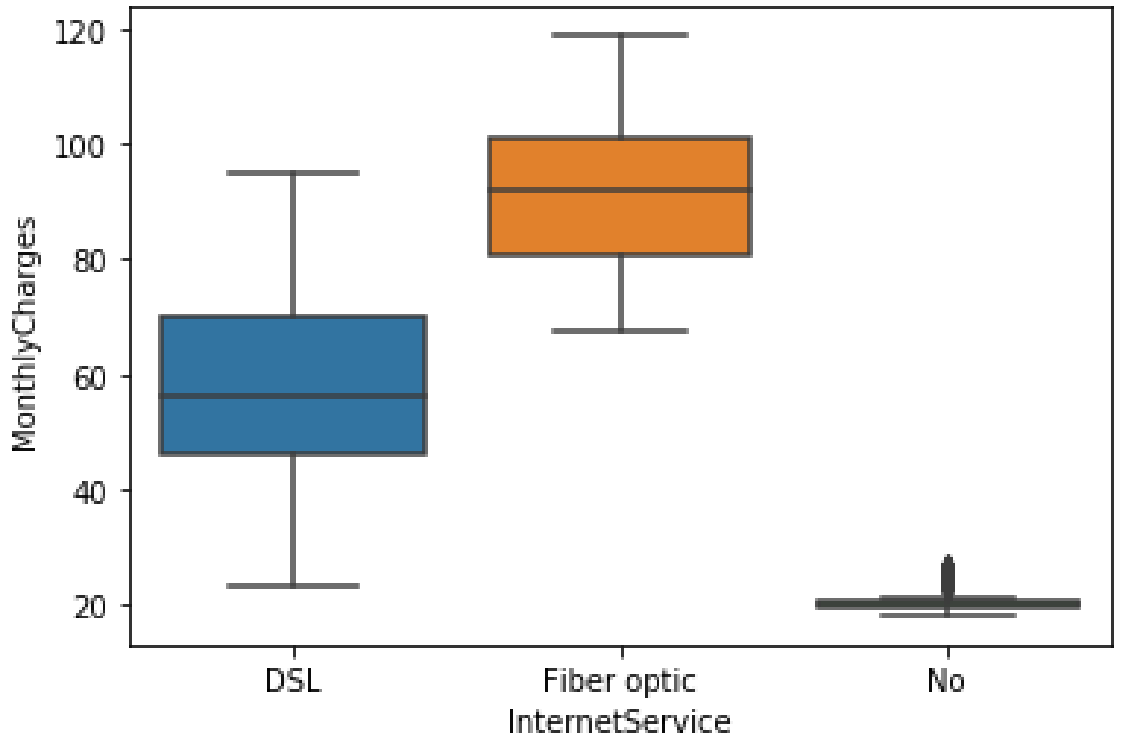
| ustomerID | gender | SeniorCitizen | Partner | Dependents | tenure |
|---|---|---|---|---|---|
| 7590-VHVEG | Female | 0 | Yes | No | 1 |
| 5575-GNVDE | Male | 0 | No | No | 34 |
| 3668-QPYBK | Male | 0 | No | No | 2 |
| 7795-CFOCW | Male | 0 | No | No | 45 |
| 9237-HQITU | Female | 0 | No | No | 2 |

```
sns.boxplot(x='Churn',y='tenure',data=churn)
plt.show()
```



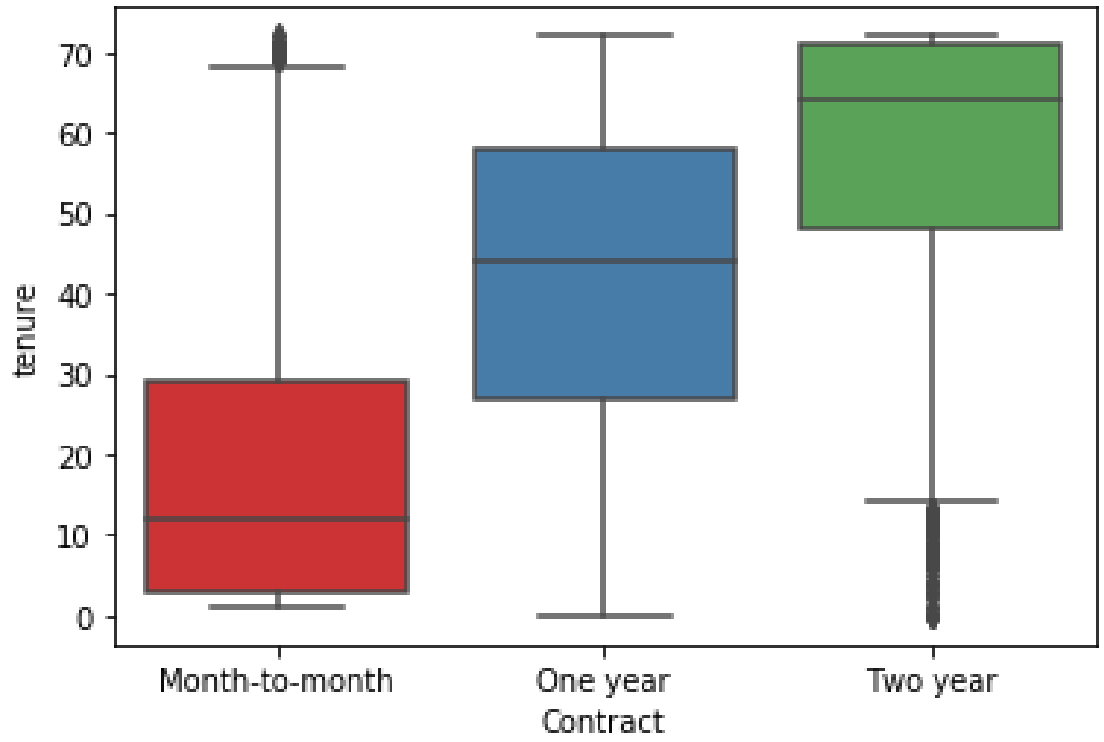
# SeaBorn BoxPlot

```
sns.boxplot(x='InternetService',y='MonthlyCharges',data=churn)
plt.show()
```



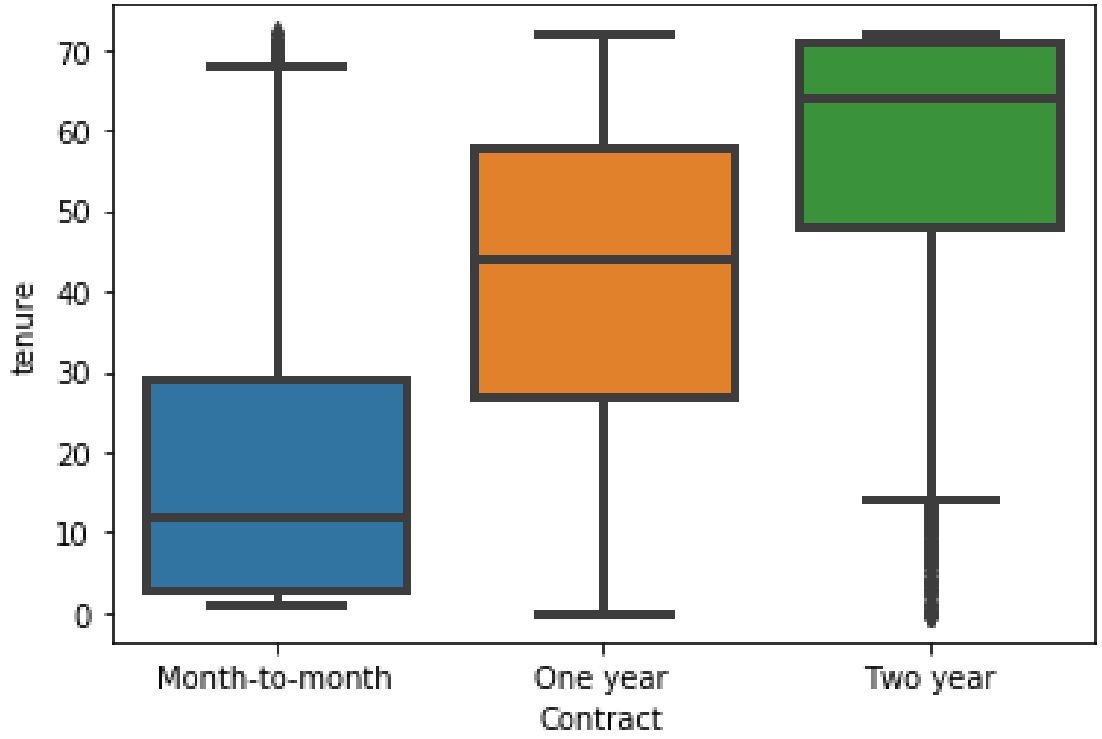
# SeaBorn BoxPlot

```
sns.boxplot(x='Contract',y='tenure',data=churn,palette="Set1")
plt.show()
```



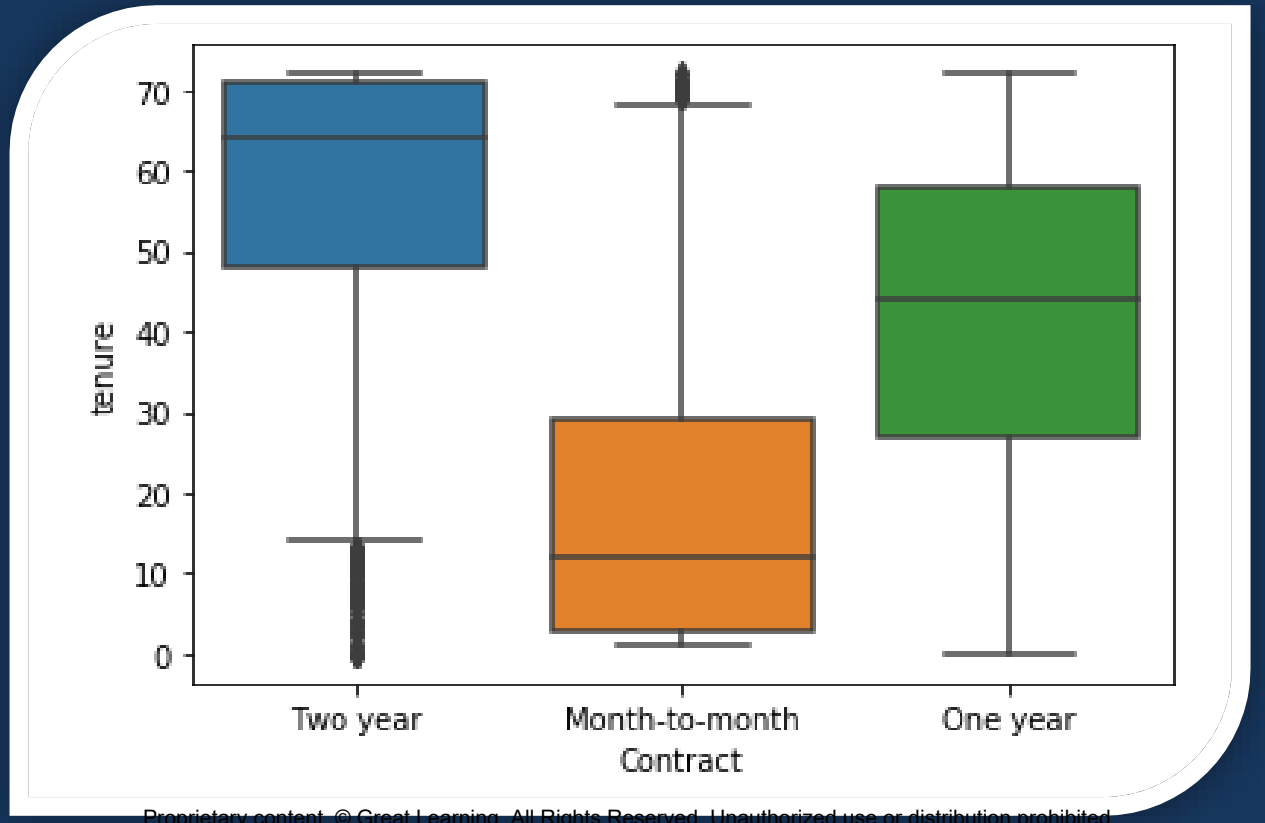
# SeaBorn BoxPlot

```
sns.boxplot(x='Contract',y='tenure',data=churn,linewidth=3)
plt.show()
```



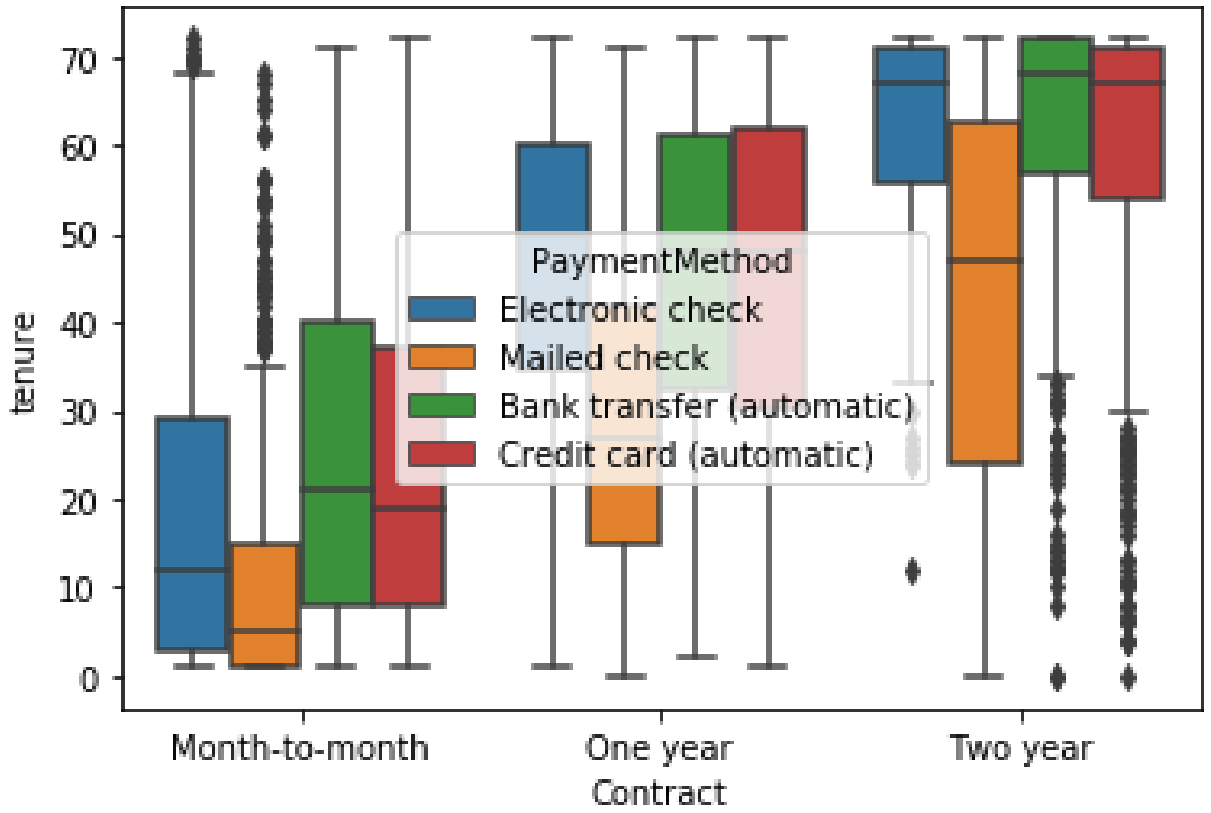
# SeaBorn BoxPlot

```
sns.boxplot(x='Contract',y='tenure',data=churn,order=["Two year","Month-to-month","One year"])
plt.show()
```



# SeaBorn BoxPlot

```
sns.boxplot(x='Contract',y='tenure',data=churn,hue="PaymentMethod")
plt.show()
```



# SeaBorn Pair Plot

```
df = sns.load_dataset("iris")
sns.pairplot(df, hue="species")
plt.show()
```