# Data Handling and Visualization (CSE2026) - Record


Submitted From,

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# INDEX

BASIC PLOTTING IN MATPLOTLIB

```
!pip install matplotlib==3.4
```

```
Collecting matplotlib==3.4
  Downloading matplotlib-3.4.0.tar.gz (37.1 MB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 37.1/37.1 MB 26.7 MB/s eta 0:00:00
  Preparing metadata (setup.py) ... done
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib==3.4) (0.12.1)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib==3.4) (1.4.5)
Requirement already satisfied: numpy>=1.16 in /usr/local/lib/python3.10/dist-packages (from matplotlib==3.4) (1.25.2)
Requirement already satisfied: pillow>=6.2.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib==3.4) (9.4.0)
Requirement already satisfied: pyparsing>=2.2.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib==3.4) (3.1.2)
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.10/dist-packages (from matplotlib==3.4) (2.8.2)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.7->matplotlib==3.4) (1.16.0)
Building wheels for collected packages: matplotlib
  Building wheel for matplotlib (setup.py) ... done
  Created wheel for matplotlib: filename=matplotlib-3.4.0-cp310-cp310-linux_x86_64.whl size=10425804 sha256=a604bf5dc05fbb0e67f2a62efe30
  Stored in directory: /root/.cache/pip/wheels/27/ea/35/0964d59ed4c7270bbeabc79c0984b58d72f9e4463746bf7062
Successfully built matplotlib
Installing collected packages: matplotlib
  Attempting uninstall: matplotlib
    Found existing installation: matplotlib 3.7.1
    Uninstalling matplotlib-3.7.1:
```

```
from matplotlib import pyplot as plt
plt.style.use('seaborn-whitegrid')

import numpy as np
print("step 1")
```

TO CREATE EMPTY PLOT

```
fig=plt.figure()
ax=plt.axes()
ax.grid()
```

PLOT LINESPACE

```
fig=plt.figure()
ax=plt.axes()
x=np.linspace(0,10,1000)
ax.plot(x,np.sin(x));
```

ADDING TITLE AND LABELS TO PLOT

```
fig=plt.figure()
ax=plt.axes()
x=np.linspace(0,10,1000)
ax.plot(x,np.sin(x))
ax.set_title('simple plot')
ax.set_xlabel('x label')
ax.set_ylabel('y label')
```

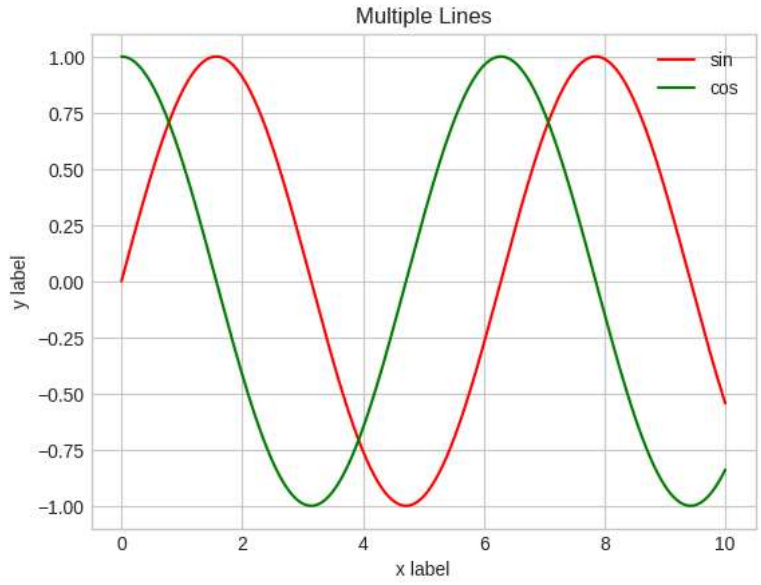
ADD A TITLE TO THE PLOT ABOVE

```
fig=plt.figure()
ax=plt.axes()
x=np.linspace(0,10,1000)
ax.plot(x,np.sin(x),label='sin')
ax.plot(x,np.cos(x),label='cos')
ax.set_title('Multiple Lines')
ax.set_xlabel('x label')
ax.set_ylabel('y label')
ax.legend()
```

SPECIFY COLOR BY NAME

```
fig=plt.figure()
ax=plt.axes()
x=np.linspace(0,10,1000)
ax.plot(x,np.sin(x),label='sin',color='red')
ax.plot(x,np.cos(x),label='cos',color='g')
ax.set_title('Multiple Lines')
ax.set_xlabel('x label')
ax.set_ylabel('y label')
ax.legend()
```

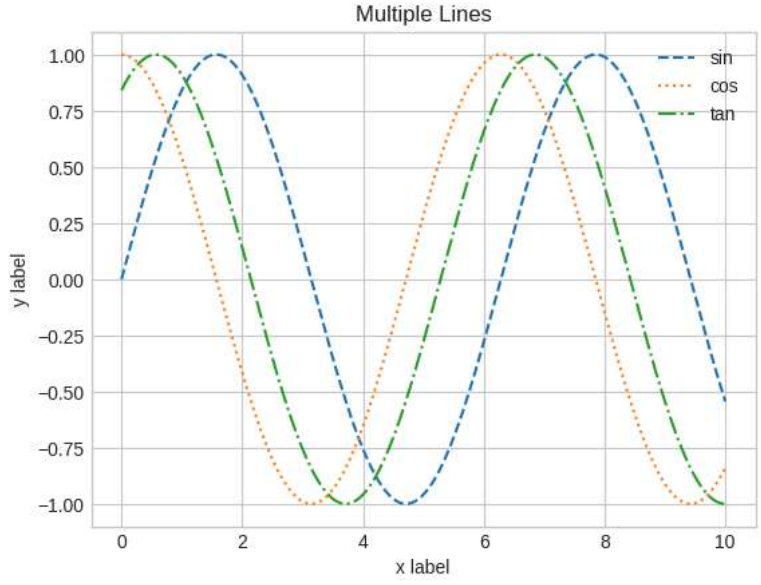
```
<matplotlib.legend.Legend at 0x7be9aa7599c0>
```



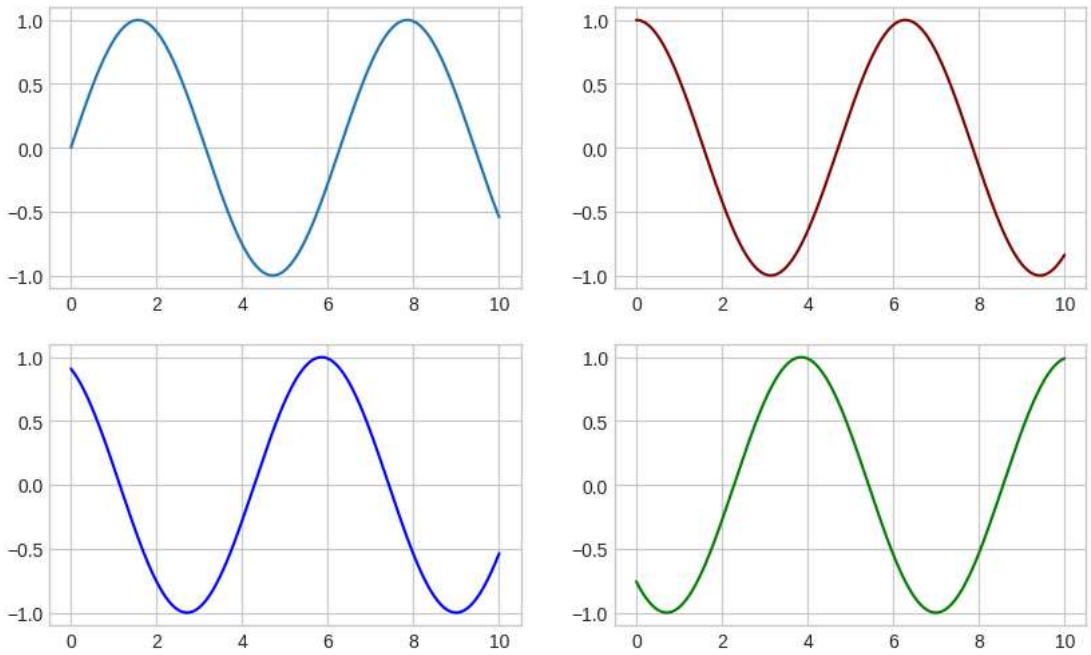

LINESTYLE

```
fig=plt.figure()
ax=plt.axes()
x=np.linspace(0,10,1000)
ax.plot(x,np.sin(x),label='sin',linestyle='dashed')
ax.plot(x,np.cos(x),label='cos',linestyle='dotted')
ax.plot(x,np.sin(x+1),label='tan',linestyle='dashdot')
ax.set_title('Multiple Lines')
ax.set_xlabel('x label')
ax.set_ylabel('y label')
ax.legend()
```

```
<matplotlib.legend.Legend at 0x7be9aa870d90>
```



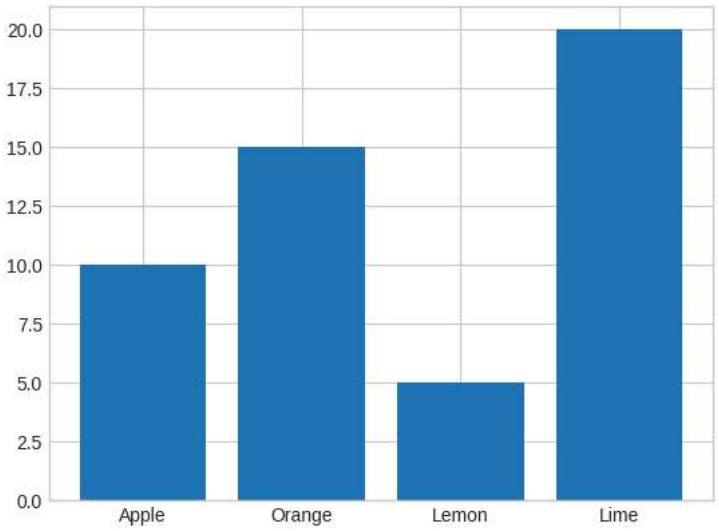
```
#SUBPLOTS
fig,axs=plt.subplots(2,2,figsize=(10,6))
x=np.linspace(0,10,1000)
axs[0,0].plot(x,np.sin(x))
axs[0,1].plot(x,np.cos(x),color='maroon')
axs[1,0].plot(x,np.sin(x+2),color='blue')
axs[1,1].plot(x,np.sin(x+4),color='green');
```




BAR CHART

```
data={'Apple':10,'Orange':15,'Lemon':5,'Lime':20}
names=list(data.keys())
values=list(data.values())
fig=plt.figure()
ax=plt.axes()
ax.bar(names,values)
```

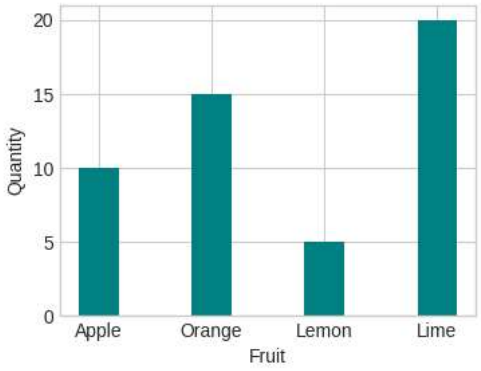
```
<BarContainer object of 4 artists>
```




Detailing bar chart

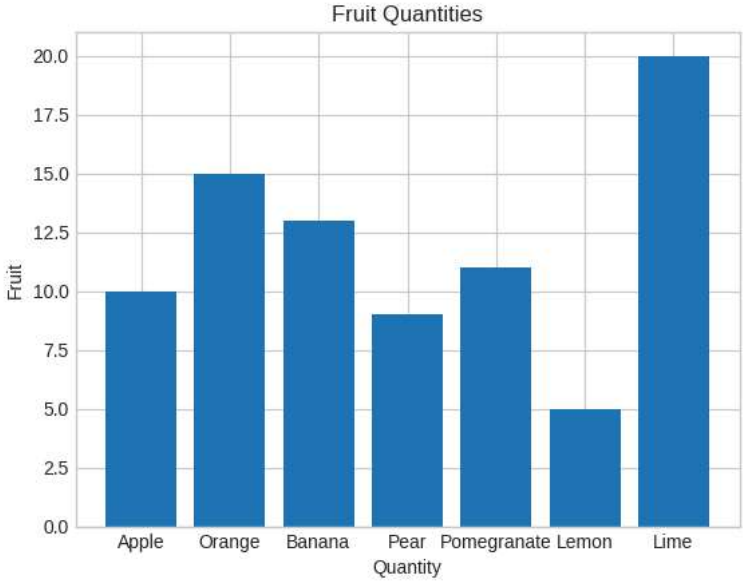
```
data={'Apple':10,'Orange':15,'Lemon':5,'Lime':20}
names=list(data.keys())
values=list(data.values())
fig=plt.figure(figsize=(4,3))
ax=plt.axes()
ax.bar(names,values,color='teal',width=0.35)
ax.set_xlabel('Fruit')
ax.set_ylabel('Quantity')
```

```
Text(0, 0.5, 'Quantity')
```




```
#creating a dictionary
data={'Apple':10,
      'Orange':15,
      'Banana':13,
      'Pear':9,
      'Pomegranate':11,
      'Lemon':5,
      'Lime':20}
names=list(data.keys())
values=list(data.values())
ax=plt.axes()
ax.bar(names,values)
ax.set_xlabel('Quantity')
ax.set_ylabel('Fruit')
ax.set_title('Fruit Quantities')
```

```
Text(0.5, 1.0, 'Fruit Quantities')
```



TO CREATE SERIES

```
import pandas as pd
import numpy as
data=np.array([
s=pd.Series(data)
print(s)
```

Add text cell

```
0    a
1    b
2    c
dtype: object
```

TO CREATE DICTIONARY

```
import pandas as pd
import numpy as np
data={'a':0,'b':1,'c':2}
s=pd.Series(data)
print(s)
```

```
a    0
b    1
c    2
dtype: int64
```

ARRAY WITH INDEX

```
import pandas as pd
import numpy as np
data=np.array(['a','b','c'])
s=pd.Series(data,index=[100,102,104])
print(s)
```

```
100    a
102    b
104    c
dtype: object
```

DICTIONARY WITH INDEX

```
import pandas as pd
import numpy as np
data={'a':0,'b':1,'c':2}
s=pd.Series(data,index=['a','d','b','c'])
print(s)
```

```
a    0.0
d    NaN
b    1.0
c    2.0
dtype: float64
```

CREATING A SERIES FROM SCALAR

```
import pandas as pd
import numpy as np
s=pd.Series(5,index=[0,1,2,3])
print(s)
```

```
0    5
1    5
2    5
3    5
dtype: int64
```

RETRIEVE THE 1ST ELEMENT

```
import pandas as pd
s=pd.Series([1,2,3,4,5],index=['a','b','c','d','e'])
print(s[0])
```

```
1
```

Add text cell

SLICING

```
import pandas as pd
s=pd.Series([1,2,3,4,5],index=['a','b','c','d','e'])
print(s[1:4])
```

```
b    2
c    3
d    4
dtype: int64
```

```
import pandas as pd
s=pd.Series([1,2,3,4,5,6,7,8,9,10],index=['a','b','c','d','e','f','g','h','i','j'])
print(s[3:8])
```

```
d    4
e    5
f    6
g    7
h    8
dtype: int64
```

retrive 1st 3 elements using slicing

```
import pandas as pd
s=pd.Series([1,2,3,4,5,6,7,8,9,10],index=['a','b','c','d','e','f','g','h','i','j'])
print(s[:3])
```

```
a    1
b    2
c    3
dtype: int64
```

retrieve a single element

```
import pandas as pd
s=pd.Series([1,2,3,4,5,6,7,8,9,10],index=['a','b','c','d','e','f','g','h','i','j'])
print(s['a'])
```

```
1
```

retrieve a multiple element

```
import pandas as pd
s=pd.Series([1,2,3,4,5,6,7,8,9,10],index=['a','b','c','d','e','f','g','h','i','j'])
print(s[['a','j','e']])
```

```
a     1
j    10
e     5
dtype: int64
```

OPERATIONS ON DATASET

```
import pandas as pd
df=pd.read_csv("/content/nyc_weather.csv")
```

```
---------------------------------------------------------------------------
UnicodeDecodeError                        Traceback (most recent call last)
<ipython-input-28-c8675a4efe38> in <cell line: 2>()
      1 import pandas as pd
----> 2 df=pd.read_csv("/content/nyc_weather.csv")

Add text cell  10 frames

/usr/local/lib/python3.10/dist-packages/pandas/_libs/parsers.pyx in pandas._libs.parsers.raise_parser_error()

UnicodeDecodeError: 'utf-8' codec can't decode bytes in position 15-16: invalid continuation byte
```

## CREATING DATAFRAME

```
import pandas as pd

df=pd.DataFrame()
print(df)
```

```
Empty DataFrame
Columns: []
Index: []
```

```
import pandas as pd
data=[1,2,3,4]
df=pd.DataFrame(data)
print(df)
```

```
   0
0  1
1  2
2  3
3  4
```

## MERGING TO FORM DATAFRAME

```
import pandas as pd
data=[['sa',10],['kav',20]]
df=pd.DataFrame(data,columns=['Name','Age'])
print(df)
```

```
   Name  Age
0   sa   10
1  kav   20
```

## APPLYING DATATYPE

```
import pandas as pd
data=[['sa',10],['kav',20]]
df=pd.DataFrame(data,columns=['Name','Age'],dtype=float)
print(df)
```

```
   Name   Age
0   sa  10.0
1  kav  20.0
<ipython-input-38-58b87c03f679>:3: FutureWarning: Could not cast to float64, falling back to object. This behavior is deprecated. In a f
  df=pd.DataFrame(data,columns=['Name','Age'],dtype=float)
```

```
import pandas as pd
data={'name' :['tom','jack'] ,'age' :[1,2]}
df=pd.DataFrame(data,index=['rank1','rank2'])
print(df)
```

```
       name  age
rank1   tom    1
rank2  jack    2
```

Add text cell

```
# import the pandas library
import pandas as pd
import numpy as np

df = pd.DataFrame(np.random.randn(5, 3), index=['a', 'c', 'e', 'f',
'h'],columns=['one', 'two', 'three'])
print(df)
df = df.reindex(['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h'])

print (df)
```

```
        one       two     three
a  0.447414 -0.156942  0.798209
c  1.266992 -1.194218 -0.402855
e -0.647991  1.435391 -0.072793
f -0.581821  1.038771 -0.776008
h  0.686654 -1.064446  1.137672
        one       two     three
a  0.447414 -0.156942  0.798209
b       NaN       NaN       NaN
c  1.266992 -1.194218 -0.402855
d       NaN       NaN       NaN
e -0.647991  1.435391 -0.072793
f -0.581821  1.038771 -0.776008
g       NaN       NaN       NaN
h  0.686654 -1.064446  1.137672
```

```
import pandas as pd
import numpy as np

df = pd.DataFrame(np.random.randn(5, 3), index=['a', 'c', 'e', 'f',
'h'],columns=['one', 'two', 'three'])

df = df.reindex(['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h'])

print (df['one'].isnull())
```

```
a    False
b     True
c    False
d     True
e    False
f    False
g     True
h    False
Name: one, dtype: bool
```

```
#Replace the missing values by 0
import pandas as pd
import numpy as np
df = pd.DataFrame(np.random.randn(3, 3), index=['a', 'c', 'e'],columns=['one',
'two', 'three'])
df = df.reindex(['a', 'b', 'c'])
print (df)
print ("NaN replaced with '0':")
print (df.fillna(0))
```

```
        one       two     three
a  0.635750 -2.285400  0.248117
b       NaN       NaN       NaN
c -0.287978 -1.188414  1.378976
NaN replaced with '0':
        one       two     three
a  0.635750 -2.285400  0.248117
b  0.000000  0.000000  0.000000
c -0.287978 -1.188414  1.378976
```

```
import pandas as pd
import numpy as np

df = pd.DataFrame(np.random.randn(5, 3), index=['a', 'c', 'e', 'f',
'h'],columns=['one', 'two', 'three'])
df = df.reindex(['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h'])
print(df)
print (df.fillna(method='pad'))
```

```
          one       two     three
a -0.366934  0.335056 -0.193792
b       NaN       NaN       NaN
c  1.056679  0.756225  0.912214
d       NaN       NaN       NaN
e -0.377422  0.985928  1.222426
f -0.929130 -0.094656 -0.679399
g       NaN       NaN       NaN
h  1.602288 -0.676405 -0.521540
          one       two     three
a -0.366934  0.335056 -0.193792
b -0.366934  0.335056 -0.193792
c  1.056679  0.756225  0.912214
d  1.056679  0.756225  0.912214
e -0.377422  0.985928  1.222426
f -0.929130 -0.094656 -0.679399
g -0.929130 -0.094656 -0.679399
h  1.602288 -0.676405 -0.521540
```

```
import pandas as pd
import numpy as np

df = pd.DataFrame(np.random.randn(5, 3), index=['a', 'c', 'e', 'f',
'h'],columns=['one', 'two', 'three'])
df = df.reindex(['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h'])

print (df.fillna(method='bfill'))
```

```
          one       two     three
a -0.692098  1.531090  0.364882
b -0.490656  0.770679  0.338704
c -0.490656  0.770679  0.338704
d -1.281391  0.103691 -0.117571
e -1.281391  0.103691 -0.117571
f -1.063626  0.533522  2.010359
g  1.511229 -0.596010  2.030684
h  1.511229 -0.596010  2.030684
```

```
import pandas as pd
import numpy as np

df = pd.DataFrame(np.random.randn(5, 3), index=['a', 'c', 'e', 'f',
'h'],columns=['one', 'two', 'three'])
#print(df)
df = df.reindex(['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h'])
print(df)
print (df.dropna())
```

```
          one       two     three
a -1.215042  1.457607 -0.241829
b       NaN       NaN       NaN
c  1.454749 -0.087851  0.659018
d       NaN       NaN       NaN
e  1.132439 -0.333103  0.232882
f  2.031967  0.474128 -0.456087
g       NaN       NaN       NaN
h  1.438924 -0.782758  1.578343
          one       two     three
a -1.215042  1.457607 -0.241829
c  1.454749 -0.087851  0.659018
e  1.132439 -0.333103  0.232882
f  2.031967  0.474128 -0.456087
h  1.438924 -0.782758  1.578343
```

```
import pandas as pd
import numpy as np
df = pd.DataFrame({'one':[10,20,30,40,50,2000],
'two':[1000,0,30,40,50,60]})
print(df)
print (df.replace({1000:10,2000:60}))
```

```
    one   two
0    10  1000
1    20     0
2    30    30
3    40    40
4    50    50
5  2000    60
   one  two
```

```
   0   10   10
   1   20    0
   2   30   30
   3   40   40
   4   50   50
   5   60   60
```

Start coding or generate with AI.

```
import numpy as np
data = [1,2,2,2,3,1,1,15,2,2,2,3,1,1,2]
mean = np.mean(data)
std = np.std(data)
print('Mean of the dataset is' ,mean)
print('Standard deviation is' ,std)
threshold = 3
outlier = []
for i in data:
    z = (i-mean)/std
    if z>threshold:
        outlier.append(i)
        print('Outlier in dataset is' ,outlier)
```

```
Mean of the dataset is 2.6666666666666665
Standard deviation is 3.3598941782277745
Outlier in dataset is [15]
```

```
import numpy as np
data = [41,26,25,21,38,19,1,157,27,24,233,37,17,13,25]
mean = np.mean(data)
std = np.std(data)
print('Mean of the dataset is' ,mean)
print('Standard deviation is' ,std)
threshold = 3
outlier = []
for i in data:
    z = (i-mean)/std
    if z>threshold:
        outlier.append(i)
        print('Outlier in dataset is' ,outlier)
```

```
Mean of the dataset is 46.93333333333333
Standard deviation is 60.488529674825315
Outlier in dataset is [233]
```

Start coding or generate with AI.

```
import numpy as np
data= [1,2,2,2,3,1,1,15,2,2,2,3,1,1,2]
mean= np.mean(data)
std= np.std(data)
print("mean of the dataset ids", mean)
print("std is", std)
threshold=3
outlier=[]
for i in data:
 z=(i-mean)/std
 if z>threshold:
  outlier.append(i)
  print("outlier in dataset is", outlier)
```

```
mean of the dataset ids 2.6666666666666665
std is 3.3598941782277745
outlier in dataset is [15]
```

Strating labsheets

```
import requests
```

```
pip install --upgrade 'library'
```

```
Collecting library
  Downloading Library-0.0.0.tar.gz (1.4 kB)
  Preparing metadata (setup.py) ... done
Building wheels for collected packages: library
  Building wheel for library (setup.py) ... done
  Created wheel for library: filename=Library-0.0.0-py3-none-any.whl size=2054 sha256=bff50854623545f3632a3b05f8cb48a7f3ae12ce62498365f4
  Stored in directory: /root/.cache/pip/wheels/e0/71/7d/b0e29b944e43374597cd4e3b88c85197001c9bfcd5dce191f4
Successfully built library
Installing collected packages: library
Successfully installed library-0.0.0
```

the romechange website:

```
r=requests.get('https://www.romexchange.com/')
```

```
r
```

```
<Response [406]>
```

```
r.status_code
```

```
406
```

```
url='https://www.romexchange.com/'
headers={'Content-type':'application/json'}
```

```
url
```

```
'https://www.romexchange.com/'
```

```
headers
```

```
{'Content-type': 'application/json'}
```

```
r=requests.get(url,headers=headers)
```

```
url='https://www.romexchange.com/'
headers={'User-Agent':'XY','Content-type':'application/json'}
r=requests.get(url,headers=headers)
```

```
url
```

```
'https://www.romexchange.com/'
```

```
headers
```

```
{'User-Agent': 'XY', 'Content-type': 'application/json'}
```

```
r
```

```
<Response [200]>
```

```
r.status_code
```

```
200
```

```
url='https://www.romexchange.com/api?item=mastela&exact=false'
headers={'User-Agent':'XY','Content-type':'application/json'}

r=requests.get(url,headers=headers)
r.status_code
```

```
500
```

```
r.text
```

```
''
```

+ Code + Text

BASIC PLOTTING IN MATPLOTLIB

```
!pip install matplotlib==3.4
```

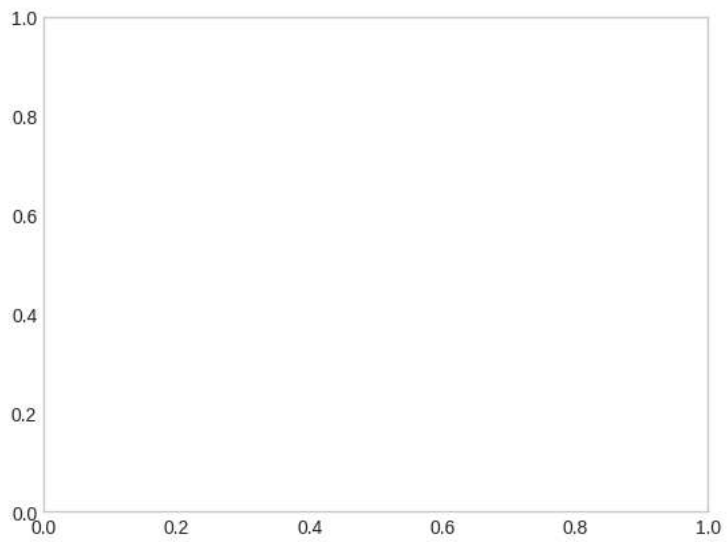
```
Collecting matplotlib==3.4
  Downloading matplotlib-3.4.0.tar.gz (37.1 MB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 37.1/37.1 MB 25.5 MB/s eta 0:00:00
  Preparing metadata (setup.py) ... done
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib==3.4) (0.12.1)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib==3.4) (1.4.5)
Requirement already satisfied: numpy>=1.16 in /usr/local/lib/python3.10/dist-packages (from matplotlib==3.4) (1.23.5)
Requirement already satisfied: pillow>=6.2.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib==3.4) (9.4.0)
Requirement already satisfied: pyparsing>=2.2.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib==3.4) (3.1.1)
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.10/dist-packages (from matplotlib==3.4) (2.8.2)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.7->matplotlib==3.4) (1.16.0)
Building wheels for collected packages: matplotlib
  Building wheel for matplotlib (setup.py) ... done
  Created wheel for matplotlib: filename=matplotlib-3.4.0-cp310-cp310-linux_x86_64.whl size=10425194 sha256=ad0e297b54bf32bbf136b3ec021c
  Stored in directory: /root/.cache/pip/wheels/27/ea/35/0964d59ed4c7270bbeabc79c0984b58d72f9e4463746bf7062
Successfully built matplotlib
Installing collected packages: matplotlib
  Attempting uninstall: matplotlib
    Found existing installation: matplotlib 3.7.1
    Uninstalling matplotlib-3.7.1:
      Successfully uninstalled matplotlib-3.7.1
ERROR: pip's dependency resolver does not currently take into account all the packages that are installed. This behaviour is the source
lida 0.0.10 requires fastapi, which is not installed.
lida 0.0.10 requires kaleido, which is not installed.
lida 0.0.10 requires python-multipart, which is not installed.
lida 0.0.10 requires uvicorn, which is not installed.
mizani 0.9.3 requires matplotlib>=3.5.0, but you have matplotlib 3.4.0 which is incompatible.
plotnine 0.12.4 requires matplotlib>=3.6.0, but you have matplotlib 3.4.0 which is incompatible.
Successfully installed matplotlib-3.4.0
```

```
from matplotlib import pyplot as plt
plt.style.use('seaborn-whitegrid')

import numpy as np
print("step 1")
```

```
step 1
<ipython-input-3-240c5389bdd3>:2: MatplotlibDeprecationWarning: The seaborn styles shipped by Matplotlib are deprecated since 3.6, as th
  plt.style.use('seaborn-whitegrid')
```

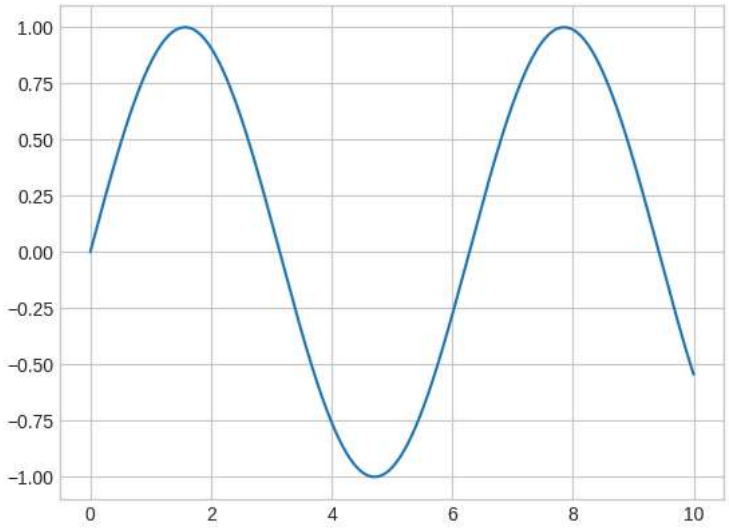
TO CREATE EMPTY PLOT

```
fig=plt.figure()
ax=plt.axes()
ax.grid()
```



PLOT LINESPACE

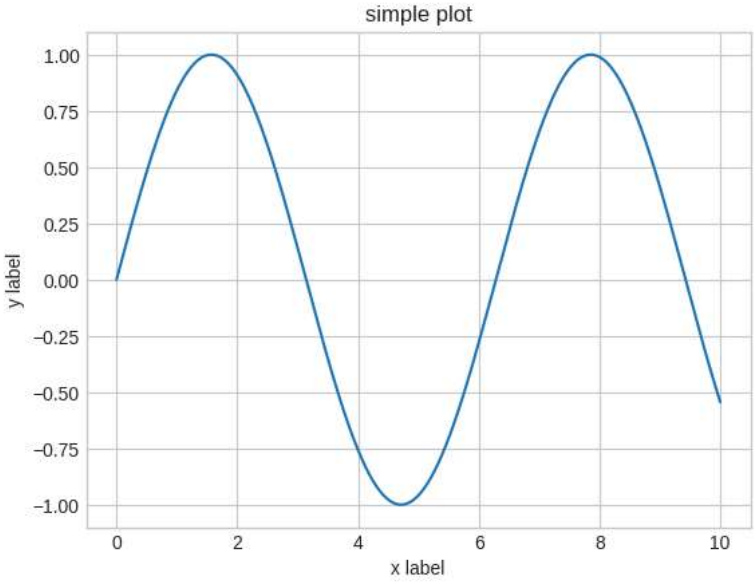
```
fig=plt.figure()
ax=plt.axes()
x=np.linspace(0,10,1000)
ax.plot(x,np.sin(x));
```




ADDING TITLE AND LABELS TO PLOT

```
fig=plt.figure()
ax=plt.axes()
x=np.linspace(0,10,1000)
ax.plot(x,np.sin(x))
ax.set_title('simple plot')
ax.set_xlabel('x label')
ax.set_ylabel('y label')
```

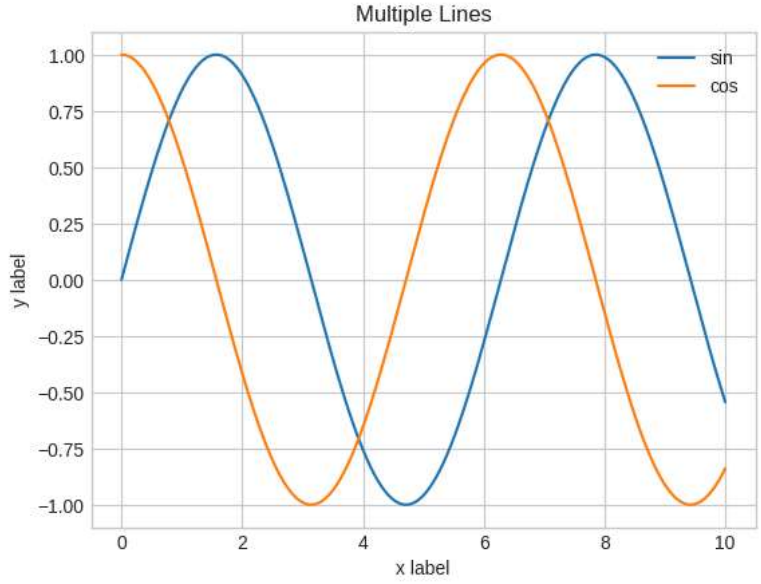
```
Text(0, 0.5, 'y label')
```




ADD A TITLE TO THE PLOT ABOVE

```
fig=plt.figure()
ax=plt.axes()
x=np.linspace(0,10,1000)
ax.plot(x,np.sin(x),label='sin')
ax.plot(x,np.cos(x),label='cos')
ax.set_title('Multiple Lines')
ax.set_xlabel('x label')
ax.set_ylabel('y label')
ax.legend()
```

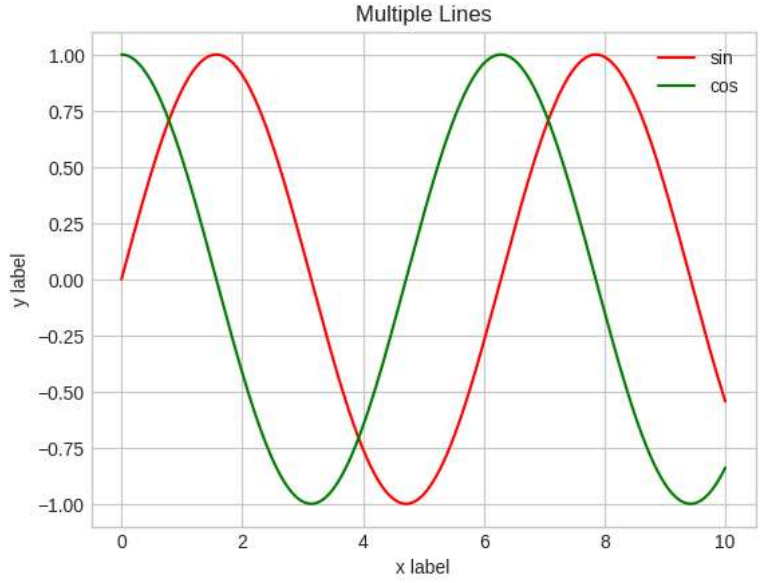
```
<matplotlib.legend.Legend at 0x7be9c6f80df0>
```




SPECIFY COLOR BY NAME

```
fig=plt.figure()
ax=plt.axes()
x=np.linspace(0,10,1000)
ax.plot(x,np.sin(x),label='sin',color='red')
ax.plot(x,np.cos(x),label='cos',color='g')
ax.set_title('Multiple Lines')
ax.set_xlabel('x label')
ax.set_ylabel('y label')
ax.legend()
```

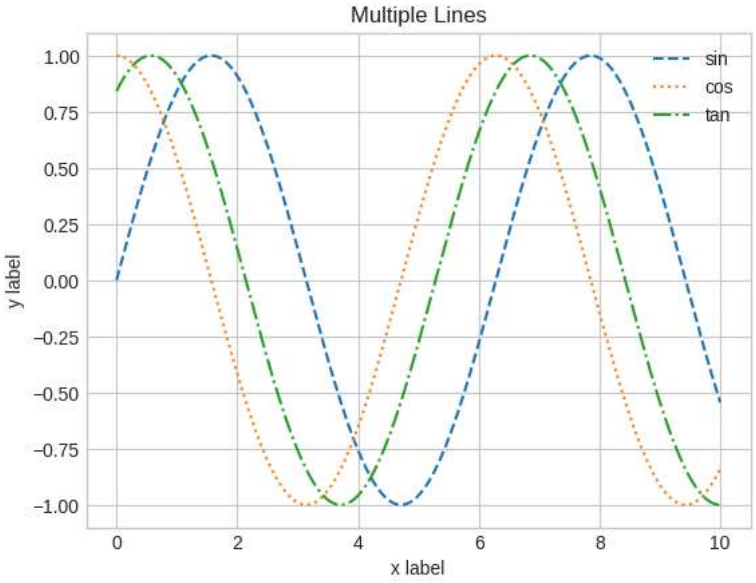
```
<matplotlib.legend.Legend at 0x7be9aa7599c0>
```



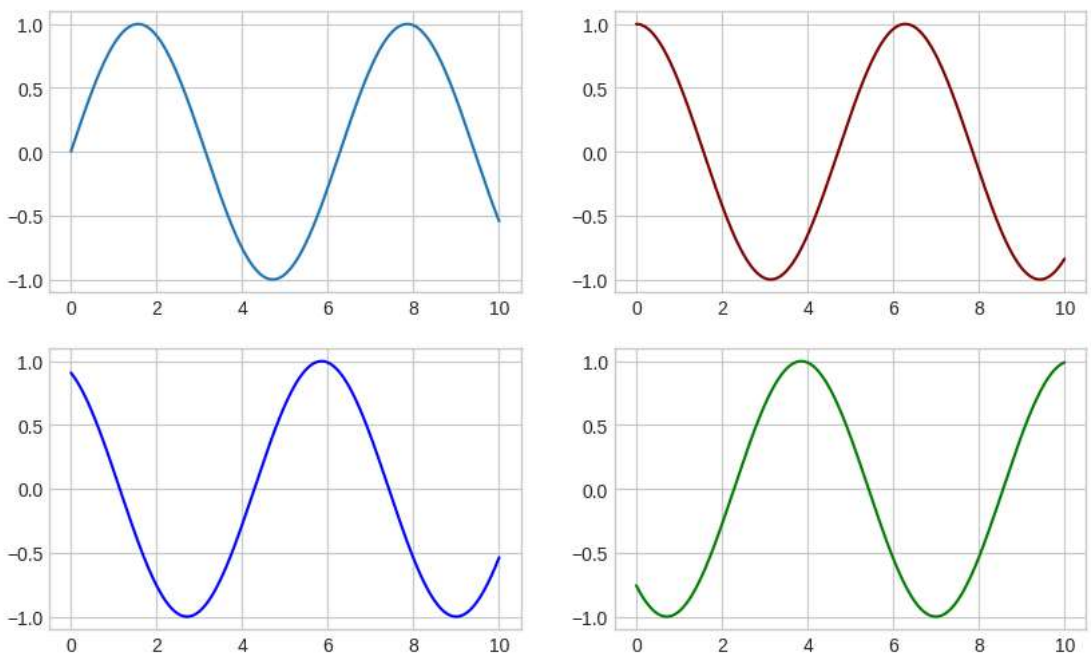

LINESTYLE

```
fig=plt.figure()
ax=plt.axes()
x=np.linspace(0,10,1000)
ax.plot(x,np.sin(x),label='sin',linestyle='dashed')
ax.plot(x,np.cos(x),label='cos',linestyle='dotted')
ax.plot(x,np.sin(x+1),label='tan',linestyle='dashdot')
ax.set_title('Multiple Lines')
ax.set_xlabel('x label')
ax.set_ylabel('y label')
ax.legend()
```

```
<matplotlib.legend.Legend at 0x7be9aa870d90>
```



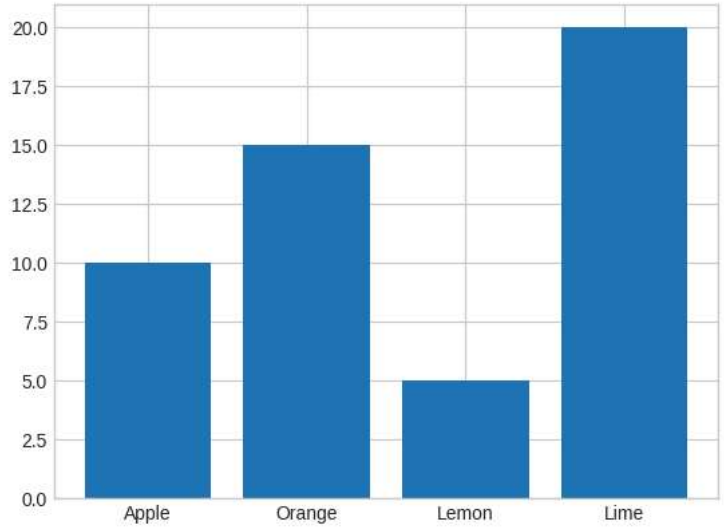

```
#SUBPLOTS
fig,axs=plt.subplots(2,2,figsize=(10,6))
x=np.linspace(0,10,1000)
axs[0,0].plot(x,np.sin(x))
axs[0,1].plot(x,np.cos(x),color='maroon')
axs[1,0].plot(x,np.sin(x+2),color='blue')
axs[1,1].plot(x,np.sin(x+4),color='green');
```



BAR CHART

```
data={'Apple':10,'Orange':15,'Lemon':5,'Lime':20}
names=list(data.keys())
values=list(data.values())
fig=plt.figure()
ax=plt.axes()
ax.bar(names,values)
```

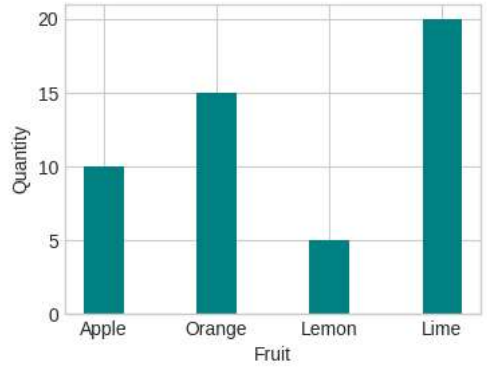
```
<BarContainer object of 4 artists>
```




Detailing bar chart

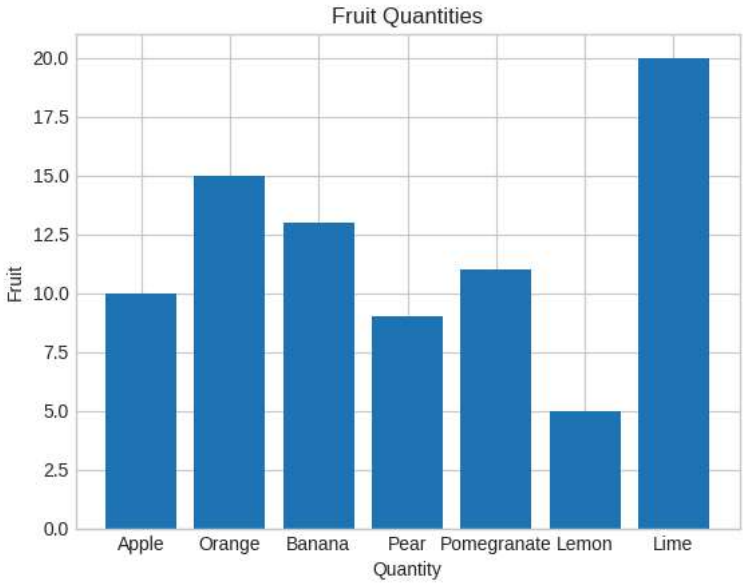
```
data={'Apple':10,'Orange':15,'Lemon':5,'Lime':20}
names=list(data.keys())
values=list(data.values())
fig=plt.figure(figsize=(4,3))
ax=plt.axes()
ax.bar(names,values,color='teal',width=0.35)
ax.set_xlabel('Fruit')
ax.set_ylabel('Quantity')
```

```
Text(0, 0.5, 'Quantity')
```



```
#creating a dictionary
data={'Apple':10,
      'Orange':15,
      'Banana':13,
      'Pear':9,
      'Pomegranate':11,
      'Lemon':5,
      'Lime':20}
names=list(data.keys())
values=list(data.values())
ax=plt.axes()
ax.bar(names,values)
ax.set_xlabel('Quantity')
ax.set_ylabel('Fruit')
ax.set_title('Fruit Quantities')
```

```
Text(0.5, 1.0, 'Fruit Quantities')
```



```
import pandas as pd
```

```
df = pd.read_csv('train.csv')
df
```

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Cabin | Embarked |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 0 | 3 | Braund, Mr. Owen Harris | male | 22.0 | 1 | 0 | A/5 21171 | 7.2500 | NaN | S |
| 1 | 2 | 1 | 1 | Cumings, Mrs. John Bradley (Florence Briggs Th... | female | 38.0 | 1 | 0 | PC 17599 | 71.2833 | C85 | C |
| 2 | 3 | 1 | 3 | Heikkinen, Miss. Laina | female | 26.0 | 0 | 0 | STON/O2. 3101282 | 7.9250 | NaN | S |
| 3 | 4 | 1 | 1 | Futrelle, Mrs. Jacques Heath (Lily May Peel) | female | 35.0 | 1 | 0 | 113803 | 53.1000 | C123 | S |
| 4 | 5 | 0 | 3 | Allen, Mr. William Henry | male | 35.0 | 0 | 0 | 373450 | 8.0500 | NaN | S |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 886 | 887 | 0 | 2 | Montvila, Rev. Juozas | male | 27.0 | 0 | 0 | 211536 | 13.0000 | NaN | S |
| 887 | 888 | 1 | 1 | Graham, Miss. Margaret Edith | female | 19.0 | 0 | 0 | 112053 | 30.0000 | B42 | S |
| 888 | 889 | 0 | 3 | Johnston, Miss. Catherine Helen "Carrie" | female | NaN | 1 | 2 | W./C. 6607 | 23.4500 | NaN | S |
| 889 | 890 | 1 | 1 | Behr, Mr. Karl Howell | male | 26.0 | 0 | 0 | 111369 | 30.0000 | C148 | C |

```
df.dtypes
```

```
PassengerId      int64
Survived         int64
Pclass           int64
Name            object
Sex             object
Age            float64
SibSp            int64
Parch            int64
Ticket          object
Fare           float64
Cabin           object
Embarked        object
dtype: object
```

```
df.describe()
```

| | PassengerId | Survived | Pclass | Age | SibSp | Parch | Fare |
|---|---|---|---|---|---|---|---|
| count | 891.000000 | 891.000000 | 891.000000 | 714.000000 | 891.000000 | 891.000000 | 891.000000 |
| mean | 446.000000 | 0.383838 | 2.308642 | 29.699118 | 0.523008 | 0.381594 | 32.204208 |
| std | 257.353842 | 0.486592 | 0.836071 | 14.526497 | 1.102743 | 0.806057 | 49.693429 |
| min | 1.000000 | 0.000000 | 1.000000 | 0.420000 | 0.000000 | 0.000000 | 0.000000 |
| 25% | 223.500000 | 0.000000 | 2.000000 | 20.125000 | 0.000000 | 0.000000 | 7.910400 |
| 50% | 446.000000 | 0.000000 | 3.000000 | 28.000000 | 0.000000 | 0.000000 | 14.454200 |
| 75% | 668.500000 | 1.000000 | 3.000000 | 38.000000 | 1.000000 | 0.000000 | 31.000000 |
| max | 891.000000 | 1.000000 | 3.000000 | 80.000000 | 8.000000 | 6.000000 | 512.329200 |

```
df.isna().sum()
```

```
PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age            177
SibSp            0
Parch            0
Ticket           0
Fare             0
Cabin          687
```

```
Embarked         2
dtype: int64
```

```
age_mean_value=df['Age'].mean()
df['Age']=df['Age'].fillna(age_mean_value)
```

```
df.drop("Cabin",axis=1,inplace=True)
```

```
df.head()
```

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Embarked |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 0 | 3 | Braund, Mr. Owen Harris | male | 22.0 | 1 | 0 | A/5 21171 | 7.2500 | S |
| 1 | 2 | 1 | 1 | Cumings, Mrs. John Bradley (Florence Briggs Th... | female | 38.0 | 1 | 0 | PC 17599 | 71.2833 | C |
| 2 | 3 | 1 | 3 | Heikkinen, Miss. Laina | female | 26.0 | 0 | 0 | STON/O2. 3101282 | 7.9250 | S |
| 3 | 4 | 1 | 1 | Futrelle, Mrs. Jacques Heath (Lily May Peel) | female | 35.0 | 1 | 0 | 113803 | 53.1000 | S |

```
filtered_age = df[df.Age>40]
filtered_age
```

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Embarked |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 7 | 0 | 1 | McCarthy, Mr. Timothy J | male | 54.0 | 0 | 0 | 17463 | 51.8625 | S |
| 11 | 12 | 1 | 1 | Bonnell, Miss. Elizabeth | female | 58.0 | 0 | 0 | 113783 | 26.5500 | S |
| 15 | 16 | 1 | 2 | Hewlett, Mrs. (Mary D Kingcome) | female | 55.0 | 0 | 0 | 248706 | 16.0000 | S |
| 33 | 34 | 0 | 2 | Wheadon, Mr. Edward H | male | 66.0 | 0 | 0 | C.A. 24579 | 10.5000 | S |
| 35 | 36 | 0 | 1 | Holverson, Mr. Alexander Oskar | male | 42.0 | 1 | 0 | 113789 | 52.0000 | S |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 862 | 863 | 1 | 1 | Swift, Mrs. Frederick Joel (Margaret Welles Ba... | female | 48.0 | 0 | 0 | 17466 | 25.9292 | S |
| 865 | 866 | 1 | 2 | Bystrom, Mrs. (Karolina) | female | 42.0 | 0 | 0 | 236852 | 13.0000 | S |
| 871 | 872 | 1 | 1 | Beckwith, Mrs. Richard Leonard (Sallie Monypeny) | female | 47.0 | 1 | 1 | 11751 | 52.5542 | S |
| 873 | 874 | 0 | 3 | Vander Cruyssen, Mr. Victor | male | 47.0 | 0 | 0 | 345765 | 9.0000 | S |
| 879 | 880 | 1 | 1 | Potter, Mrs. Thomas Jr (Lily Alexenia Wilson) | female | 56.0 | 0 | 1 | 11767 | 83.1583 | C |

150 rows × 11 columns

```
# let's sort the column Name in ascending order
sorted_passengers = df.sort_values('Name',ascending=True,kind ='heapsort')
```

```
sorted_passengers.head(10)
```

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Embarked |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 845 | 846 | 0 | 3 | Abbing, Mr. Anthony | male | 42.0 | 0 | 0 | C.A. 5547 | 7.5500 | S |
| 746 | 747 | 0 | 3 | Abbott, Mr. Rossmore Edward | male | 16.0 | 1 | 1 | C.A. 2673 | 20.2500 | S |
| 279 | 280 | 1 | 3 | Abbott, Mrs. Stanton (Rosa Hunt) | female | 35.0 | 1 | 1 | C.A. 2673 | 20.2500 | S |
| 308 | 309 | 0 | 2 | Abelson, Mr. Samuel | male | 30.0 | 1 | 0 | P/PP 3381 | 24.0000 | C |
| 874 | 875 | 1 | 2 | Abelson, Mrs. Samuel (Hannah Wizosky) | female | 28.0 | 1 | 0 | P/PP 3381 | 24.0000 | C |
| 365 | 366 | 0 | 3 | Adahl, Mr. Mauritz Nils Martin | male | 30.0 | 0 | 0 | C 7076 | 7.2500 | S |
| 401 | 402 | 0 | 3 | Adams, Mr. John | male | 26.0 | 0 | 0 | 341826 | 8.0500 | S |
| 40 | 41 | 0 | 3 | Ahlin, Mrs. Johan (Johanna Persdotter Larsson) | female | 40.0 | 1 | 0 | 7546 | 9.4750 | S |
| 855 | 856 | 1 | 3 | Aks, Mrs. Sam (Leah Rosen) | female | 18.0 | 0 | 1 | 392091 | 9.3500 | S |
| 207 | 208 | 1 | 3 | Albimona, Mr. Nassef Cassem | male | 26.0 | 0 | 0 | 2699 | 18.7875 | C |

```
merged_df = pd.merge(df.head(2),df.tail(2),how='outer',indicator=True)
merged_df
```

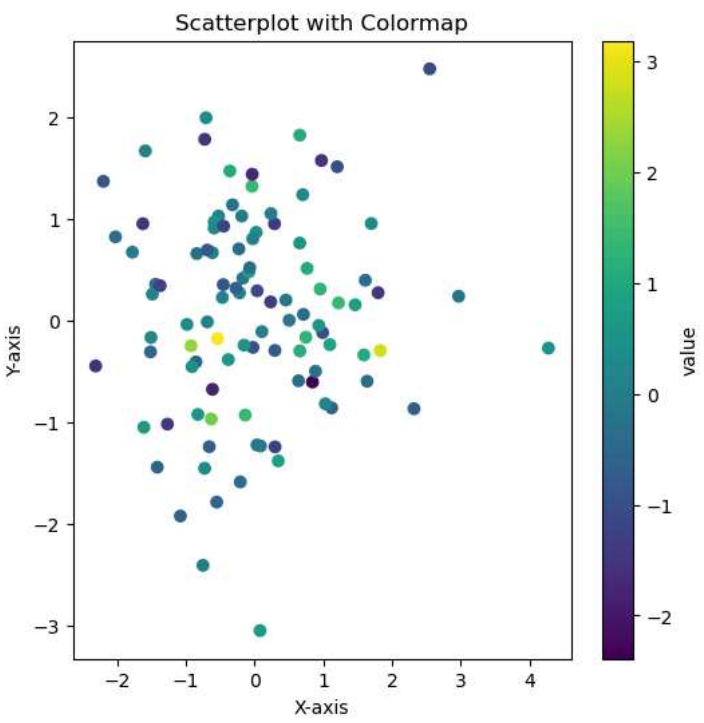
| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Embarked | _merge |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 0 | 3 | Braund, Mr. Owen Harris | male | 22.0 | 1 | 0 | A/5 21171 | 7.2500 | S | left_only |
| 1 | 2 | 1 | 1 | Cumings, Mrs. John Bradley (Florence Briggs Th... | female | 38.0 | 1 | 0 | PC 17599 | 71.2833 | C | left_only |
| 2 | 890 | 1 | 1 | Behr, Mr. Karl Howell | male | 26.0 | 0 | 0 | 111369 | 30.0000 | C | right_only |

```
group_df = df.groupby('Name')
```

```
group_df
```

```
<pandas.core.groupby.generic.DataFrameGroupBy object at 0x111f7ad50>
```

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
# Sample dataframe with multiple colums
data = pd.DataFrame({
    "x": np.random.randn(100),
    "y": np.random.randn(100),
    "value": np.random.randn(100)
})
#Define the colormap and alpha values
cmap = "viridis"
alpha = 1
#Create the Scatterplot
plt.figure(figsize=(6,6))
plt.scatter(data["x"],data["y"], c=data["value"], cmap=cmap, alpha=alpha)
#Customize the plot (optional)
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.title("Scatterplot with Colormap")
plt.colorbar(label="value")
#show the plot
plt.show()
```

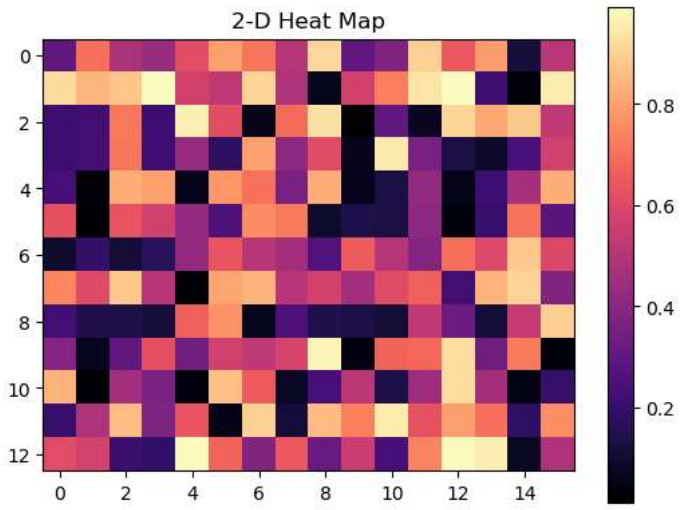



```
import pandas as pd
import numpy as np
print(np.random.randn(100))
```

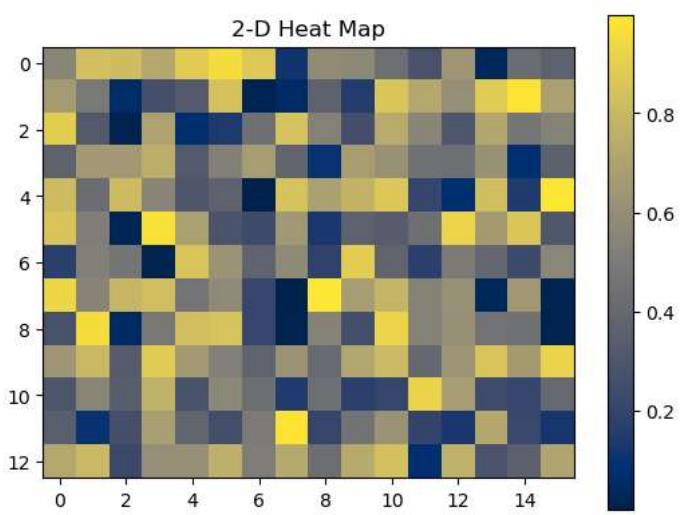
```
[ 0.93603133 -1.63722979 -0.1001744  -0.60149469  0.39932534 -0.45703361
  0.25057015  1.16184784 -0.79708678  2.88347889 -0.14618649  0.337601
 -2.0345703   0.40240422 -0.77514298 -1.04586704 -0.28505791 -0.23513006
 -0.14975113  0.23885146  1.72175188  0.83628108  0.44163425  0.10695965
  0.80570507 -0.24603939  0.28883352 -0.68801307 -1.83107853 -0.5669822
 -0.1057094  -0.0189177   0.26834436  0.18755706 -0.84127166  0.52464179
 -1.14570934 -0.21483583  2.34927447  0.35593397  1.35393218 -1.24366076
  0.91521568 -1.14074783 -1.42731147  1.24097388  0.91417475  0.15797778
 -1.38603285  0.97211733 -0.35319504 -0.13251576  0.16290939  1.00081601
  0.26846481  0.05458016 -0.25696446 -2.3473615   1.22469537  0.41355171
 -0.10080791  1.09875899  0.95038585 -2.41815866 -0.79853071 -0.16964941
 -1.67448663 -0.40002767 -0.42075586  0.35686112  0.44291465  1.19193174
  0.53157364 -0.47701345  0.263171   -0.0443464  -0.07068025  0.2340464
 -0.28149185 -0.19582088 -0.69668824 -1.26743537 -0.16443496  0.47244768
  1.15742809  0.02413712  0.34102243  0.56784084  1.08765417  0.46394361
 -0.20817849 -0.47558734 -0.62140393  0.1354527   1.16532663 -0.88561804
 -0.71428299  1.21782237 -0.34087043  0.44290545]
```

Start coding or generate with AI.

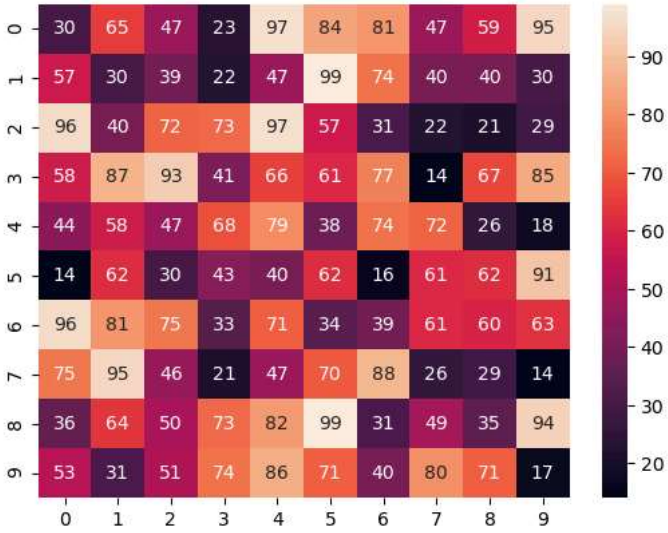
```
import numpy as np
import matplotlib.pyplot as plt
data = np.random.random((13,16))
plt.imshow(data,cmap="magma")
plt.title("2-D Heat Map")
plt.colorbar()
plt.show()
```




```
import numpy as np
import matplotlib.pyplot as plt
data = np.random.random((13,16))
plt.imshow(data,cmap="cividis")
plt.title("2-D Heat Map")
plt.colorbar()
plt.show()
```




```
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt

#generating 2-D 10x10 matrix of random numbers
data = np.random.randint(low=14,
                         high=100,
                         size=(10, 10))
#plotting heatmap
hm = sns.heatmap(data=data,annot=True)
plt.show()
```




Start coding or generate with AI.

Start coding or generate with AI.

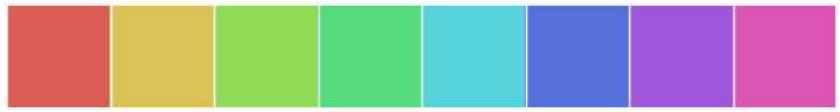
```
Start coding or generate with AI.
```

```
pip install seaborn
```

```
Requirement already satisfied: seaborn in c:\users\reddy\anaconda3\lib\site-packages (0.11.0)
Requirement already satisfied: pandas>=0.23 in c:\users\reddy\anaconda3\lib\site-packages (from seaborn) (1.4.4)
Requirement already satisfied: numpy>=1.15 in c:\users\reddy\anaconda3\lib\site-packages (from seaborn) (1.21.5)
Requirement already satisfied: matplotlib>=2.2 in c:\users\reddy\anaconda3\lib\site-packages (from seaborn) (3.5.2)
Requirement already satisfied: scipy>=1.0 in c:\users\reddy\anaconda3\lib\site-packages (from seaborn) (1.9.1)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn) (2.8.2
Requirement already satisfied: pyparsing>=2.2.1 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn) (3.0.9)
Requirement already satisfied: packaging>=20.0 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn) (21.3)
Requirement already satisfied: pillow>=6.2.0 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn) (9.2.0)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn) (4.25.0)
Requirement already satisfied: cycler>=0.10 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn) (0.11.0)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn) (1.4.2)
Requirement already satisfied: pytz>=2020.1 in c:\users\reddy\anaconda3\lib\site-packages (from pandas>=0.23->seaborn) (2022.1)
Requirement already satisfied: six>=1.5 in c:\users\reddy\anaconda3\lib\site-packages (from python-dateutil>=2.7->matplotlib>=2.2->seabo
Note: you may need to restart the kernel to use updated packages.
```

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline

sns.set(rc={"figure.figsize": (6,6)})


current_palette = sns.color_palette()
sns.palplot(current_palette)
```

```
sns.palplot(sns.color_palette("hls",8))
```



```
sns.palplot(sns.color_palette("husl",8))
```

```
sample_colors = ["windows blue","amber","greyish","faded green","dusty purple","pale red","medium green","denim blue"]
sns.palplot(sns.xkcd_palette(sample_colors))
```

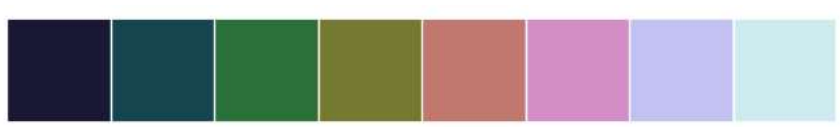
```
%pip install seaborn==0.11.0
```

```
Collecting seaborn==0.11.0Note: you may need to restart the kernel to use updated packages.

  Downloading seaborn-0.11.0-py3-none-any.whl (283 kB)
     ------------------------------------ 283.1/283.1 kB 2.9 MB/s eta 0:00:00
Requirement already satisfied: pandas>=0.23 in c:\users\reddy\anaconda3\lib\site-packages (from seaborn==0.11.0) (1.4.4)
Requirement already satisfied: scipy>=1.0 in c:\users\reddy\anaconda3\lib\site-packages (from seaborn==0.11.0) (1.9.1)
Requirement already satisfied: numpy>=1.15 in c:\users\reddy\anaconda3\lib\site-packages (from seaborn==0.11.0) (1.21.5)
```

```
Requirement already satisfied: matplotlib>=2.2 in c:\users\reddy\anaconda3\lib\site-packages (from seaborn==0.11.0) (3.5.2)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn==0.11.0
Requirement already satisfied: pillow>=6.2.0 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn==0.11.0) (9.2.
Requirement already satisfied: fonttools>=4.22.0 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn==0.11.0) (
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn==0.11.0) (
Requirement already satisfied: cycler>=0.10 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn==0.11.0) (0.11.
Requirement already satisfied: pyparsing>=2.2.1 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn==0.11.0) (3
Requirement already satisfied: packaging>=20.0 in c:\users\reddy\anaconda3\lib\site-packages (from matplotlib>=2.2->seaborn==0.11.0) (21
Requirement already satisfied: pytz>=2020.1 in c:\users\reddy\anaconda3\lib\site-packages (from pandas>=0.23->seaborn==0.11.0) (2022.1)
Requirement already satisfied: six>=1.5 in c:\users\reddy\anaconda3\lib\site-packages (from python-dateutil>=2.7->matplotlib>=2.2->seabo
Installing collected packages: seaborn
  Attempting uninstall: seaborn
    Found existing installation: seaborn 0.11.2
    Uninstalling seaborn-0.11.2:
      Successfully uninstalled seaborn-0.11.2
Successfully installed seaborn-0.11.0
```

```
sample_colors = ["windows blue","amber","greyish","faded green","dusty purple","pale red","medium green","denim blue"]
sns.palplot(sns.xkcd_palette(sample_colors))
```

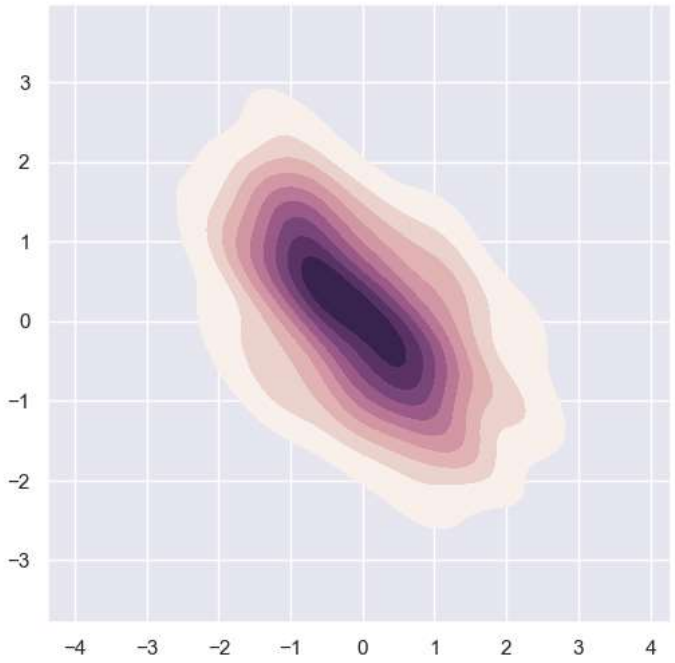
```
# Default matplotlib Cubehelix version:
sns.palplot(sns.color_palette("cubehelix",8))
```



```
# Default Seaborn Cubehelix version:
sns.palplot(sns.cubehelix_palette(8))
```

```
x, y = np.random.multivariate_normal([0, 0], [[1, -.5],[-.5, 1]],size = 300).T

sample_cmap = sns.cubehelix_palette(light=1, as_cmap=True)
sns.kdeplot(x=x, y=y, cmap=sample_cmap, shade=True)
```

```
<AxesSubplot:>
```

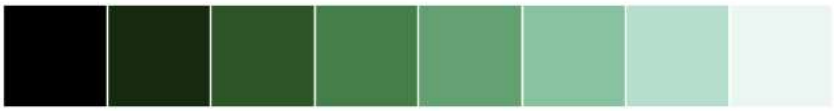



```
sns.choose_cubehelix_palette(as_cmap=True)
```

```
interactive(children=(IntSlider(value=9, description='n_colors', max=16, min=2), FloatSlider(value=0.0, descri…
```

**interactive**


```
sns.palplot(sns.cubehelix_palette(n_colors=8, start=1.7, rot=0.2, dark=0, light=.95, reverse=True))
```



```
# Loading up built-in dataset:
tips = sns.load_dataset("C:/Users/reddy/OneDrive/Desktop/tips.csv")

# Creating Strip plot for day-wise revenue:
sns.stripplot(x="day", y="total_bill", data=tips, color="g")
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
~\AppData\Local\Temp\ipykernel_2320\3471772796.py in <module>
      1 # Loading up built-in dataset:
----> 2 tips = sns.load_dataset("C:/Users/reddy/OneDrive/Desktop/tips.csv")
      3
      4 # Creating Strip plot for day-wise revenue:
      5 sns.stripplot(x="day", y="total_bill", data=tips, color="g")

~\anaconda3\lib\site-packages\seaborn\utils.py in load_dataset(name, cache, data_home, **kws)
    484         if not os.path.exists(cache_path):
    485             if name not in get_dataset_names():
--> 486                 raise ValueError(f"'{name}' is not one of the example datasets.")
    487             urlretrieve(full_path, cache_path)
    488         full_path = cache_path

ValueError: 'C:/Users/reddy/OneDrive/Desktop/tips.csv' is not one of the example datasets.
```

```
# Set Theme:
sns.set_style('whitegrid')

# Creating Strip plot for day-wise revenue:
sns.swarmplot(x="day", y="total_bill", data=tips, palette="viridis")
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
~\AppData\Local\Temp\ipykernel_2320\3511107052.py in <module>
      2
```

-

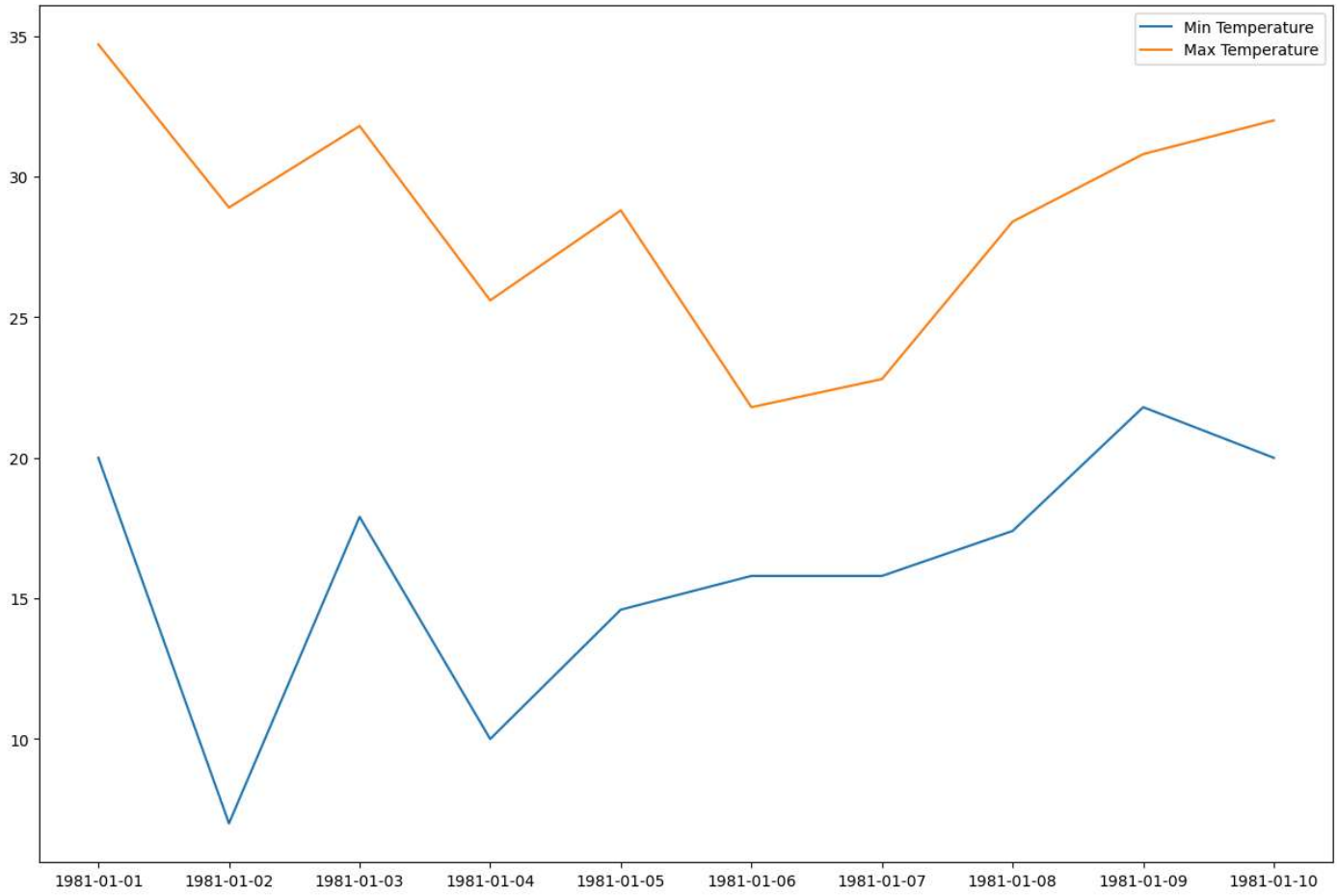
PLOT CATEGORIES IN SEABORN

1.Relational plot : This plot is used to understand the relation between two variables 2.Categorical plot : This plot deals with categorical variables and how they can be visualized 3.Distribution plot : This plot is used for examing 4.Matrix plot 5.Regression plot

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from matplotlib.pyplot import figure

import seaborn as sns
%matplotlib inline
```

```
dates = ['1981-01-01', '1981-01-02', '1981-01-03', '1981-01-04', '1981-01-05', '1981-01-06', '1981-01-07', '1981-01-08', '1981-01-09', '1981-(
min_temperature=[20,7,17.9,10.0,14.6,15.8,15.8,17.4,21.8,20.0]
max_temperature=[34.7,28.9,31.8,25.6,28.8,21.8,22.8,28.4,30.8,32.0]

fig,axes = plt.subplots(nrows = 1, ncols = 1, figsize = (15,10))
axes.plot(dates, min_temperature, label = 'Min Temperature')
axes.plot(dates, max_temperature, label = 'Max Temperature')
axes.legend()
```

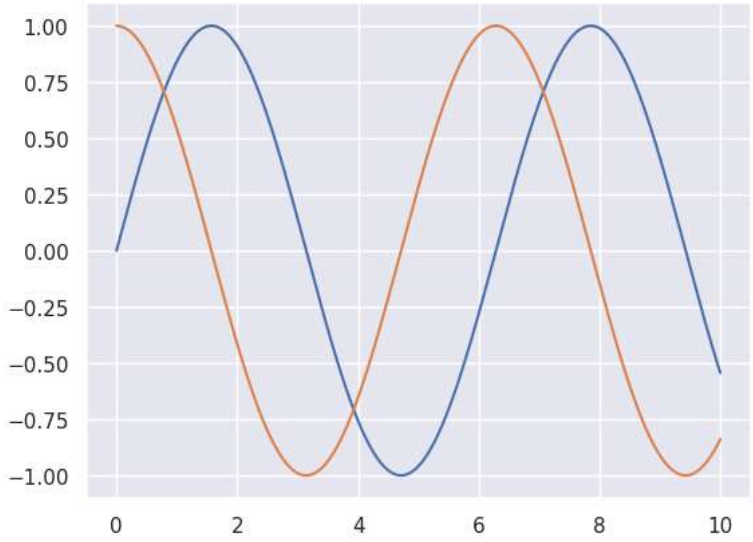
```
<matplotlib.legend.Legend at 0x7fda4ffde560>
```




```
sns.set()
```

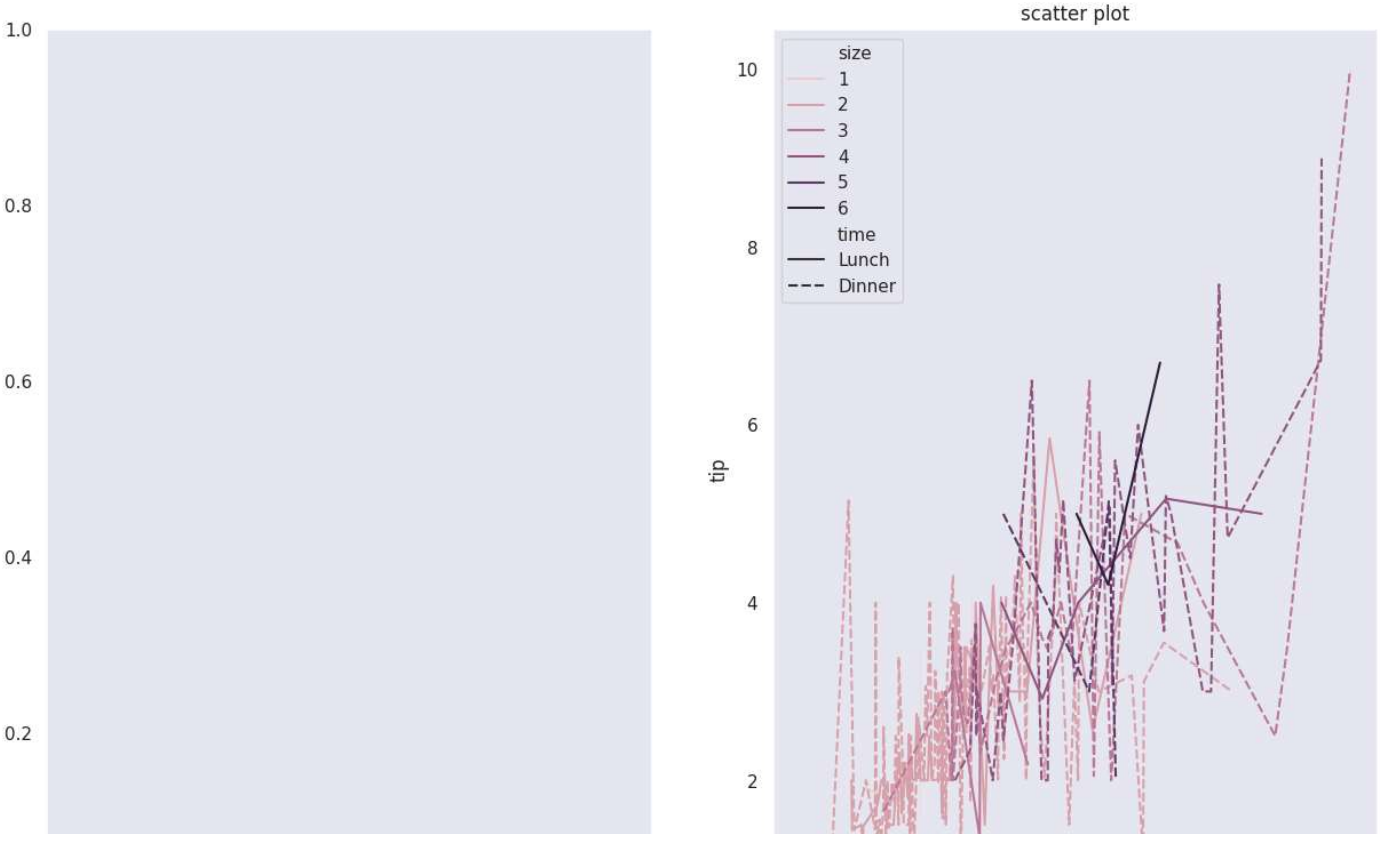
```
x = np.linspace(0,10,1000)
plt.plot(x, np.sin(x), x, np.cos(x))
```

```
[<matplotlib.lines.Line2D at 0x7fda4fd8a2f0>,
 <matplotlib.lines.Line2D at 0x7fda4fd8a350>]
```



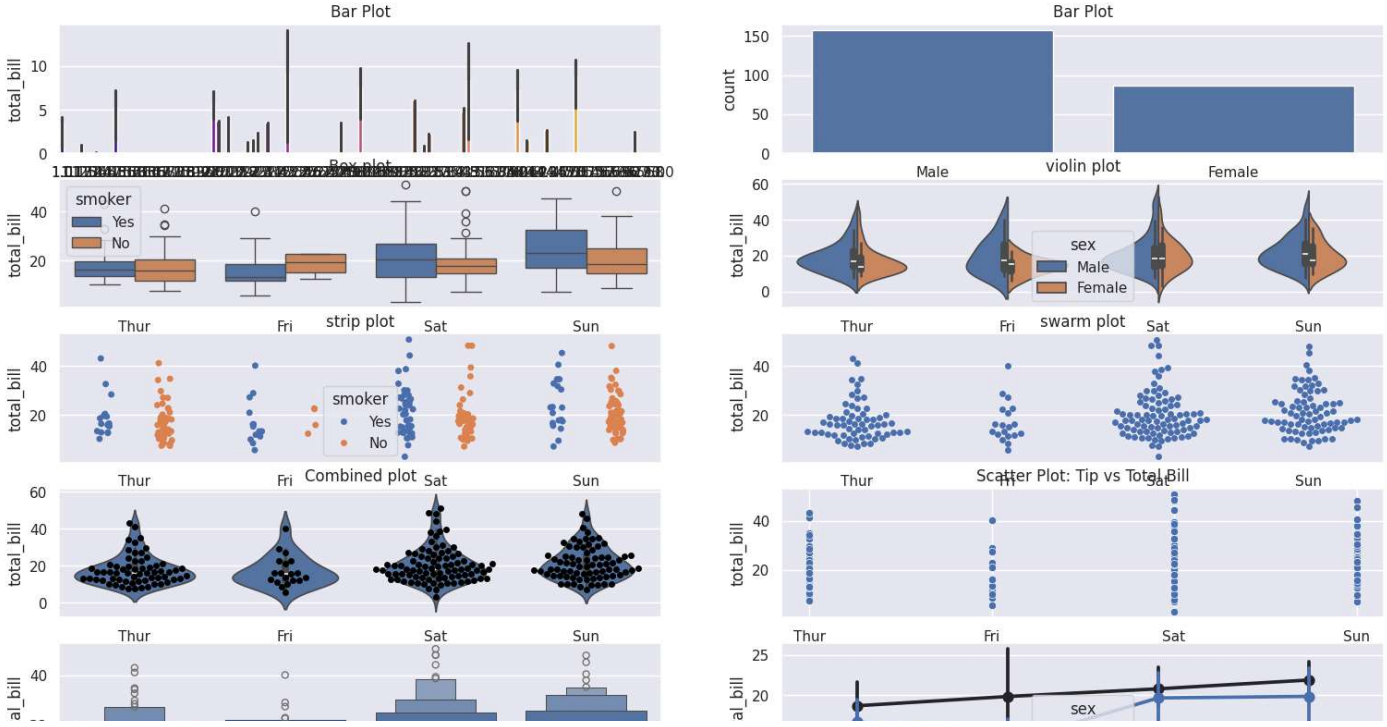

```
sns.set(style='dark')
fig,ax = plt.subplots(nrows = 1, ncols = 2, figsize = (15,10))
df = sns.load_dataset("tips")

print(df.head())

sns.lineplot(x='total_bill', y='tip', hue='size', style='time', data=df, ax=ax[1]).set_title('scatter plot')
```

```
   total_bill   tip     sex smoker  day    time  size
0       16.99  1.01  Female     No  Sun  Dinner     2
1       10.34  1.66    Male     No  Sun  Dinner     3
2       21.01  3.50    Male     No  Sun  Dinner     3
3       23.68  3.31    Male     No  Sun  Dinner     2
4       24.59  3.61  Female     No  Sun  Dinner     4
Text(0.5, 1.0, 'scatter plot')
```



```
sns.set(style='darkgrid')
fig,ax = plt.subplots(nrows = 5, ncols = 2)
fig.set_size_inches(18.5, 10.5)
df = sns.load_dataset("tips")

sns.barplot(x='tip', y='total_bill', data = df, palette = 'plasma', estimator = np.std, ax=ax[0,0]).set_title('Bar Plot')
sns.countplot(x ='sex', data=df, ax=ax[0,1]).set_title('Bar Plot')
sns.boxplot(x = 'day', y = 'total_bill', data = df, hue = 'smoker', ax=ax[1,0]).set_title('Box plot')
sns.violinplot(x = 'day', y = 'total_bill', data = df, hue = 'sex', split = True, ax=ax[1,1]).set_title('violin plot')
sns.stripplot(x = 'day', y = 'total_bill', data = df, hue = 'smoker', jitter = True, dodge = True, ax=ax[2,0]).set_title('strip plot')
sns.swarmplot(x = 'day', y = 'total_bill', data = df, ax=ax[2,1]).set_title('swarm plot')

sns.violinplot(x = 'day', y = 'total_bill', data = df, ax=ax[3,0])
sns.swarmplot(x = 'day', y = 'total_bill', color = 'black', data = df, ax=ax[3,0]).set_title('Combined plot')

sns.scatterplot(x = 'day', y = 'total_bill', data = df, ax=ax[3,1]).set_title("Scatter Plot: Tip vs Total Bill")

sns.boxenplot(x = 'day', y = 'total_bill', data = df, color = 'b', scale='linear', ax=ax[4,0])

sns.pointplot(x = 'day', y = 'total_bill', data = df, hue = 'sex', color = 'b', ax=ax[4,1])
```

```
<ipython-input-15-de4fcc9757c1>:6: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and set `legend

  sns.barplot(x='tip', y='total_bill', data = df, palette = 'plasma', estimator = np.std, ax=ax[0,0]).set_title('Bar Plot')
<ipython-input-15-de4fcc9757c1>:18: FutureWarning:

The `scale` parameter has been renamed to `width_method` and will be removed in v0.15. Pass `width_method='linear' for the same effect.
  sns.boxenplot(x = 'day', y = 'total_bill', data = df, color = 'b', scale='linear', ax=ax[4,0])
<ipython-input-15-de4fcc9757c1>:20: FutureWarning:

Setting a gradient palette using color= is deprecated and will be removed in v0.14.0. Set `palette='dark:b'` for the same effect.

  sns.pointplot(x = 'day', y = 'total_bill', data = df, hue = 'sex', color = 'b', ax=ax[4,1])
<Axes: xlabel='day', ylabel='total_bill'>
```



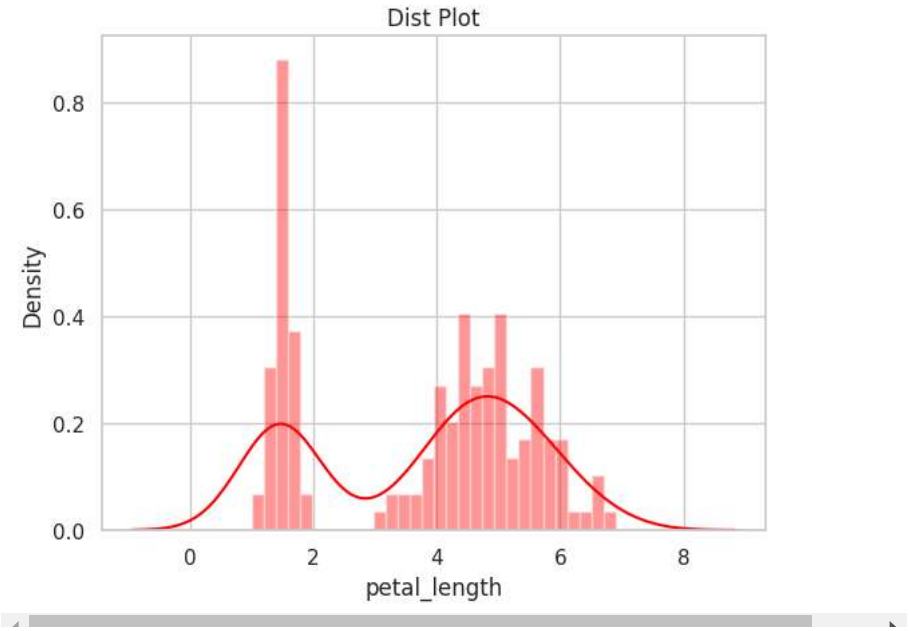

```
#Distribution Plots

joinplot
distplot
pairplot
rugplot
```

```
sns.set_style('whitegrid')

df = sns.load_dataset('iris')
print(df.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
```

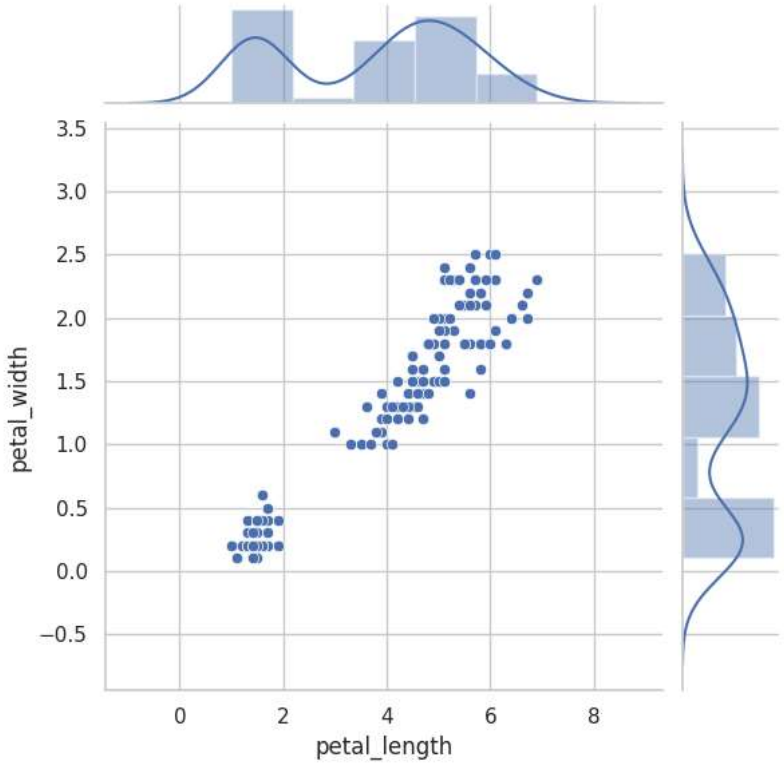
```
sns.distplot(df['petal_length'], kde = True, color = 'red', bins = 30).set_title('Dist Plot')
```

```
<ipython-input-17-6691fe3df3d8>:1: UserWarning:

`distplot` is a deprecated function and will be removed in seaborn v0.14.0.

Please adapt your code to use either `displot` (a figure-level function with
similar flexibility) or `histplot` (an axes-level function for histograms).

For a guide to updating your code to use the new functions, please see
https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751

  sns.distplot(df['petal_length'], kde = True, color = 'red', bins = 30).set_title('Dist
Text(0.5, 1.0, 'Dist Plot')
```




```
jointgrid = sns.JointGrid(x = 'petal_length', y = 'petal_width', data = df)
jointgrid.plot_joint(sns.scatterplot)
jointgrid.plot_marginals(sns.distplot)
```

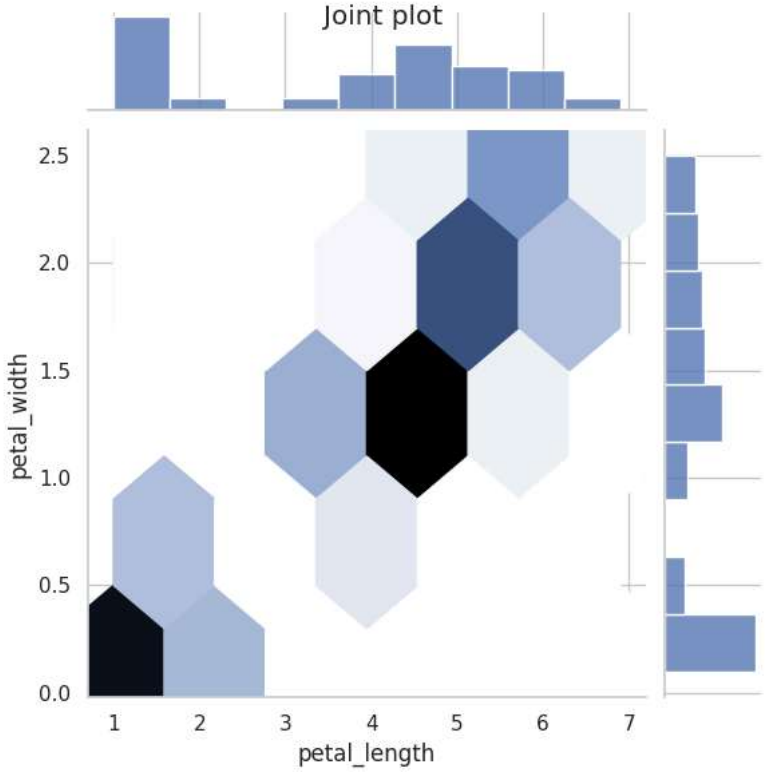
```
/usr/local/lib/python3.10/dist-packages/seaborn/axisgrid.py:1886: UserWarning:

`distplot` is a deprecated function and will be removed in seaborn v0.14.0.

Please adapt your code to use either `displot` (a figure-level function with
similar flexibility) or `histplot` (an axes-level function for histograms).

For a guide to updating your code to use the new functions, please see
https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751

  func(self.x, **orient_kw_x, **kwargs)
/usr/local/lib/python3.10/dist-packages/seaborn/axisgrid.py:1892: UserWarning:

`distplot` is a deprecated function and will be removed in seaborn v0.14.0.

Please adapt your code to use either `displot` (a figure-level function with
similar flexibility) or `histplot` (an axes-level function for histograms).

For a guide to updating your code to use the new functions, please see
https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751

  func(self.y, **orient_kw_y, **kwargs)
<seaborn.axisgrid.JointGrid at 0x7fda3d58bc10>
```




Start coding or generate with AI.

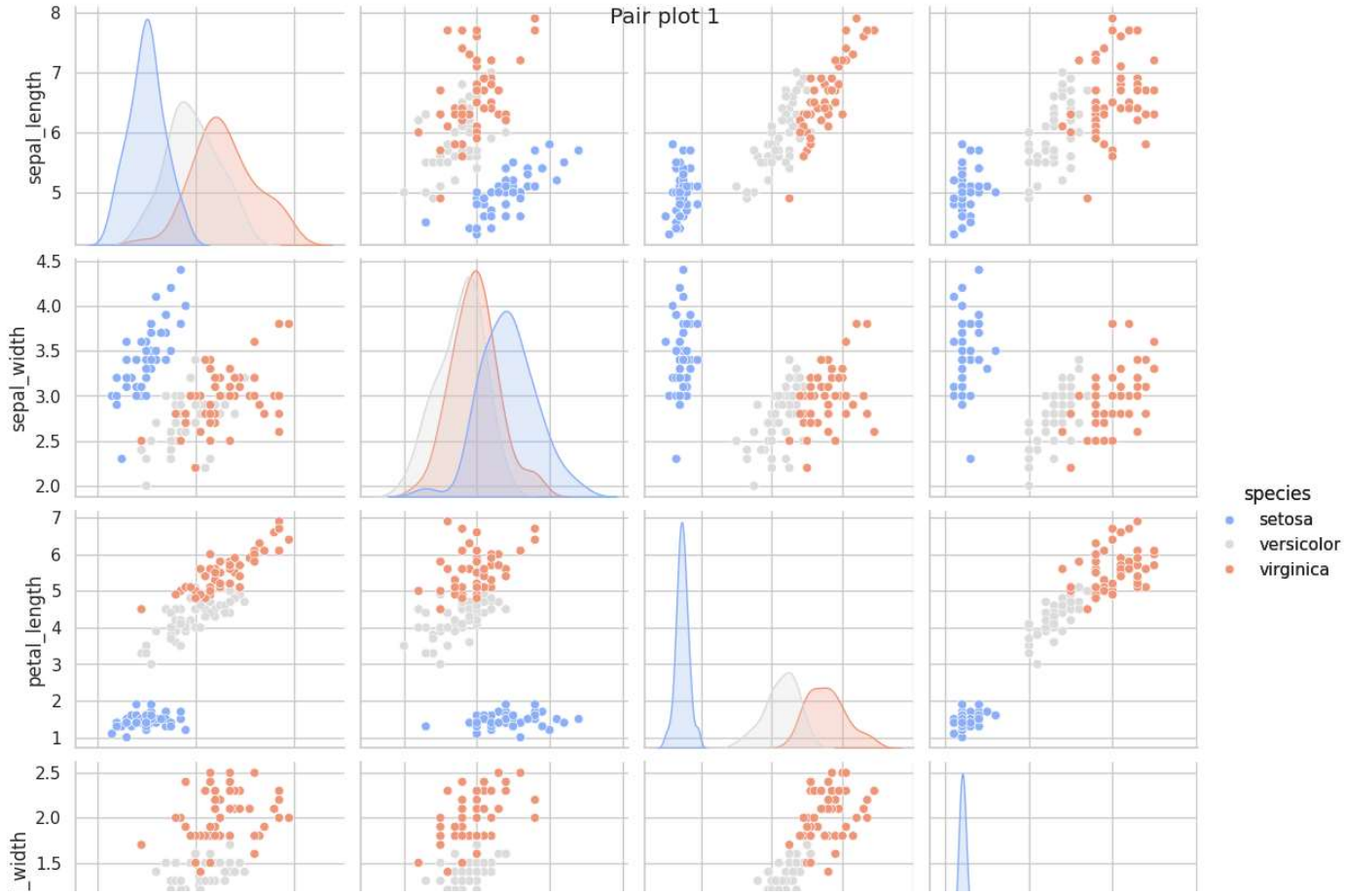
```
g = sns.jointplot(x = 'petal_length', y = 'petal_width', data = df, kind = 'hex')
g.fig.suptitle('Joint plot')
```

```
Text(0.5, 0.98, 'Joint plot')
```



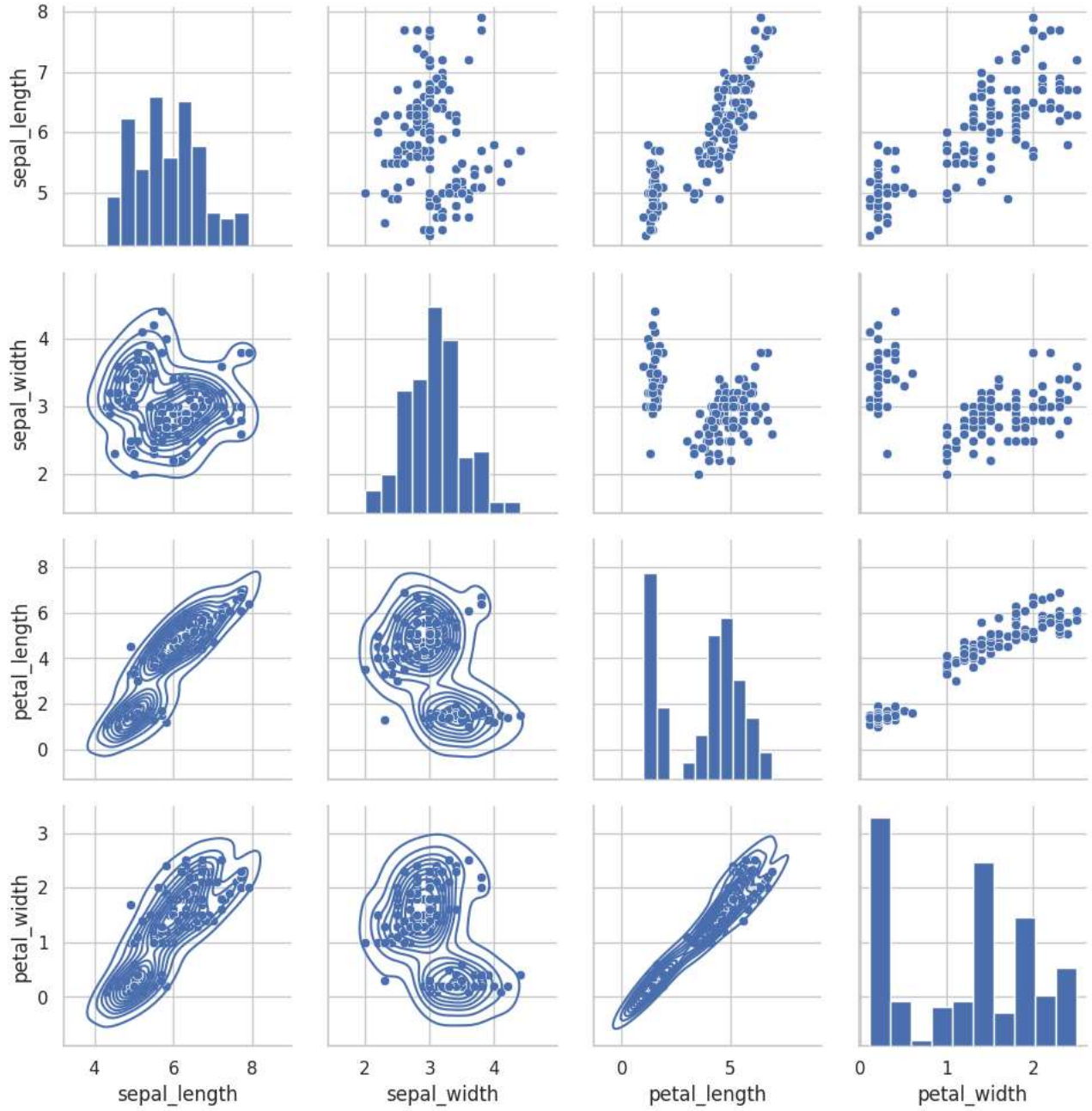

```
g = sns.pairplot(df,hue = "species", palette = "coolwarm")
g.fig.suptitle("Pair plot 1")
g.add_legend()
```

```
<seaborn.axisgrid.PairGrid at 0x7fda3d865900>
```



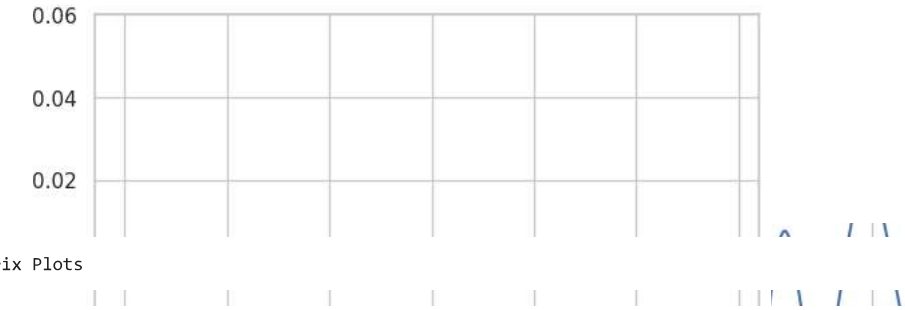
```
pairgrid = sns.PairGrid(data = df)
pairgrid = pairgrid.map_offdiag(sns.scatterplot)
pairgrid = pairgrid.map_diag(plt.hist)
pairgrid = pairgrid.map_lower(sns.kdeplot)
g = sns.PairGrid(df, diag_sharey = False, corner = True)
g.map_lower(sns.scatterplot)
g.map_diag(sns.kdeplot)
```

```
<seaborn.axisgrid.PairGrid at 0x7fda3bc50be0>
```



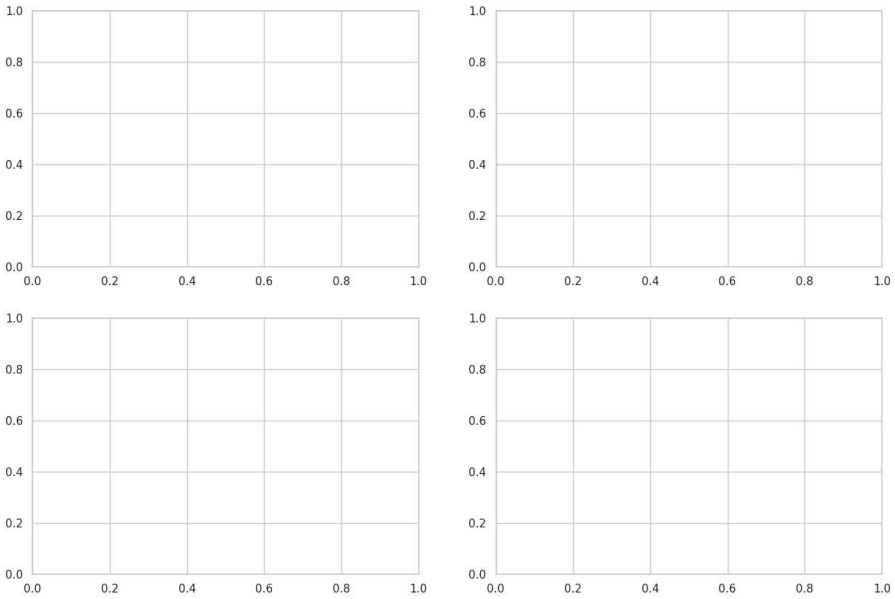

```
sns.rugplot(df['petal_length'])
```

```
<Axes: xlabel='petal_length'>
```




```
#Matrix Plots

fig, ax = plt.subplots(nrows=2, ncols=2, figsize=(15,10))

df1 = sns.load_dataset('flights')
df2 = sns.load_dataset('iris')

df11 = pd.pivot_table(values = 'passengers', index = 'month', columns = 'year', data = df1)

dfc1 = df1.corr()
dfc2 = df2.corr()
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
<ipython-input-41-c4253d8ab63d> in <cell line: 8>()
      6 df11 = pd.pivot_table(values = 'passengers', index = 'month', columns = 'year',
data = df1)
      7
----> 8 dfc1 = df1.corr()
      9 dfc2 = df2.corr()

                                  6 frames
/usr/local/lib/python3.10/dist-packages/pandas/core/arrays/categorical.py in
__array__(self, dtype)
   1342         ret = take_nd(self.categories._values, self._codes)
   1343         if dtype and not is_dtype_equal(dtype, self.categories.dtype):
-> 1344             return np.asarray(ret, dtype)
   1345         # When we're a Categorical[ExtensionArray], like Interval,
   1346         # we need to ensure __array__ gets all the way to an

ValueError: could not convert string to float: 'Jan'
```



```
sns.heatmap(df11, cmap = "YlGnBu", linecolor = "r", linewidths = 0.5, annot = True, fmt = "d", square = True, ax = ax[0,0]).set_title("heat
sns.heatmap(dfc2, cmap = "coolwarm", linecolor = "black", linewidths = 1, annot = True, ax = ax[0,0]).set_title("heat map iris")
```

```
import pandas as pd
import matplotlib.pyplot as plt
from wordcloud import WordCloud
from wordcloud import STOPWORDS


df = pd.read_csv('/content/netflix_titles.csv',usecols = ['cast'])
df.head()
```

| | cast |
|---|---|
| 0 | NaN |
| 1 | Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban... |
| 2 | Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi... |
| 3 | NaN |
| 4 | Mayur More, Jitendra Kumar, Ranjan Raj, Alam K... |

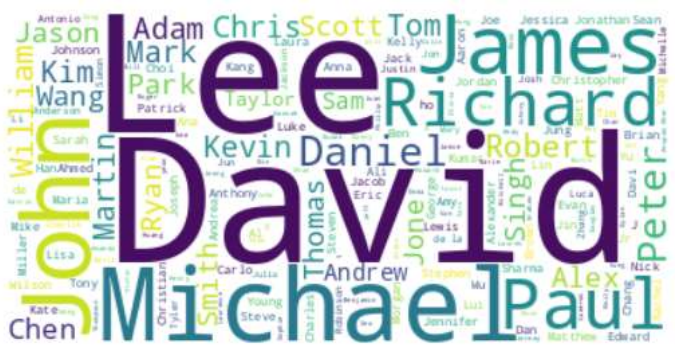
```
ndf = df.dropna()
ndf.head()
```

| | cast |
|---|---|
| 1 | Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban... |
| 2 | Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi... |
| 4 | Mayur More, Jitendra Kumar, Ranjan Raj, Alam K... |
| 5 | Kate Siegel, Zach Gilford, Hamish Linklater, H... |
| 6 | Vanessa Hudgens, Kimiko Glenn, James Marsden, ... |

```
text = " ".join(item for item in ndf['cast'])
print(text)
```

```
Ama Qamata, Khosi Ngema, Gail Mabalane, Thabang Molaba, Dillon Windvogel, Natasha Thahane, Arno Greeff, Xolile Tshabalala, Getmore Sitho
```

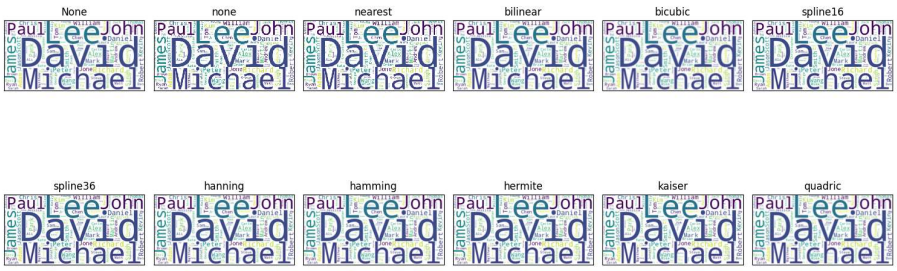
```
stopwords = set(STOPWORDS)


wordcloud = WordCloud(background_color = "white").generate(text)
plt.imshow(wordcloud, interpolation = "bilinear")
plt.axis("off")
plt.margins(x = 0, y = 0)
plt.show()
```




```
wordcloud=WordCloud(background_color='white',max_words=100,max_font_size=300,width=800,height=500,colormap='magma').generate(text)
plt.figure(figsize=(20,20))
plt.imshow(wordcloud,interpolation='bilinear')
plt.axis('off')
plt.margins(x=0,y=0)
```


```
wordcloud=WordCloud(background_color='white',max_words=100,max_font_size=300,width=800,height=500,colormap='magma').generate(text)
plt.figure(figsize=(20,20))
plt.imshow(wordcloud,interpolation='nearest',alpha=0.5)
plt.axis('off')
plt.margins(x=0,y=0)
```


```
methods = [None, 'none', 'nearest', 'bilinear', 'bicubic', 'spline16','spline36', 'hanning', 'hamming', 'hermite', 'kaiser', 'quadric','catr
fig, axs = plt.subplots(nrows=3, ncols=6, figsize=(15, 10),subplot_kw={'xticks': [], 'yticks': []})
wordcloud=WordCloud(stopwords=stopwords,background_color='white').generate(text)
for ax, interp_method in zip(axs.flat, methods):
    ax.imshow(wordcloud, interpolation=interp_method, cmap='viridis')
    ax.set_title(str(interp_method))

plt.tight_layout()
plt.show()
```




```
methods = [None, 'none', 'nearest', 'bilinear', 'bicubic', 'spline16','spline36', 'hanning', 'hamming', 'hermite', 'kaiser', 'quadric','catr
fig, axs = plt.subplots(nrows=3, ncols=6, figsize=(15, 10),subplot_kw={'xticks': [], 'yticks': []})
cmap=['viridis','plasma','inferno','magma','cividis']
i=0
wordcloud=WordCloud(stopwords=stopwords,background_color='white').generate(text)
for ax, interp_method in zip(axs.flat, methods):
    ax.imshow(wordcloud, interpolation=interp_method, cmap=cmap[i])
    ax.set_title(str(interp_method))
    if(i==4):
      i=0
    else:
      i=i+1

plt.tight_layout()
plt.show()
```

A time series is the series of data points listed in time order.

A time series is a sequence of successive equal interval points in time.

A time-series analysis consists of methods for analyzing time series data in order to extract meaningful insights and other useful characteristics of data.

For performing time series analysis download stock_data.csv

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


# reading the dataset using read_csv
df = pd.read_csv("stock_data.csv",
                 parse_dates=True,
                 index_col="Date")

# displaying the first five rows of dataset
df.head()
```

| Date | Open | High | Low | Close | Volume | Name |
|---|---|---|---|---|---|---|
| **2006-01-03** | 39.69 | 41.22 | 38.79 | 40.91 | 24232729 | AABA |
| **2006-01-04** | 41.22 | 41.90 | 40.77 | 40.97 | 20553479 | AABA |
| **2006-01-05** | 40.93 | 41.73 | 40.85 | 41.53 | 12829610 | AABA |
| **2006-01-06** | 42.88 | 43.57 | 42.80 | 43.21 | 29422828 | AABA |
| **2006-01-09** | 43.10 | 43.66 | 42.82 | 43.42 | 16268338 | AABA |

We have used the 'parse_dates' parameter in the read_csv function to convert the 'Date' column to the DatetimeIndex format.

By default, Dates are stored in string format which is not the right format for time series data analysis.

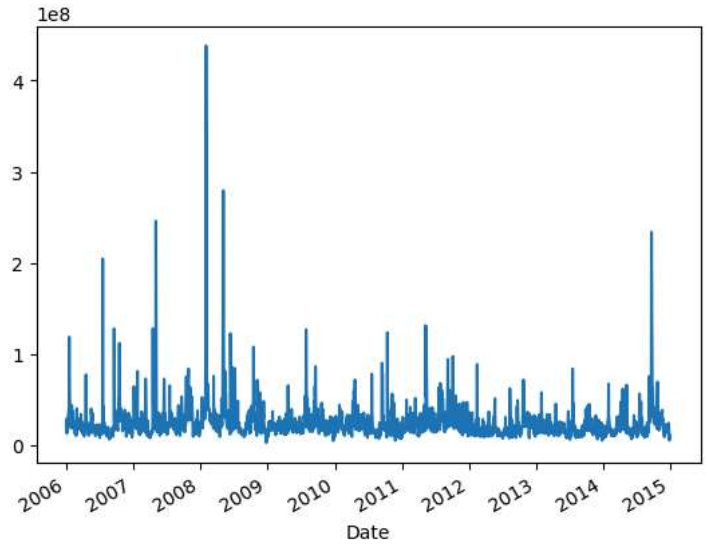
Now, removing the unwanted columns from dataframe i.e. 'Unnamed: 0'.

```
# deleting column
df = df.drop(columns='Name')
```

Example 1: Plotting a simple line plot for time series data.

```
df['Volume'].plot()
```

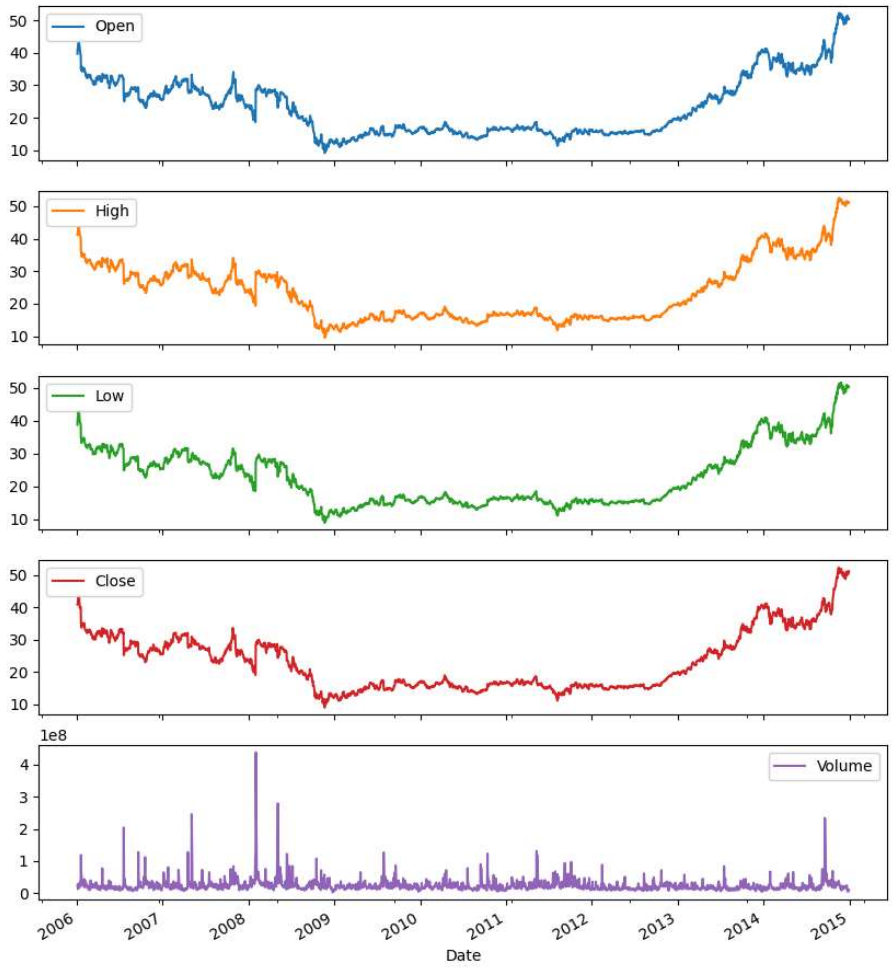
```
<Axes: xlabel='Date'>
```



Example 2: Now let's plot all other columns using subplot.

```
df.plot(subplots=True, figsize=(10, 12))
```

```
array([<Axes: xlabel='Date'>, <Axes: xlabel='Date'>,
       <Axes: xlabel='Date'>, <Axes: xlabel='Date'>,
       <Axes: xlabel='Date'>], dtype=object)
```




```
print(df['Volume'].dtype)
```

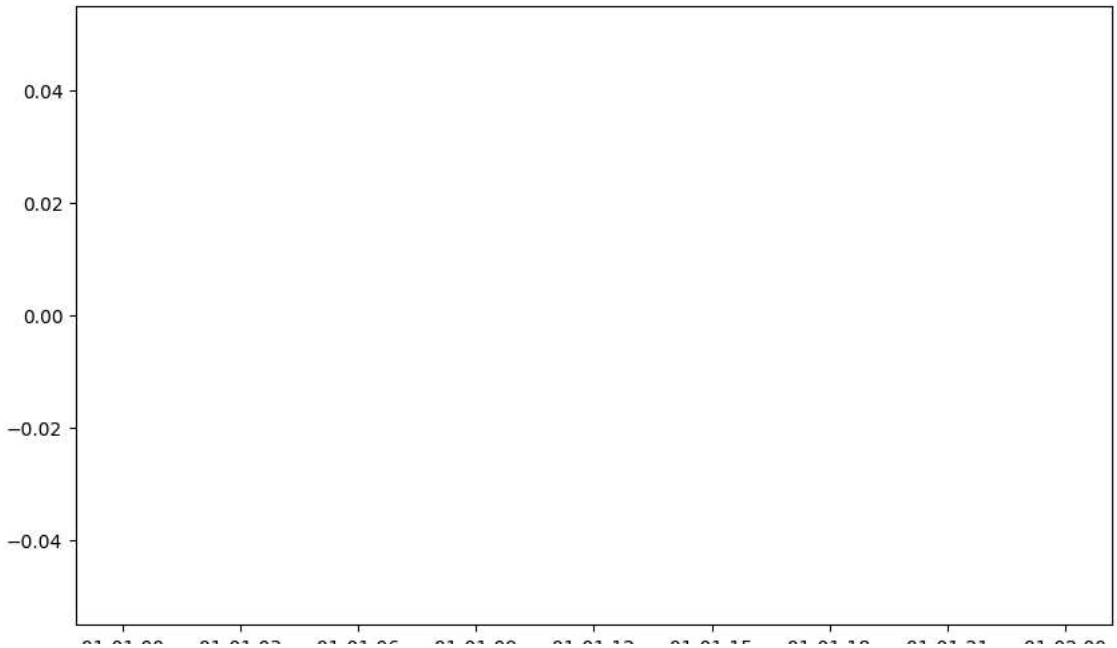
```
int64
```

Resampling: Resampling is a methodology of economically using a data sample to improve the accuracy and quantify the uncertainty of a population parameter. Resampling for months or weeks and making bar plots is another very simple and widely used method of finding seasonality. Here we are going to make a bar plot of month data for 2016 and 2017.

Example 3:

```
# Resampling the time series data based on monthly 'M' frequency
df_month = df.resample("M").mean()

# using subplot
fig, ax = plt.subplots(figsize=(10, 6))

# plotting bar graph
ax.bar(df_month['2016':'2008'].index,
       df_month.loc['2016':'2008', "Volume"],
       width=25, align='center')
```

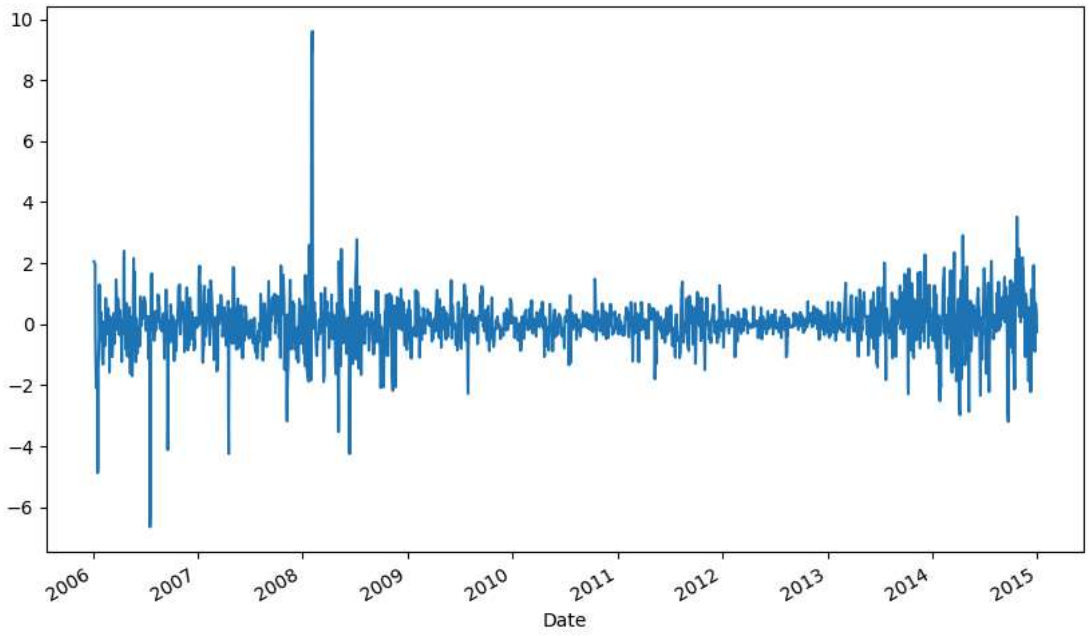
```
<BarContainer object of 0 artists>
```




Differencing: Differencing is used to make the difference in values of a specified interval. By default, it's one, we can specify different values for plots. It is the most popular method to remove trends in the data.

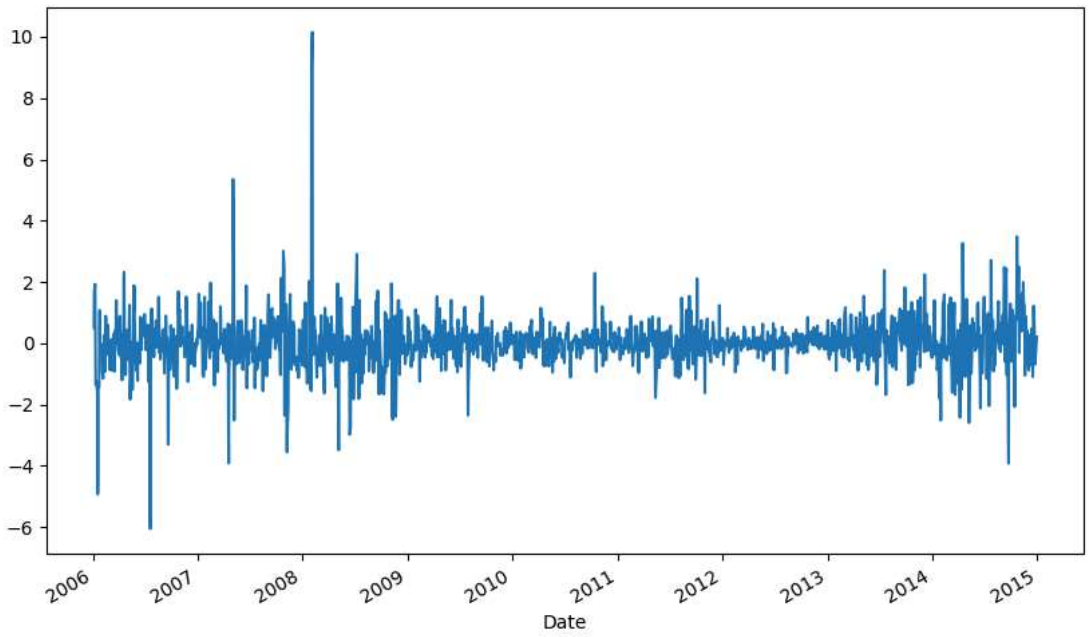
```
df.Low.diff(2).plot(figsize=(10, 6))
```

```
<Axes: xlabel='Date'>
```




```
df.High.diff(2).plot(figsize=(10, 6))
```

```
<Axes: xlabel='Date'>
```



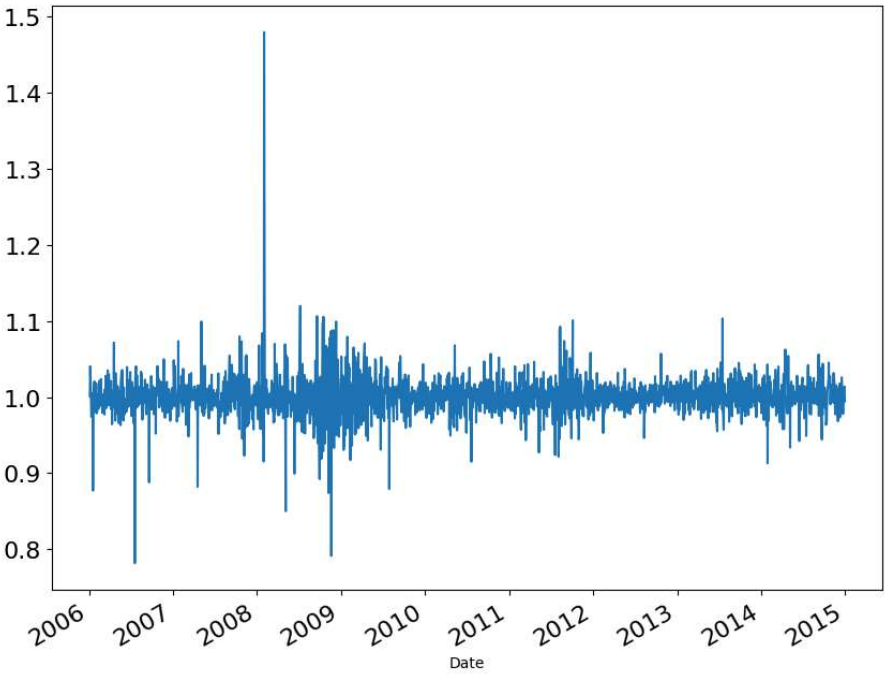

**Plotting the Changes in Data**

We can also plot the changes that occurred in data over time. There are a few ways to plot changes in data.

Shift: The shift function can be used to shift the data before or after the specified time interval. We can specify the time, and it will shift the data by one day by default. That means we will get the previous day's data. It is helpful to see previous day data and today's data simultaneously side by side.

```
df['Change'] = df.Close.div(df.Close.shift())
df['Change'].plot(figsize=(10, 8), fontsize=16)
```

```
<Axes: xlabel='Date'>
```



.div() function helps to fill up the missing data values.

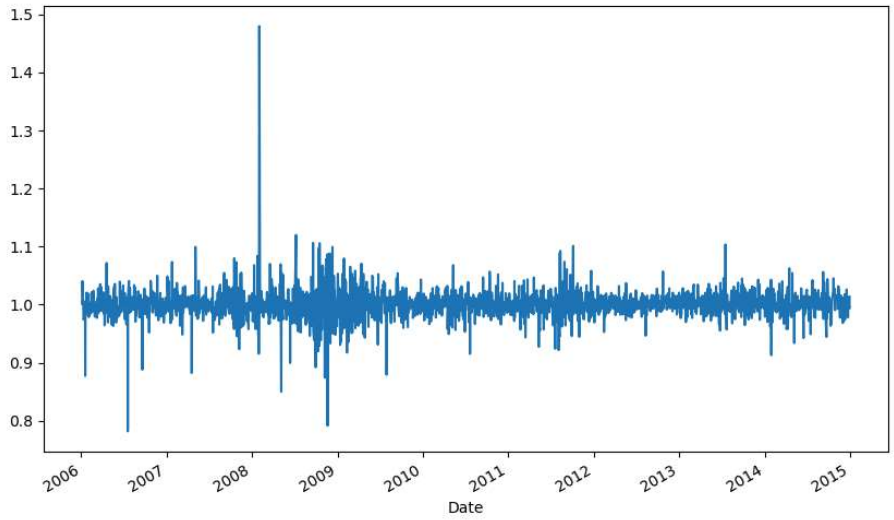
Actually, div() means division.

If we take df. div(6) it will divide each element in df by 6.

We do this to avoid the null or missing values that are created by the 'shift()' operation.

```
df['Change'].plot(figsize=(10, 6))
```

```
<Axes: xlabel='Date'>
```




```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
DatetimeIndex: 2263 entries, 2006-01-03 to 2014-12-30
Data columns (total 7 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   Open    2263 non-null   float64
 1   High    2263 non-null   float64
 2   Low     2263 non-null   float64
 3   Close   2263 non-null   float64
 4   Volume  2263 non-null   int64  
 5   Name    2263 non-null   object 
 6   Change  2262 non-null   float64
dtypes: float64(5), int64(1), object(1)
memory usage: 141.4+ KB
```

Double-click (or enter) to edit