infosys-1

October 30, 2025

NUMPY MATRIX

[ ]:
```
#SINGLE DIMENSIONAL ARRAY
n1=np.array([10,20,30,40,50])
n1
```

[ ]:
```
array([10, 20, 30, 40, 50])
```

[ ]:
```
#MULTIDIMENSIONAL ARRAY
import numpy as np
n2=np.array([[10,20,30],[40,50,60]])
n2
```

[ ]:
```
array([[10, 20, 30],
       [40, 50, 60]])
```

INITIALIZING NUMPY ARRAY WITH ZEROS

[ ]:
```
n1=np.zeros((1,2))
n1
```

[ ]:
```
array([[0., 0.]])
```

[ ]:
```
n1=np.zeros((5,5))
n1
```

[ ]:
```
array([[0., 0., 0., 0., 0.],
       [0., 0., 0., 0., 0.],
       [0., 0., 0., 0., 0.],
       [0., 0., 0., 0., 0.],
       [0., 0., 0., 0., 0.]])
```

INITIALIZING NUMPY ARRAY WITH SAME NUMBERS

[ ]:
```
n1=np.full((2,2),10)
n1
```

[ ]:
```
array([[10, 10],
       [10, 10]])
```

INITIALIZING NUMPY ARRAY

[ ]:
```
n1=np.arange(10,20)
n1
```

[ ]:
```
array([10, 11, 12, 13, 14, 15, 16, 17, 18, 19])
```

[ ]:
```
import numpy as np
n1=np.arange(10,50,5)
n1
```

[ ]:
```
array([10, 15, 20, 25, 30, 35, 40, 45])
```

[ ]:
```
n1=np.random.randint(1,100,5)
n1
```

[ ]:
```
array([69, 68, 94, 66, 72])
```

[ ]:
```
n1=np.array([[1,2,3],[4,5,6]])
n1.shape
```

[ ]:
```
(2, 3)
```

NUMPY SHAPE

[ ]:
```
#SHAPE
n1.shape=(3,2)
n1.shape
```

[ ]:
```
(3, 2)
```

JOINING NUMPY ARRAY

[ ]:
```
#VSTACK()
n1=np.array([10,20,30])
n2=np.array([40,50,60])
np.vstack((n1,n2))
```

[ ]:
```
array([[10, 20, 30],
       [40, 50, 60]])
```

[ ]:
```
#HSTACK()
n1= np.array([10, 20, 30])
n2=np.array([40,50,60])
np.hstack((n1,n2))
```

[ ]:
```
array([10, 20, 30, 40, 50, 60])
```

[ ]:
```
#COLUMN_STACK()
n1=np.array([10,20, 30])
n2=np.array([40,50,60])
np.column_stack((n1,n2))
```

[ ]:
```
array([[10, 40],
       [20, 50],
       [30, 60]])
```

[ ]:
```
#TRANSPOSE()
import numpy as np
n1.transpose()
```

[ ]:
```
array([10, 20, 30])
```

[ ]:
```
import numpy as np
n1 = np.array([10, 20, 30])
n1
```

[ ]:
```
array([10, 20, 30])
```

[ ]:
```
n1=np.array([[1,2,3],[4,5,6],[7,8,9]])
n1
```

[ ]:
```
array([[1, 2, 3],
       [4, 5, 6],
       [7, 8, 9]])
```

[ ]:
```
import numpy as np
n2 = np.array([[1, 2], [3, 4], [5, 6]])
n1.dot(n2)
```

[ ]:
```
array([[ 22,  28],
       [ 49,  64],
       [ 76, 100]])
```

[ ]:
```
n2=np.array([[7,8,9],[6,5,4],[5,4,3]])
n2
```

[ ]:
```
array([[7, 8, 9],
       [6, 5, 4],
       [5, 4, 3]])
```

[ ]:
```
n1= np.array([[1, 2], [3, 4], [5, 6]])
n2.dot(n1.T)
```

[ ]:
```
array([[ 5, 11, 17],
       [11, 25, 39],
       [17, 39, 61]])
```

PANDAS SERIES OBJECT

[ ]:
```
#SERIES OBJECT IS ONE-DIMENSIONAL LABELED ARRAY
import pandas as pd
s1=pd.Series([9,7,6,4,5])
s1
```

[ ]:
```
0    9
1    7
2    6
3    4
4    5
dtype: int64
```

[ ]:
```
import pandas as pd
s1=pd.Series([1,2,3],index=['x','y','z'])
s1
```

[ ]:
```
x    1
y    2
z    3
dtype: int64
```

[ ]:
```
import pandas as pd
pd.Series({'a':10,'b':20,'c':30})
```

[ ]:
```
a    10
b    20
c    30
dtype: int64
```

[ ]:
```
import pandas as pd
pd.Series({'a':10,'b':20,'c':30},index=['b','a','g'])
```

[ ]:
```
b    20.0
a    10.0
g     NaN
dtype: float64
```

[ ]:
```
#EXTRACTING A SINGLE ELEMENT
s1=pd.Series([1,2,3,4,5,6,7,8,9,10])
s1[5]
```

[ ]:
```
np.int64(6)
```

[ ]:
```
#EXTRACTING ELEMENTS FROM BACK
s1=pd.Series([1,2,3,4,5,6,7,8,9,10])
s1[-3:]
```

[ ]:
```
7     8
8     9
9    10
dtype: int64
```

[ ]:
```
#EXTRACTING A SEQUENCE OF ELEMENTS
s1=pd.Series([1,2,3,4,5,6,7,8,9,10])
s1[:5]
```

[ ]:
```
0    1
1    2
2    3
3    4
4    5
dtype: int64
```

[ ]:
```
#SUM
import numpy as np
n1=np.array([10,20])
n2=np.array([30,40])
np.sum([n1,n2])
```

[ ]:
```
np.int64(100)
```

[ ]:
```
np.sum([n1,n2],axis=0)
```

[ ]:
```
array([40, 60])
```

[ ]:
```
np.sum([n1,n2],axis=1)
```

[ ]:
```
array([30, 70])
```

[ ]:
```
#ADDITION
import numpy as np
n1=np.array([10,20,30])
n1=n1+1
n1
```

[ ]:
```
array([11, 21, 31])
```

[ ]:
```
#MULTIPLICATION
import numpy as np
n1=np.array([10,20,30])
```

```
n1=n1*2
n1
```

[ ]:
```
array([20, 40, 60])
```

[ ]:
```
#SUBTRACTION
import numpy as np
n1=np.array([10,20,30])
n1=n1-1
n1
```

[ ]:
```
array([ 9, 19, 29])
```

[ ]:
```
#DIVISION
import numpy as np
n1=np.array([10,20,30])
n1=n1/2
n1
```

[ ]:
```
array([ 5., 10., 15.])
```

[ ]:
```
#MEAN
import numpy as np
n1=np.array([10,20,30,40,50,60])
np.mean(n1)
```

[ ]:
```
np.float64(35.0)
```

[ ]:
```
import numpy as np
n1=np.array([1,5,3,100,4,48])
np.std(n1)#standard deviation
```

[ ]:
```
np.float64(36.59424666377065)
```

[ ]:
```
#MEDIAN
import numpy as np
n1=np.array([11,45,5,96,67,85])
np.median(n1)
```

[ ]:
```
np.float64(56.0)
```

[ ]:
```
import numpy as np
n1=np.array([[1,2,3],[4,5,6],[7,8,9]])
n1
```

[ ]:
```
array([[1, 2, 3],
       [4, 5, 6],
```

```
       [7, 8, 9]])
```

NUMPY MATRIX

[ ]:
```
n1[0]
```

[ ]:
```
array([1, 2, 3])
```

[ ]:
```
n1[1]
```

[ ]:
```
array([4, 5, 6])
```

[ ]:
```
n1[:,1]
```

[ ]:
```
array([2, 5, 8])
```

[ ]:
```
n1[:,2]
```

[ ]:
```
array([3, 6, 9])
```

[ ]:
```
#PANDAS
import pandas as pd
s1 = pd.Series([1,2,3,4,5,6,7,8,9])
s2 = pd.Series([10,20,30,40,50,60,70,80,90])
```

[ ]:
```
s1+s2
```

[ ]:
```
0    11
1    22
2    33
3    44
4    55
5    66
6    77
7    88
8    99
dtype: int64
```

[ ]:
```
s1 +5
```

[ ]:
```
0     6
1     7
2     8
3     9
4    10
5    11
6    12
7    13
```

```
8    14
dtype: int64
```

[ ]:
```
import pandas as pd
pd.DataFrame({"Name":['bob','sam','anne'],'Marks':[76,25,92]})
```

[ ]:
```
   Name  Marks
0   bob     76
1   sam     25
2  anne     92
```

[ ]:
```
df=pd.DataFrame({"Name":["sam","anne","jennifer"],"Marks":[50,60,70]})
```

[ ]:
```
df
```

[ ]:
```
        Name  Marks
0        sam     50
1       anne     60
2  jennifer     70
```

[ ]:
```
type(df)
```

[ ]:
```
pandas.core.frame.DataFrame
```

[ ]:
```
iris=pd.read_csv('Iris (1).csv')
```

UPLOADING IRIS DATASET

[ ]:
```
from google.colab import files

uploaded = files.upload()

for fn in uploaded.keys():
  print('User uploaded file "{name}" with length {length} bytes'.format(
      name=fn, length=len(uploaded[fn])))
```

```
<IPython.core.display.HTML object>

Saving Iris.csv to Iris (1).csv
User uploaded file "Iris (1).csv" with length 5107 bytes
```

[ ]:
```
iris.head()
```

[ ]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa

```
4   5            5.0           3.6            1.4           0.2  Iris-setosa
```

[ ]:
```
import pandas as pd
ds = pd.read_csv('Iris (1).csv')
```

[ ]:
```
ds.head()
```

[ ]:
```
   Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm      Species
0   1            5.1           3.5            1.4           0.2  Iris-setosa
1   2            4.9           3.0            1.4           0.2  Iris-setosa
2   3            4.7           3.2            1.3           0.2  Iris-setosa
3   4            4.6           3.1            1.5           0.2  Iris-setosa
4   5            5.0           3.6            1.4           0.2  Iris-setosa
```

[ ]:
```
ds.head(20)
```

[ ]:
```
    Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm      Species
0    1            5.1           3.5            1.4           0.2  Iris-setosa
1    2            4.9           3.0            1.4           0.2  Iris-setosa
2    3            4.7           3.2            1.3           0.2  Iris-setosa
3    4            4.6           3.1            1.5           0.2  Iris-setosa
4    5            5.0           3.6            1.4           0.2  Iris-setosa
5    6            5.4           3.9            1.7           0.4  Iris-setosa
6    7            4.6           3.4            1.4           0.3  Iris-setosa
7    8            5.0           3.4            1.5           0.2  Iris-setosa
8    9            4.4           2.9            1.4           0.2  Iris-setosa
9   10            4.9           3.1            1.5           0.1  Iris-setosa
10  11            5.4           3.7            1.5           0.2  Iris-setosa
11  12            4.8           3.4            1.6           0.2  Iris-setosa
12  13            4.8           3.0            1.4           0.1  Iris-setosa
13  14            4.3           3.0            1.1           0.1  Iris-setosa
14  15            5.8           4.0            1.2           0.2  Iris-setosa
15  16            5.7           4.4            1.5           0.4  Iris-setosa
16  17            5.4           3.9            1.3           0.4  Iris-setosa
17  18            5.1           3.5            1.4           0.3  Iris-setosa
18  19            5.7           3.8            1.7           0.3  Iris-setosa
19  20            5.1           3.8            1.5           0.3  Iris-setosa
```

[ ]:
```
ds.tail()
```

[ ]:
```
      Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm  \
145  146            6.7           3.0            5.2           2.3
146  147            6.3           2.5            5.0           1.9
147  148            6.5           3.0            5.2           2.0
148  149            6.2           3.4            5.4           2.3
149  150            5.9           3.0            5.1           1.8
```

```
            Species
145  Iris-virginica
146  Iris-virginica
147  Iris-virginica
148  Iris-virginica
149  Iris-virginica
```

[ ]:
```
ds.tail(10)
```

[ ]:
```
      Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm  \
140  141            6.7           3.1            5.6           2.4
141  142            6.9           3.1            5.1           2.3
142  143            5.8           2.7            5.1           1.9
143  144            6.8           3.2            5.9           2.3
144  145            6.7           3.3            5.7           2.5
145  146            6.7           3.0            5.2           2.3
146  147            6.3           2.5            5.0           1.9
147  148            6.5           3.0            5.2           2.0
148  149            6.2           3.4            5.4           2.3
149  150            5.9           3.0            5.1           1.8

            Species
140  Iris-virginica
141  Iris-virginica
142  Iris-virginica
143  Iris-virginica
144  Iris-virginica
145  Iris-virginica
146  Iris-virginica
147  Iris-virginica
148  Iris-virginica
149  Iris-virginica
```

[ ]:
```
ds.shape
```

[ ]:
```
(150, 6)
```

[ ]:
```
ds.describe()
```

[ ]:
```
               Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm
count  150.000000     150.000000    150.000000     150.000000    150.000000
mean    75.500000       5.843333      3.054000       3.758667      1.198667
std     43.445368       0.828066      0.433594       1.764420      0.763161
min      1.000000       4.300000      2.000000       1.000000      0.100000
25%     38.250000       5.100000      2.800000       1.600000      0.300000
50%     75.500000       5.800000      3.000000       4.350000      1.300000
75%    112.750000       6.400000      3.300000       5.100000      1.800000
```

```
max    150.000000       7.900000      4.400000       6.900000      2.500000
```

[ ]:
```
iris.iloc[0:3,0:2]
```

[ ]:
```
   Id  SepalLengthCm
0   1            5.1
1   2            4.9
2   3            4.7
```

[ ]:
```
iris.iloc[0:9,0:8]
```

[ ]:
```
   Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm      Species
0   1            5.1           3.5            1.4           0.2  Iris-setosa
1   2            4.9           3.0            1.4           0.2  Iris-setosa
2   3            4.7           3.2            1.3           0.2  Iris-setosa
3   4            4.6           3.1            1.5           0.2  Iris-setosa
4   5            5.0           3.6            1.4           0.2  Iris-setosa
5   6            5.4           3.9            1.7           0.4  Iris-setosa
6   7            4.6           3.4            1.4           0.3  Iris-setosa
7   8            5.0           3.4            1.5           0.2  Iris-setosa
8   9            4.4           2.9            1.4           0.2  Iris-setosa
```

[ ]:
```
ds.iloc[0:3,2:5]
```

[ ]:
```
   SepalWidthCm  PetalLengthCm  PetalWidthCm
0           3.5            1.4           0.2
1           3.0            1.4           0.2
2           3.2            1.3           0.2
```

[ ]:
```
ds.iloc[120:150,2:5]
```

[ ]:
```
     SepalWidthCm  PetalLengthCm  PetalWidthCm
120           3.2            5.7           2.3
121           2.8            4.9           2.0
122           2.8            6.7           2.0
123           2.7            4.9           1.8
124           3.3            5.7           2.1
125           3.2            6.0           1.8
126           2.8            4.8           1.8
127           3.0            4.9           1.8
128           2.8            5.6           2.1
129           3.0            5.8           1.6
130           2.8            6.1           1.9
131           3.8            6.4           2.0
132           2.8            5.6           2.2
133           2.8            5.1           1.5
134           2.6            5.6           1.4
```

```
135            3.0            6.1            2.3
136            3.4            5.6            2.4
137            3.1            5.5            1.8
138            3.0            4.8            1.8
139            3.1            5.4            2.1
140            3.1            5.6            2.4
141            3.1            5.1            2.3
142            2.7            5.1            1.9
143            3.2            5.9            2.3
144            3.3            5.7            2.5
145            3.0            5.2            2.3
146            2.5            5.0            1.9
147            3.0            5.2            2.0
148            3.4            5.4            2.3
149            3.0            5.1            1.8
```

[ ]:
```
iris.drop('SepalLengthCm',axis=1)
```

[ ]:
```
       Id  SepalWidthCm  PetalLengthCm  PetalWidthCm         Species
0       1           3.5            1.4           0.2     Iris-setosa
1       2           3.0            1.4           0.2     Iris-setosa
2       3           3.2            1.3           0.2     Iris-setosa
3       4           3.1            1.5           0.2     Iris-setosa
4       5           3.6            1.4           0.2     Iris-setosa
..    ...           ...            ...           ...             ...
145   146           3.0            5.2           2.3  Iris-virginica
146   147           2.5            5.0           1.9  Iris-virginica
147   148           3.0            5.2           2.0  Iris-virginica
148   149           3.4            5.4           2.3  Iris-virginica
149   150           3.0            5.1           1.8  Iris-virginica

[150 rows x 5 columns]
```

[ ]:
```
ds.loc[1:5,('SepalLengthCm','PetalLengthCm')]
```

[ ]:
```
   SepalLengthCm  PetalLengthCm
1            4.9            1.4
2            4.7            1.3
3            4.6            1.5
4            5.0            1.4
5            5.4            1.7
```

[ ]:
```
ds.loc[100:150,('SepalLengthCm','PetalLengthCm')]
```

[ ]:
```
     SepalLengthCm  PetalLengthCm
100            6.3            6.0
101            5.8            5.1
```

102	7.1	5.9
103	6.3	5.6
104	6.5	5.8
105	7.6	6.6
106	4.9	4.5
107	7.3	6.3
108	6.7	5.8
109	7.2	6.1
110	6.5	5.1
111	6.4	5.3
112	6.8	5.5
113	5.7	5.0
114	5.8	5.1
115	6.4	5.3
116	6.5	5.5
117	7.7	6.7
118	7.7	6.9
119	6.0	5.0
120	6.9	5.7
121	5.6	4.9
122	7.7	6.7
123	6.3	4.9
124	6.7	5.7
125	7.2	6.0
126	6.2	4.8
127	6.1	4.9
128	6.4	5.6
129	7.2	5.8
130	7.4	6.1
131	7.9	6.4
132	6.4	5.6
133	6.3	5.1
134	6.1	5.6
135	7.7	6.1
136	6.3	5.6
137	6.4	5.5
138	6.0	4.8
139	6.9	5.4
140	6.7	5.6
141	6.9	5.1
142	5.8	5.1
143	6.8	5.9
144	6.7	5.7
145	6.7	5.2
146	6.3	5.0
147	6.5	5.2
148	6.2	5.4

```
149            5.9            5.1
```

[ ]:
```
iris.loc[0:3,("SepalLengthCm","PetalLengthCm")]
```

[ ]:
```
   SepalLengthCm  PetalLengthCm
0            5.1            1.4
1            4.9            1.4
2            4.7            1.3
3            4.6            1.5
```

[ ]:
```
iris.drop([1,2,3],axis=0)
```

[ ]:
```
      Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm  \
0      1            5.1           3.5            1.4           0.2
4      5            5.0           3.6            1.4           0.2
5      6            5.4           3.9            1.7           0.4
6      7            4.6           3.4            1.4           0.3
7      8            5.0           3.4            1.5           0.2
..   …              …             …              …             …
145  146            6.7           3.0            5.2           2.3
146  147            6.3           2.5            5.0           1.9
147  148            6.5           3.0            5.2           2.0
148  149            6.2           3.4            5.4           2.3
149  150            5.9           3.0            5.1           1.8

            Species
0       Iris-setosa
4       Iris-setosa
5       Iris-setosa
6       Iris-setosa
7       Iris-setosa
..              …
145  Iris-virginica
146  Iris-virginica
147  Iris-virginica
148  Iris-virginica
149  Iris-virginica

[147 rows x 6 columns]
```

[ ]:
```
iris.mean(numeric_only=True)
```

[ ]:
```
Id               75.500000
SepalLengthCm     5.843333
SepalWidthCm      3.054000
PetalLengthCm     3.758667
PetalWidthCm      1.198667
```

```
dtype: float64
```

[ ]:
```
iris.median(numeric_only=True)
```

[ ]:
```
Id               75.50
SepalLengthCm     5.80
SepalWidthCm      3.00
PetalLengthCm     4.35
PetalWidthCm      1.30
dtype: float64
```

[ ]:
```
iris.min()
```

[ ]:
```
Id                      1
SepalLengthCm         4.3
SepalWidthCm          2.0
PetalLengthCm         1.0
PetalWidthCm          0.1
Species       Iris-setosa
dtype: object
```

[ ]:
```
iris.max()
```

[ ]:
```
Id                      150
SepalLengthCm           7.9
SepalWidthCm            4.4
PetalLengthCm           6.9
PetalWidthCm            2.5
Species       Iris-virginica
dtype: object
```

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

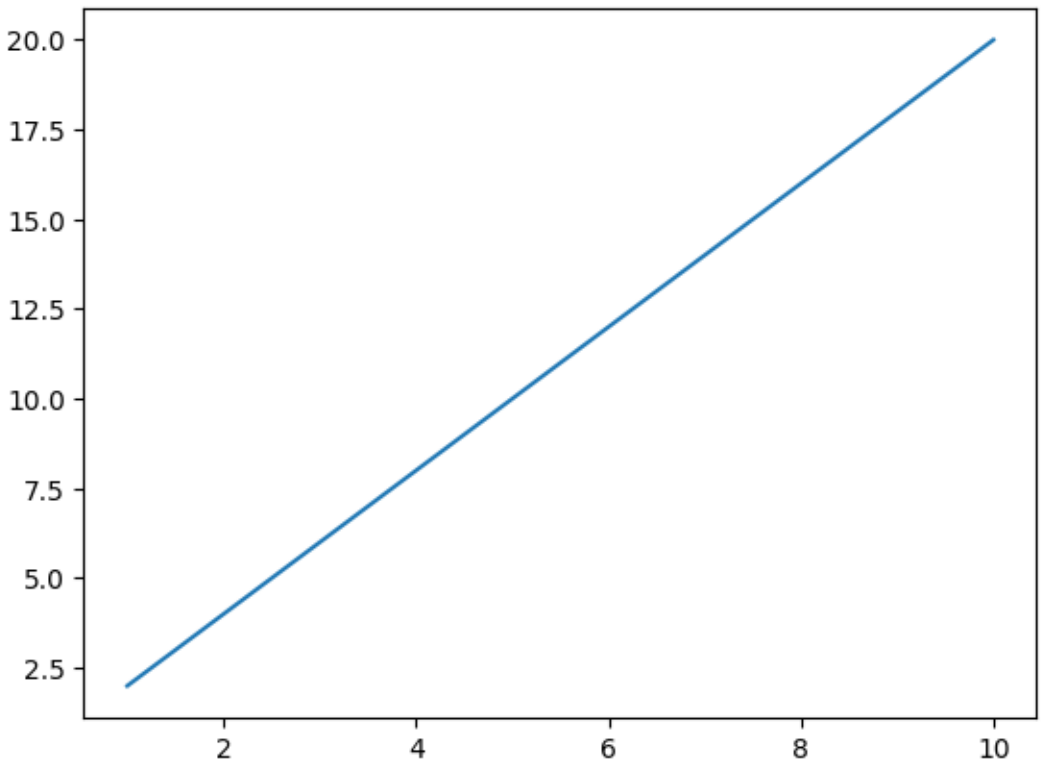
[ ]:
```
x=np.arange(1,11)
y= 2*x
y
```

[ ]:
```
array([ 2,  4,  6,  8, 10, 12, 14, 16, 18, 20])
```

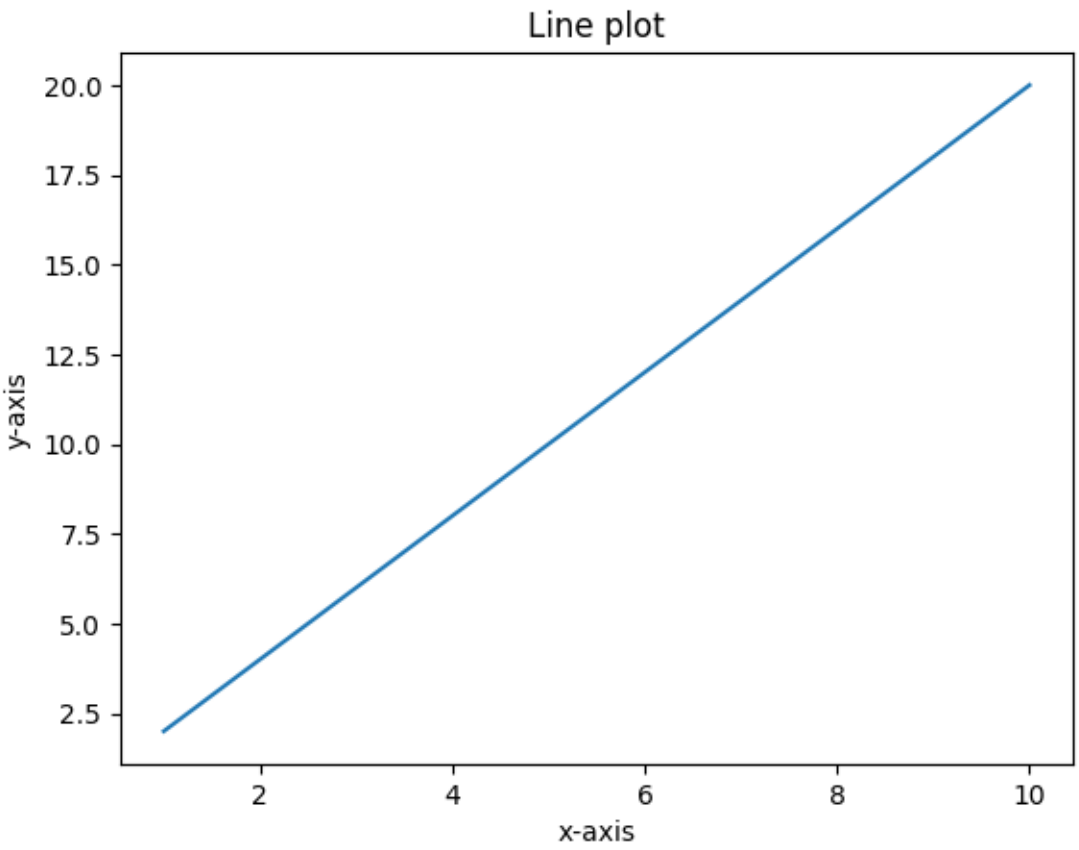
[ ]:
```
x=np.arange(1,11)
x
```

[ ]:
```
array([ 1,  2,  3,  4,  5,  6,  7,  8,  9, 10])
```

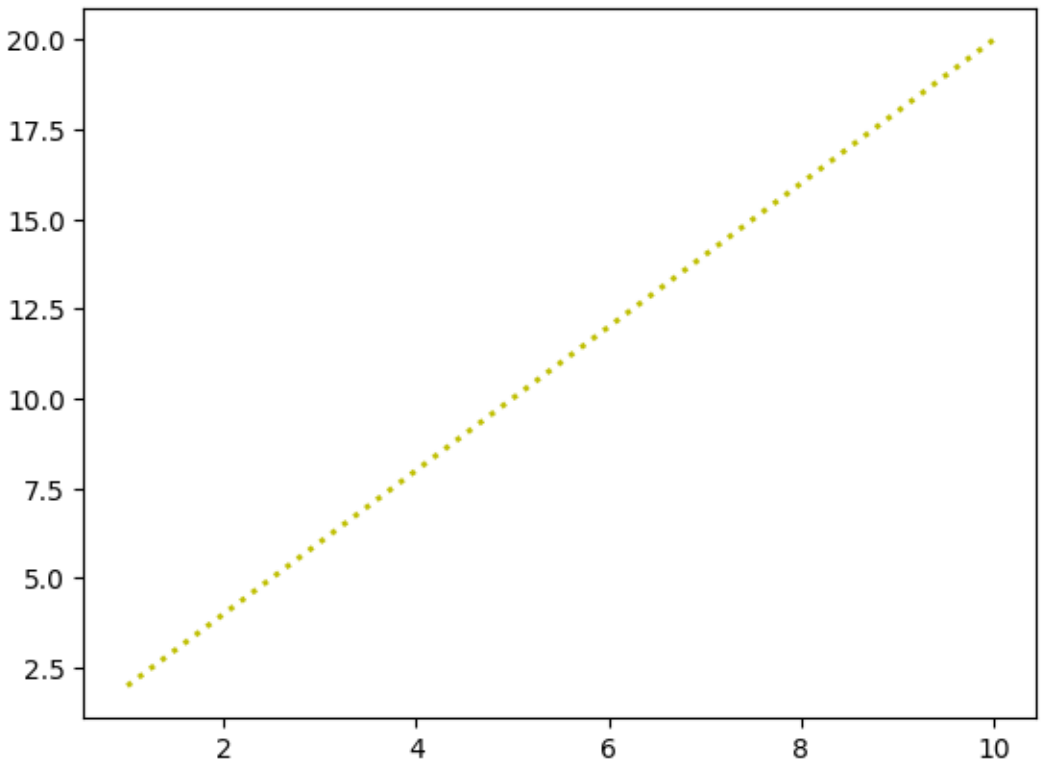
[ ]:
```
plt.plot(x,y)
plt.show()
```



[ ]:
```
plt.plot(x,y)
plt.title("Line plot")
plt.xlabel("x-axis")
plt.ylabel("y-axis")
plt.show()
```

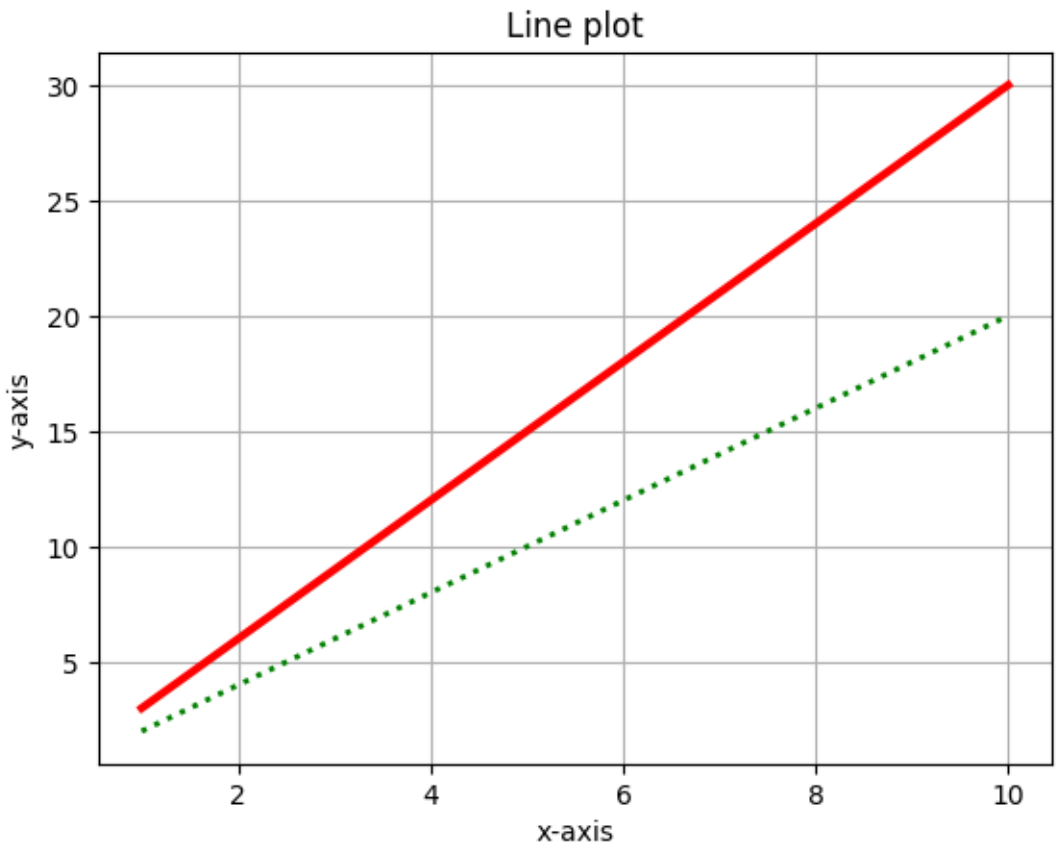


[ ]:
```
plt.plot(x,y,color='y',linestyle=':',linewidth=2)
plt.show()
```

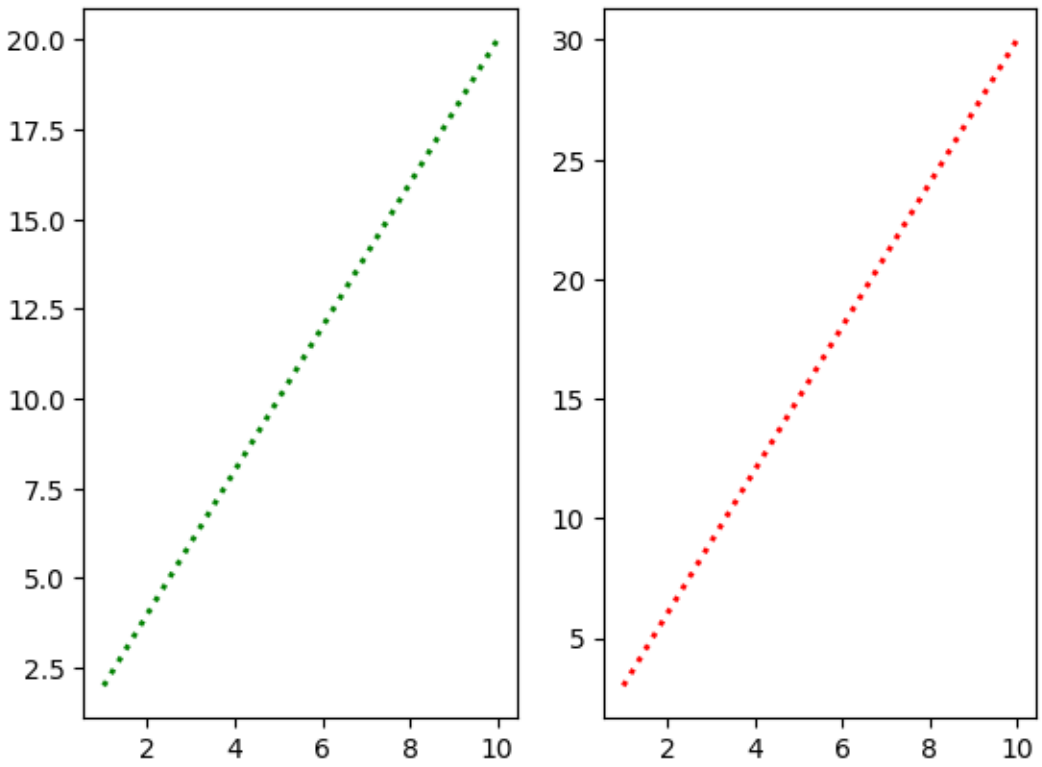


[ ]:
```
x=np.arange(1,11)
y1=2*x
y2=3*x
```

[ ]:
```
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()
```



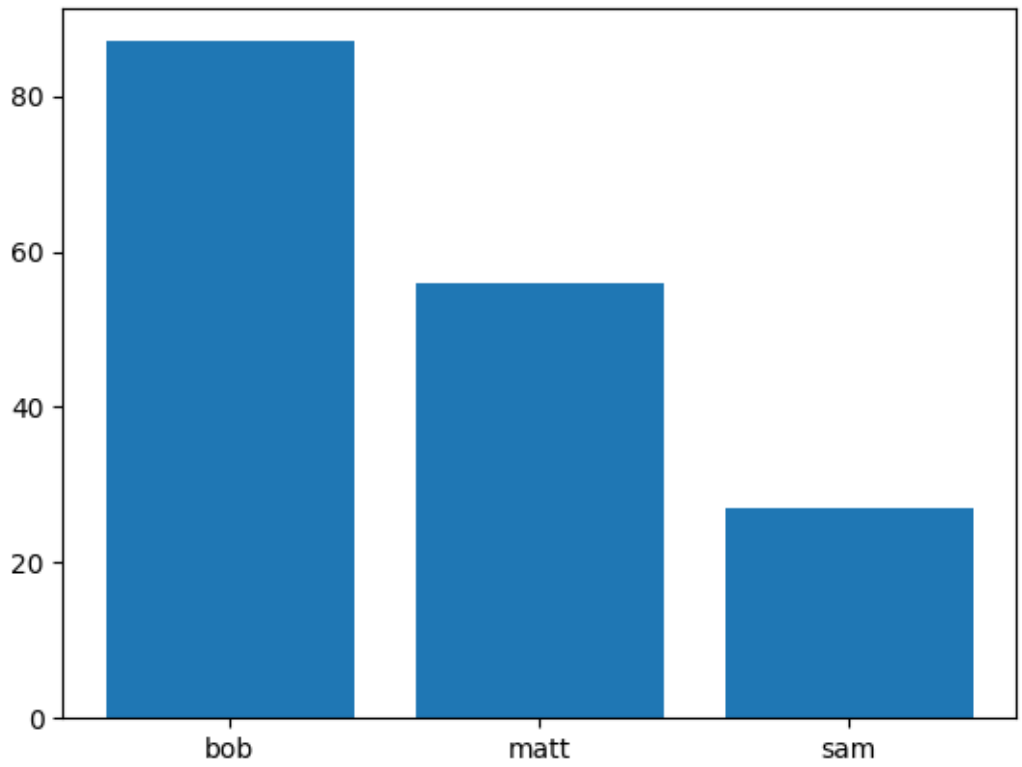
[ ]:
```
x=np.arange(1,11)
y1=2*x
y2=3*x

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()
```



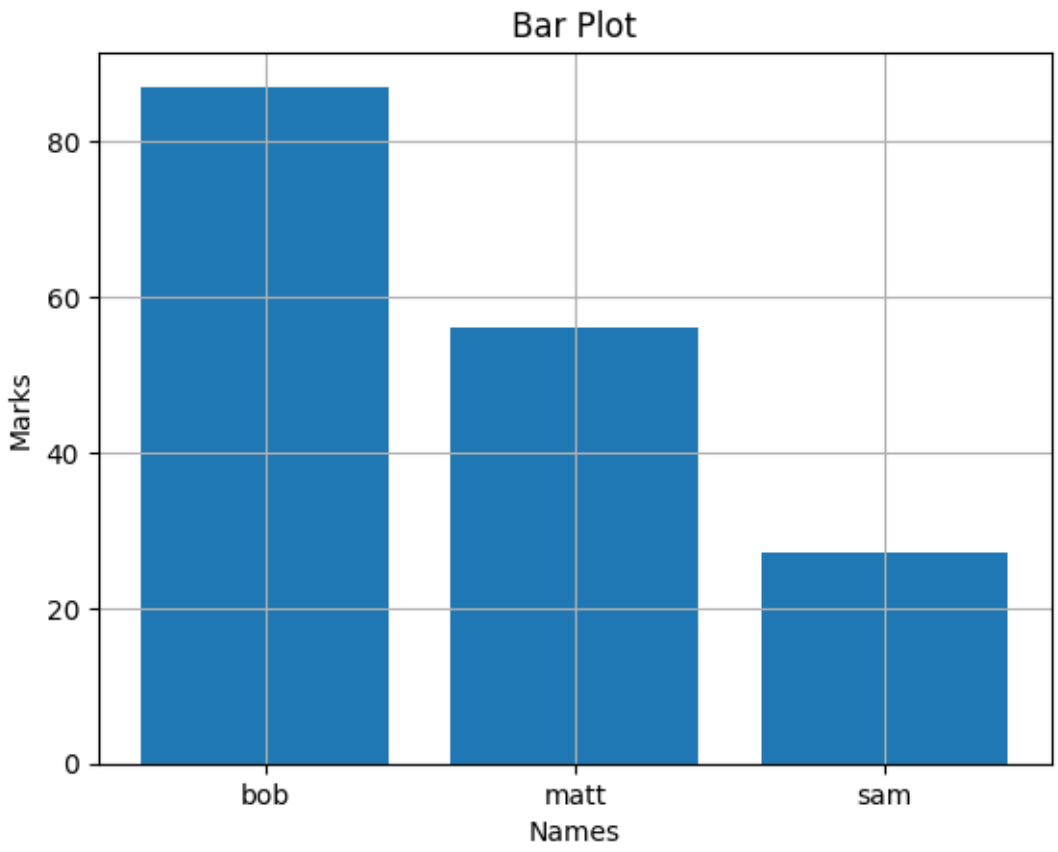
[ ]:
```
student = {"bob":87,"matt":56,"sam":27}
```

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

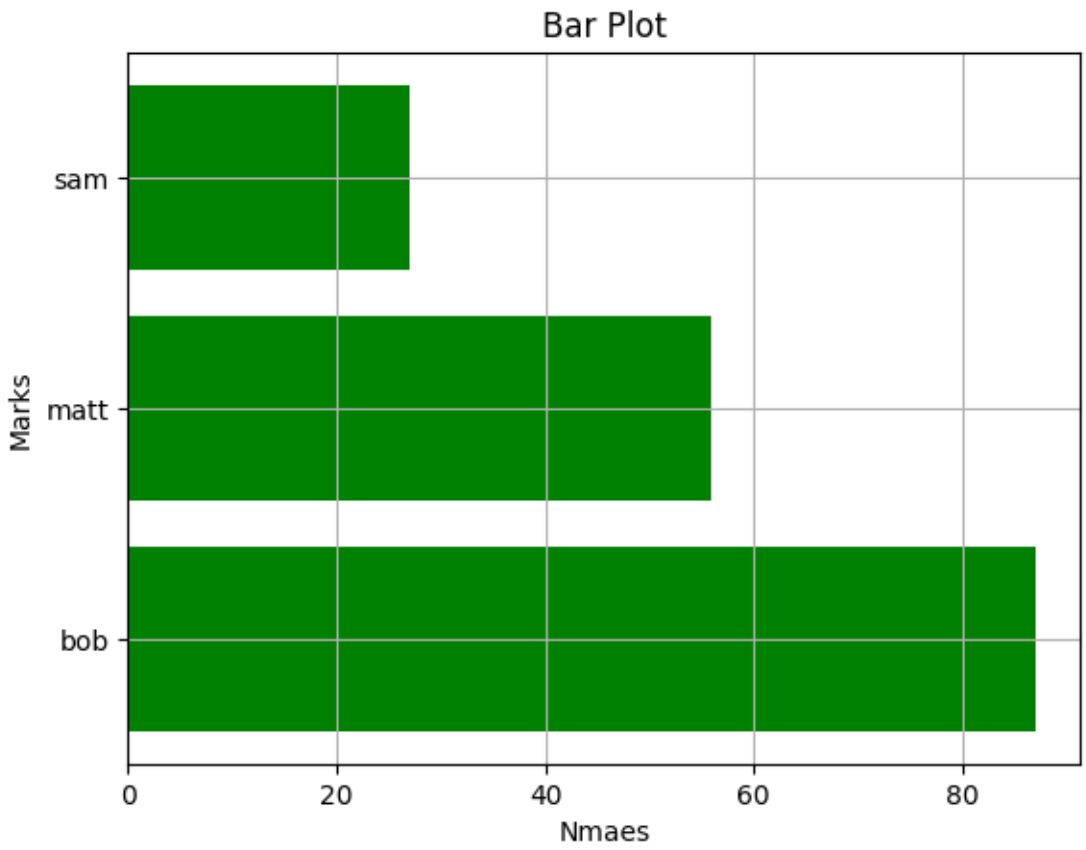
[ ]:
```
plt.bar(names,values)
plt.show()
```



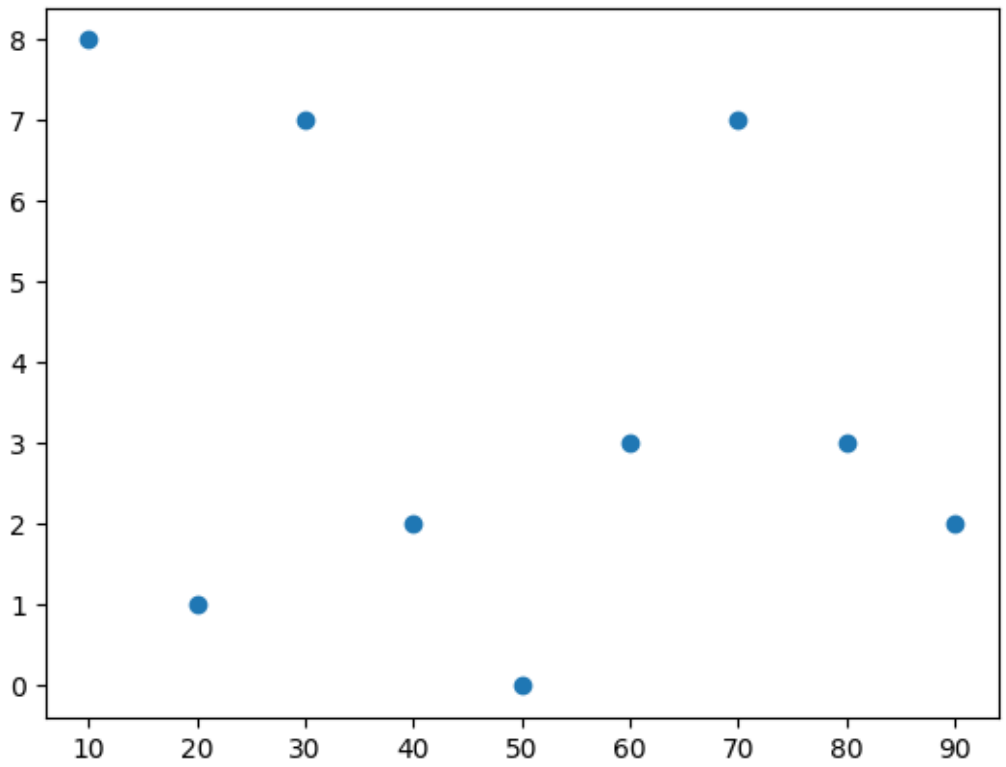
[ ]:
```
plt.bar(names,values)
plt.title("Bar Plot")
plt.xlabel("Names")
plt.ylabel("Marks")
plt.grid(True)
plt.show()
```



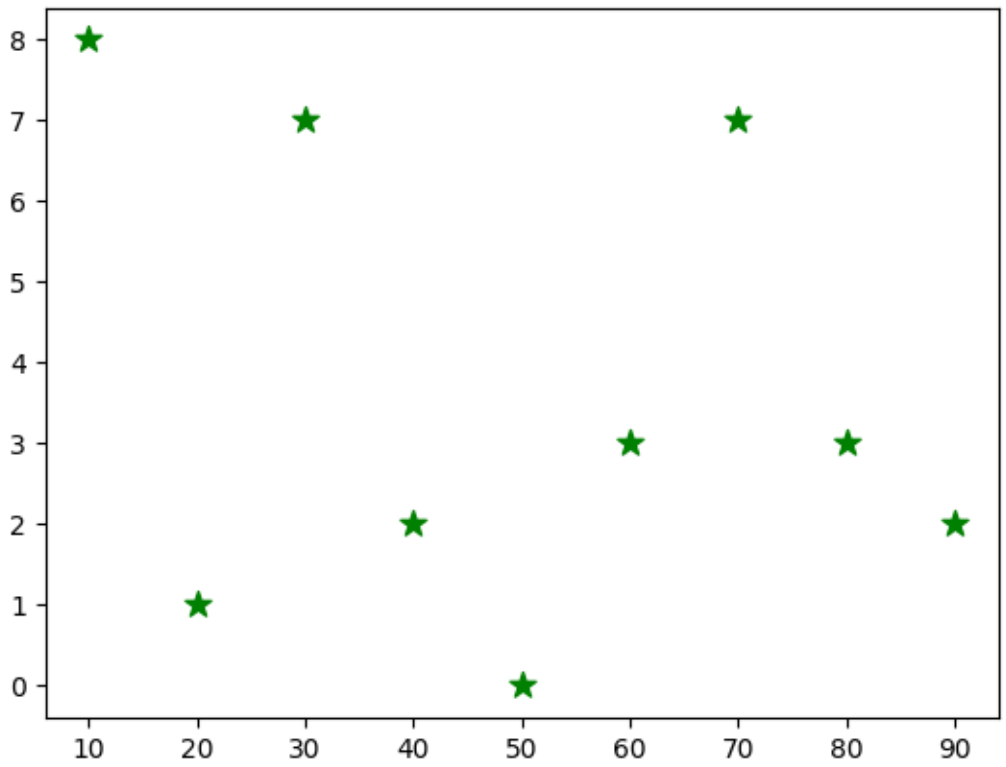
[ ]:
```
plt.barh(names,values,color='g')
plt.title("Bar Plot")
plt.xlabel("Nmaes")
plt.ylabel("Marks")
plt.grid(True)
plt.show()
```



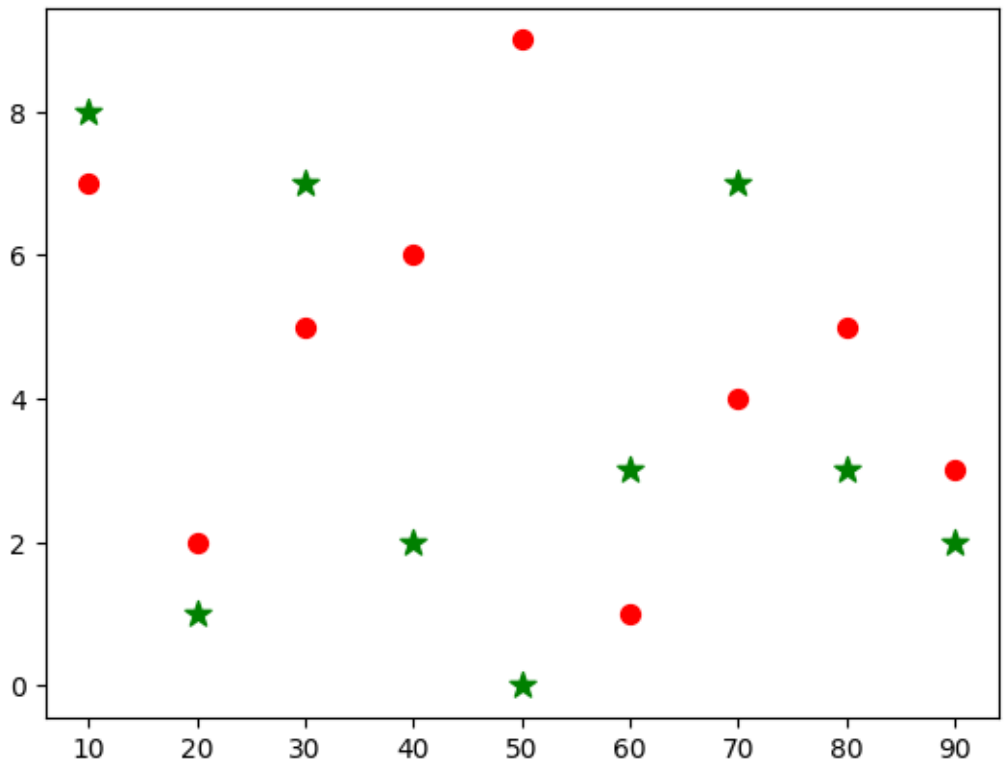
[ ]:
```
x=[10,20,30,40,50,60,70,80,90]
a=[8,1,7,2,0,3,7,3,2]

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



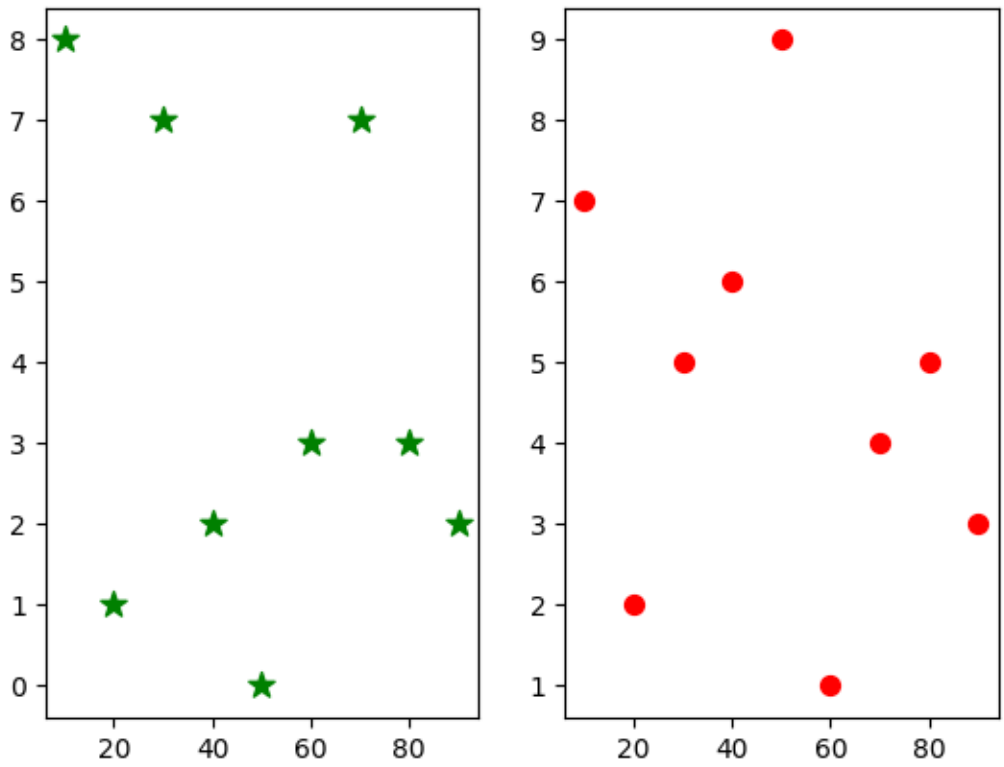
[ ]:
```
x=[10,20,30,40,50,60,70,80,90]
a=[8,1,7,2,0,3,7,3,2]

plt.scatter(x,a,marker="*",c="g",s=100)
plt.show()
```



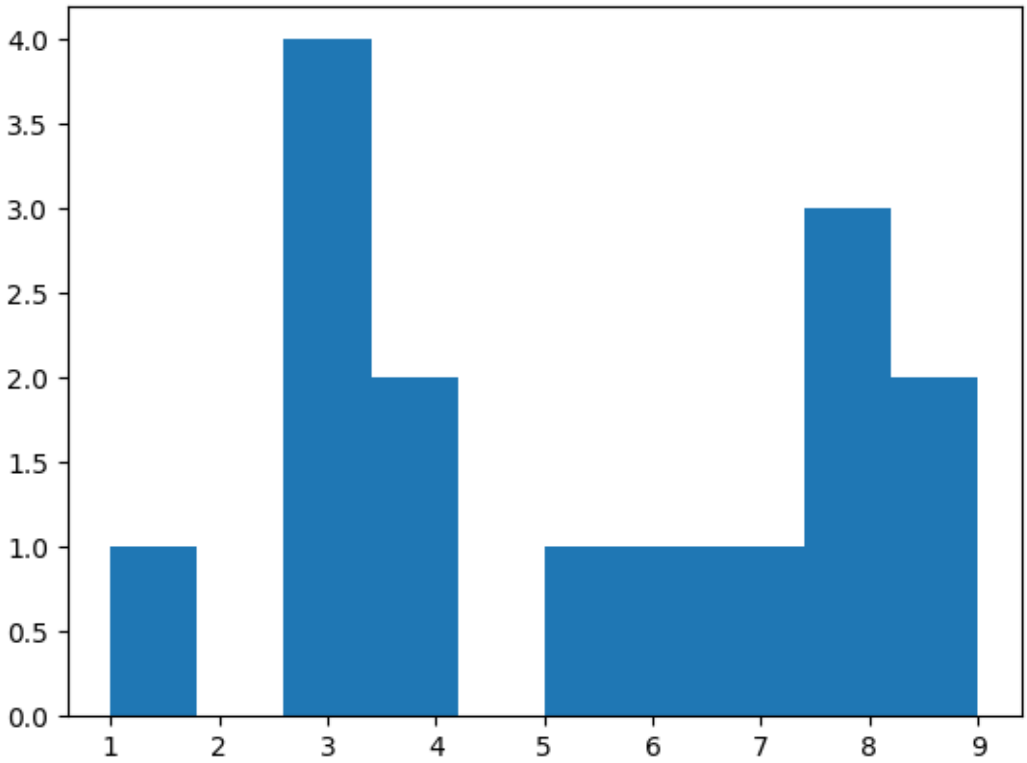
[ ]:
```
x=[10,20,30,40,50,60,70,80,90]
a=[8,1,7,2,0,3,7,3,2]
b=[7,2,5,6,9,1,4,5,3]

plt.scatter(x,a,marker="*",c="g",s=100)
plt.scatter(x,b,marker=".",c="r",s=200)
plt.show()
```



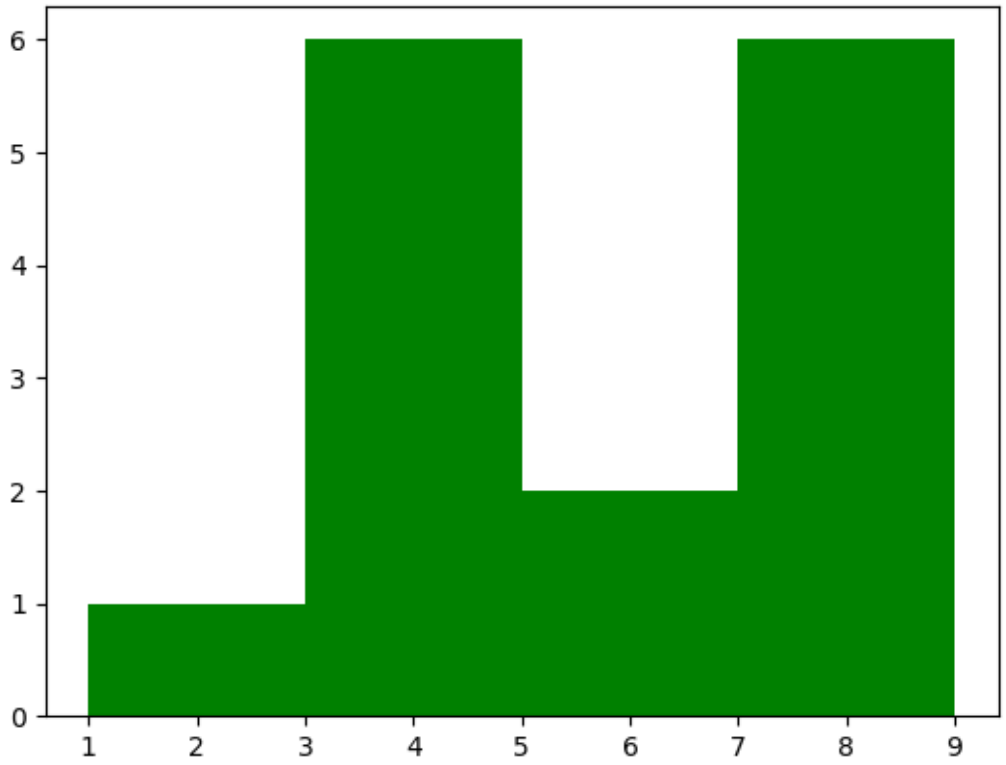
[ ]:
```
x=[10,20,30,40,50,60,70,80,90]
a=[8,1,7,2,0,3,7,3,2]
b=[7,2,5,6,9,1,4,5,3]
plt.subplot(1,2,1)
plt.scatter(x,a,marker="*",c="g",s=100)
plt.subplot(1,2,2)
plt.scatter(x,b,marker=".",c="r",s=200)
plt.show()
```



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


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



[ ]:
```
#CHANGING AESTHETICS
plt.hist(data,color="g",bins=4)
plt.show()
```

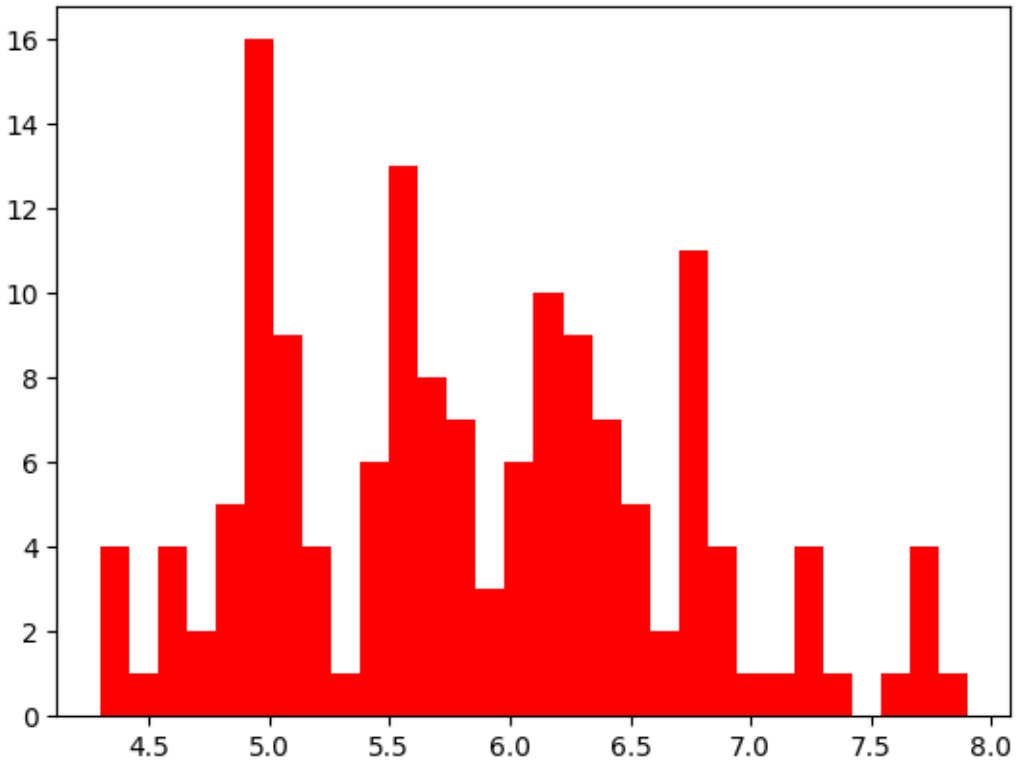


[ ]:
```
iris=pd.read_csv('Iris (1).csv')
iris.head()
```

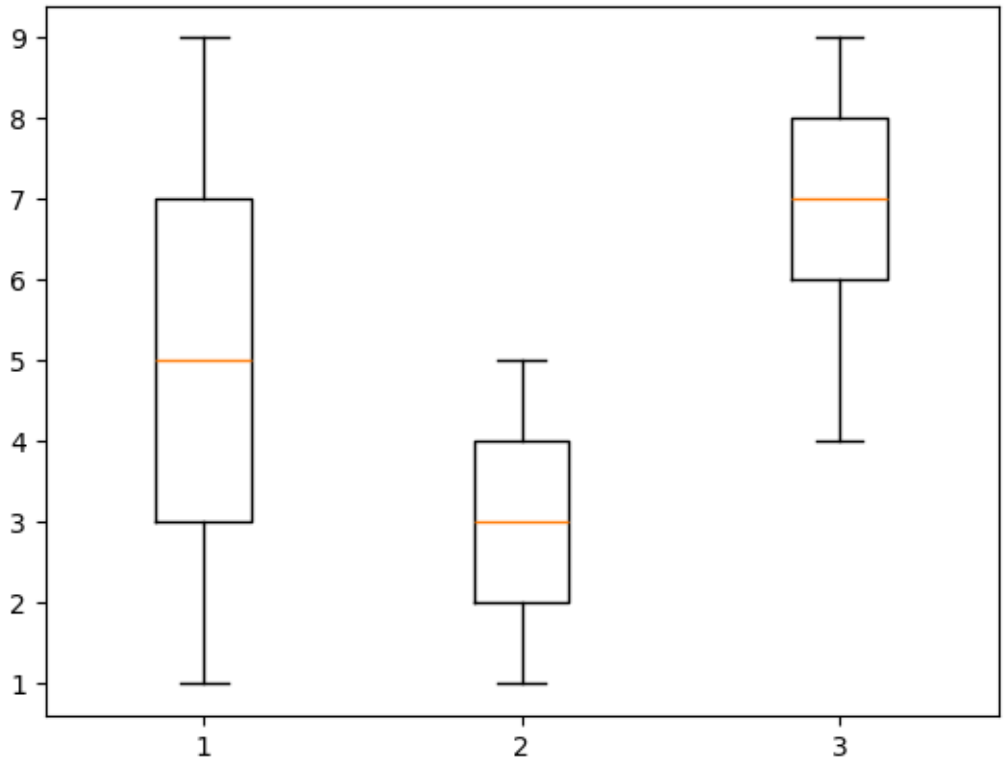
[ ]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa

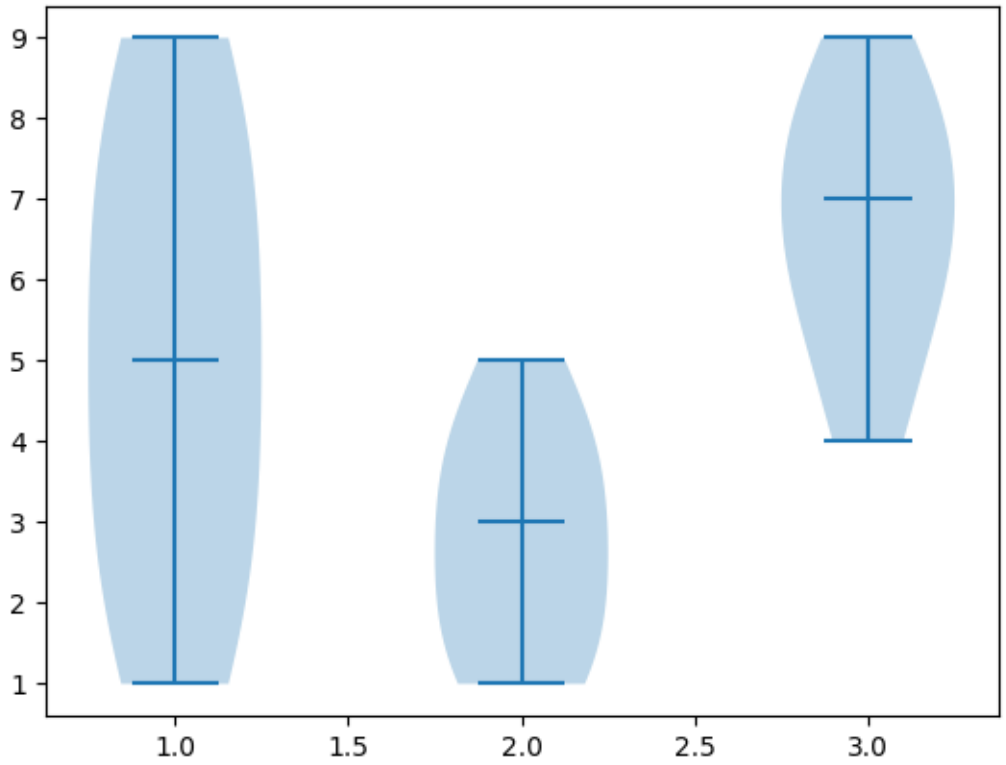
[ ]:
```
plt.hist(iris['SepalLengthCm'],bins=30,color="r")
plt.show()
```



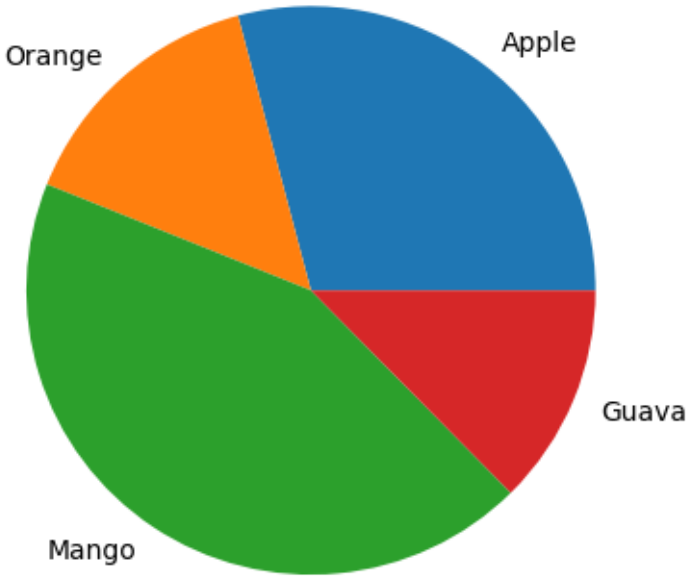
[ ]:
```
#BOXPLOT
one = [1,2,3,4,5,6,7,8,9]
two = [1,2,3,4,5,4,3,2,1]
three = [6,7,8,9,8,7,6,5,4]

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

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



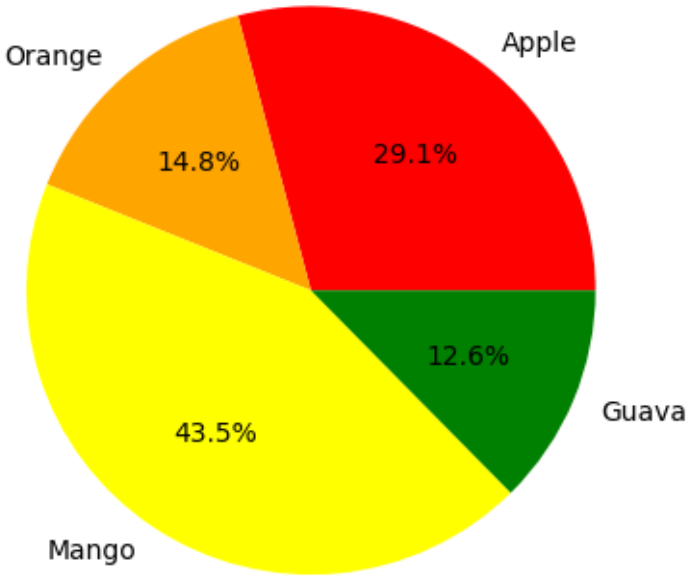
[ ]:
```
#violin plot
import matplotlib.pyplot as plt
one = [1,2,3,4,5,6,7,8,9,]
two = [1,2,3,4,5,4,3,2,1]
three = [6,7,8,9,8,7,6,5,4]

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

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



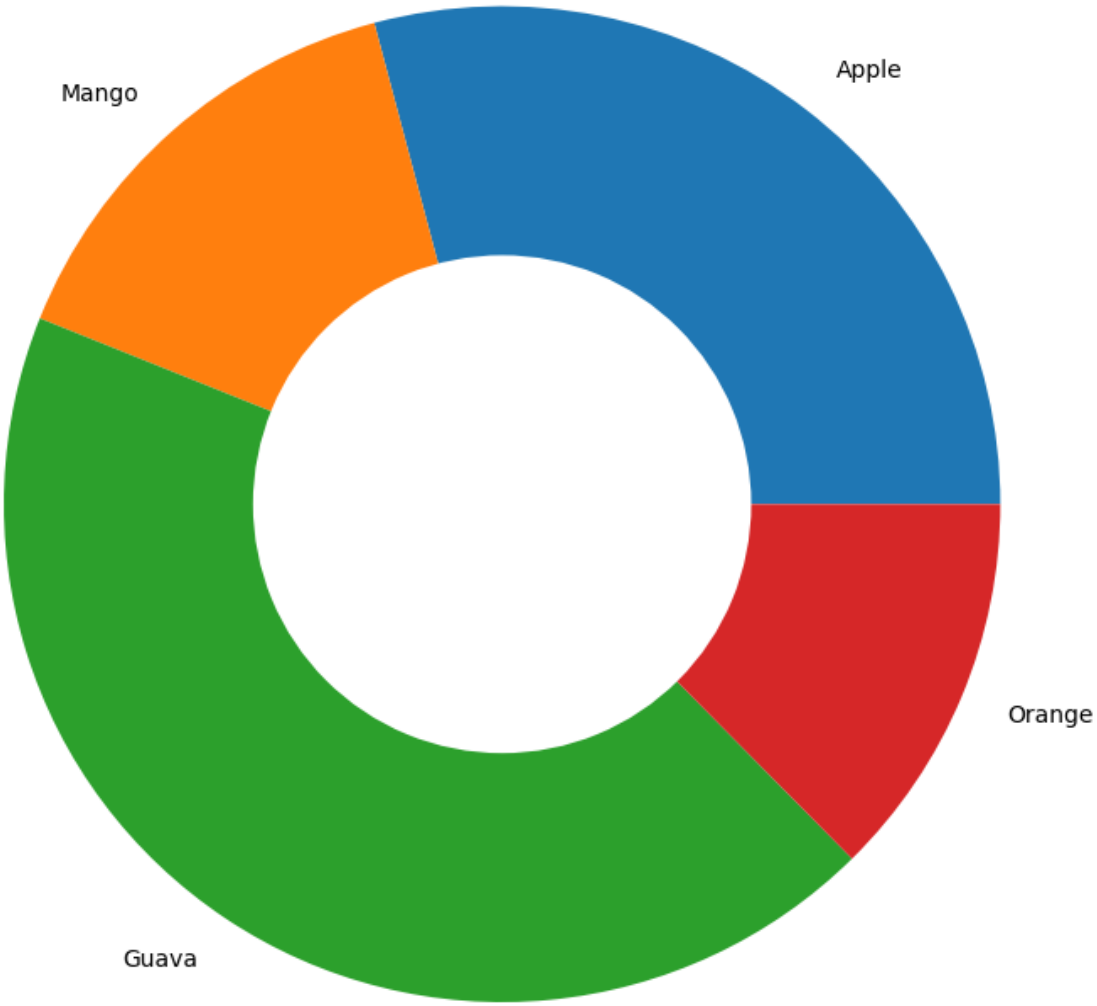
[ ]:
```
#pie chart
fruit = ['Apple','Orange','Mango','Guava']
quantity = [67,34,100,29]

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



[ ]:
```
plt.pie(quantity,labels=fruit,autopct='%0.
  ↪1f%%',colors=['red','orange','yellow','green'])
plt.show()
```



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



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

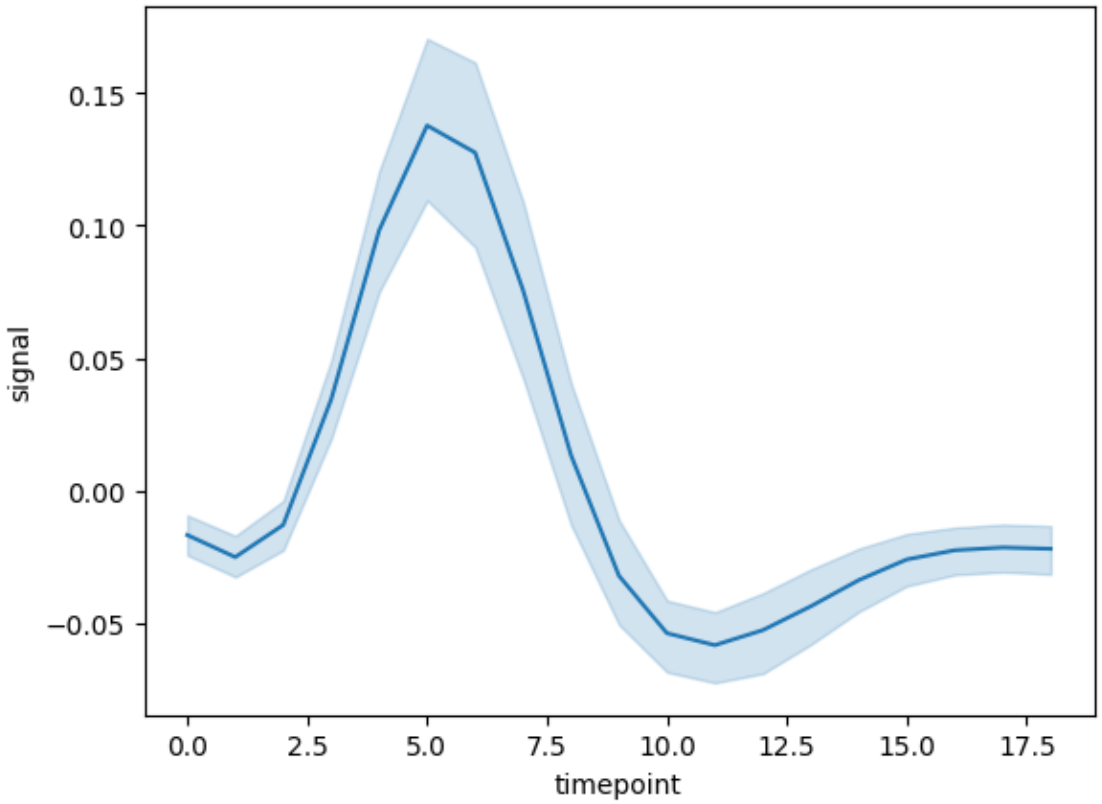


[ ]:
```
import seaborn as sns
from matplotlib import pyplot as plt
fmri = sns.load_dataset("fmri")
fmri.head()
```

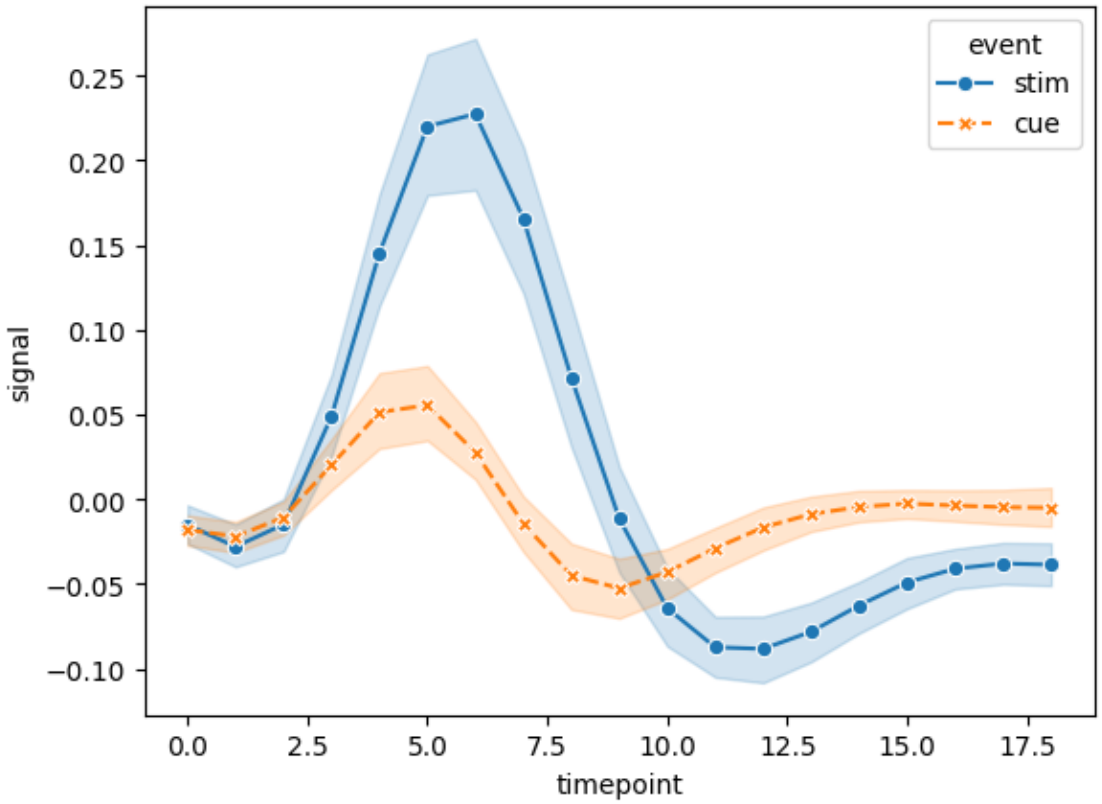
[ ]:

	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

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



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



[ ]:
```
#seaborn
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

[ ]:
```
#visualising statistical relationships
ds = sns.load_dataset('tips')
```

[ ]:
```
ds.head()
```

[ ]:

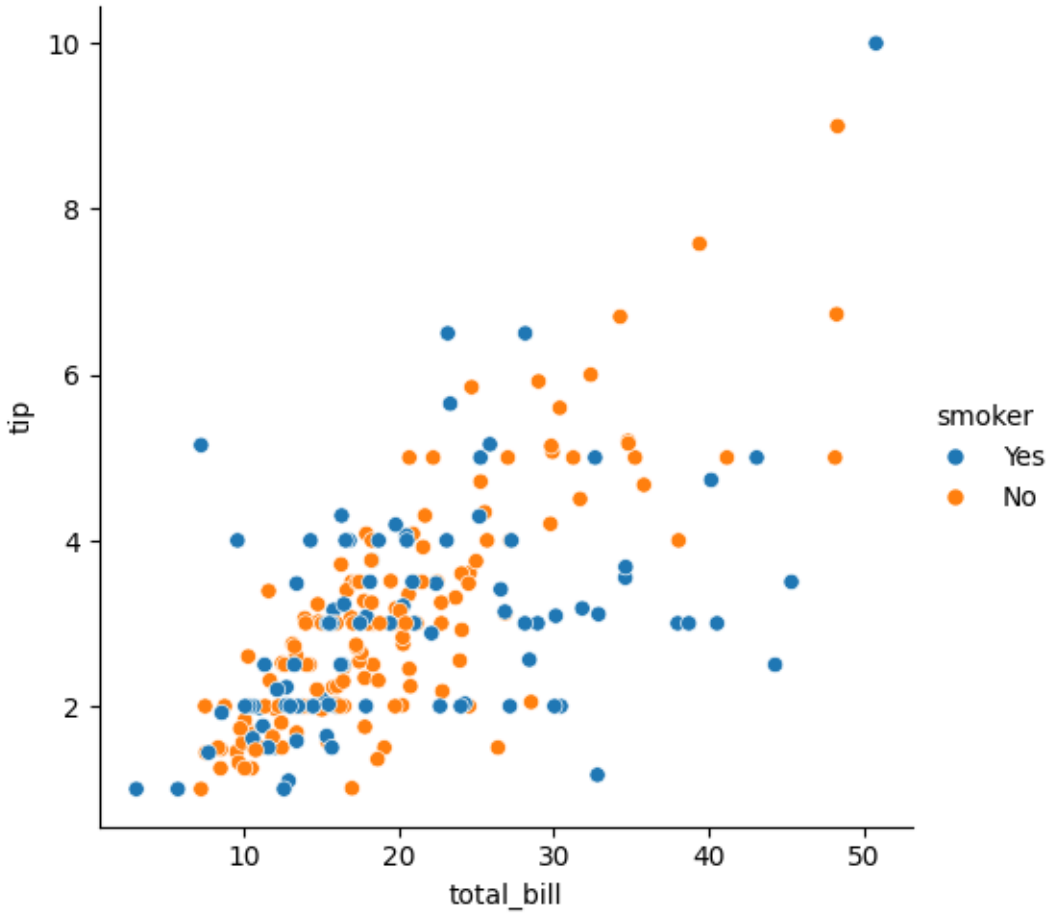
	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4

[ ]:
```
ds.shape
```

[ ]:
```
(244, 7)
```

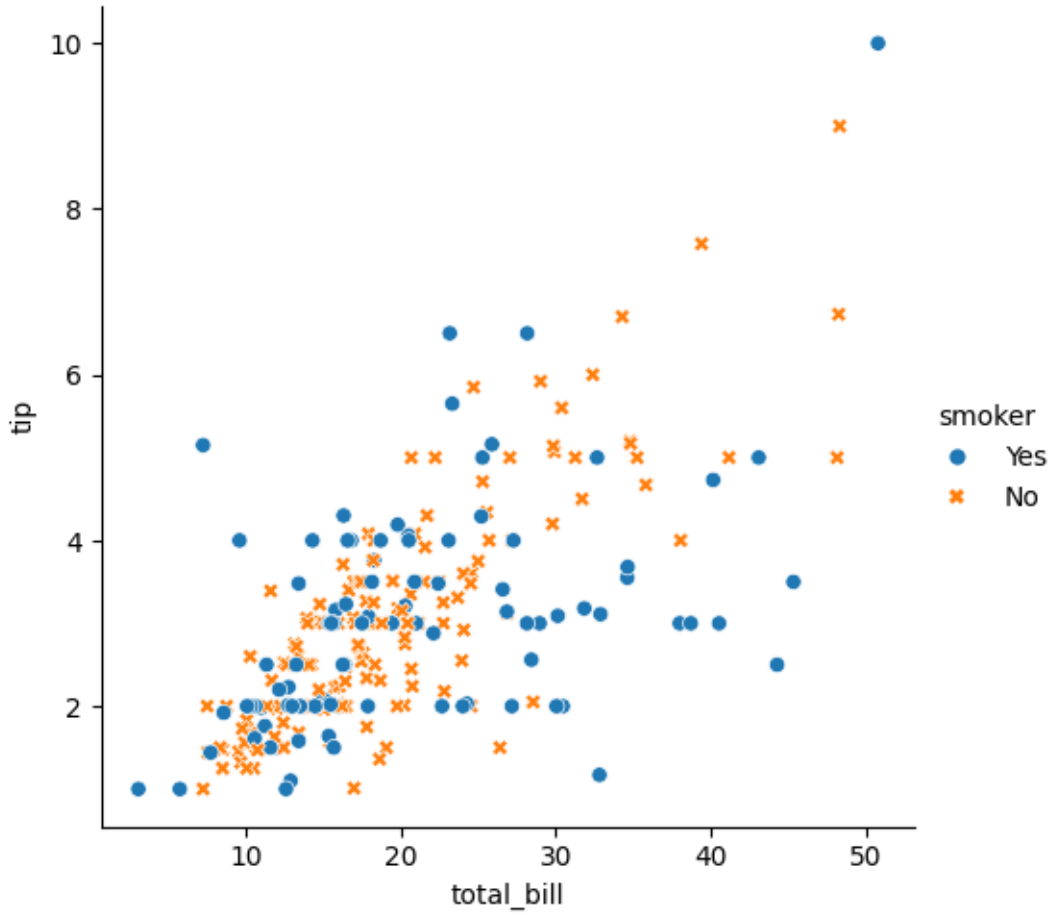
[ ]:
```
#relating variables with scatter plots
sns.relplot(data=ds,x='total_bill',y='tip',hue='smoker')
```

[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x7e5076059f10>
```



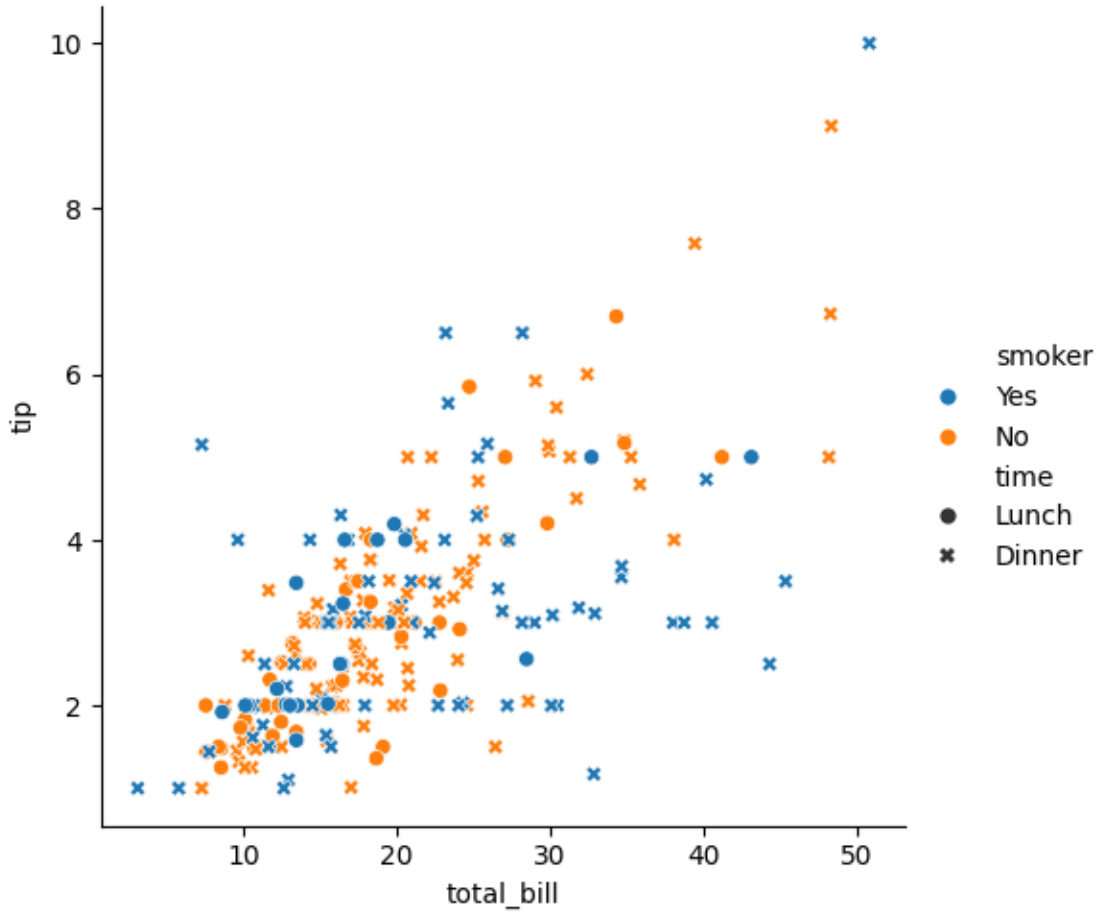
[ ]:
```
#marker
sns.relplot(data=ds,x='total_bill',y='tip',hue='smoker',style='smoker')
```

[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x7e5075d20530>
```



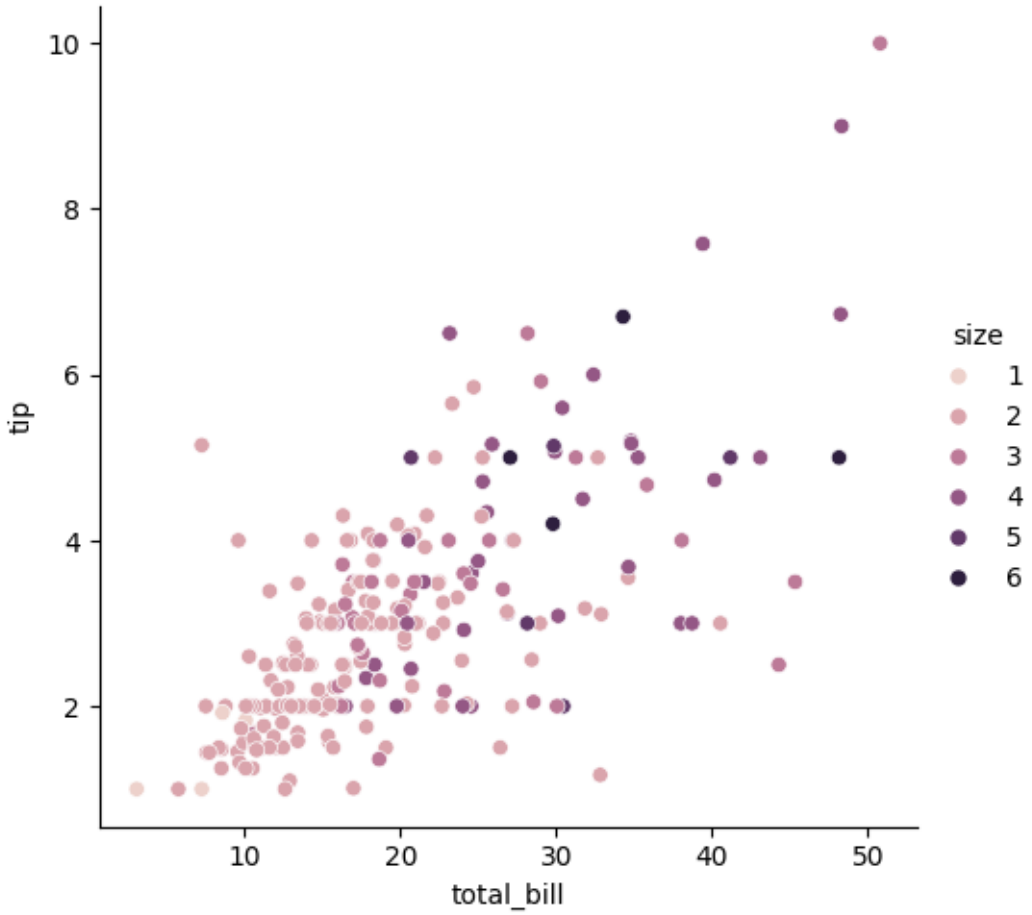
[ ]:
```
sns.relplot(
    data=ds,
    x="total_bill",y="tip",hue="smoker",style="time"
    )
```

[ ]: <seaborn.axisgrid.FacetGrid at 0x7e5075a0be60>



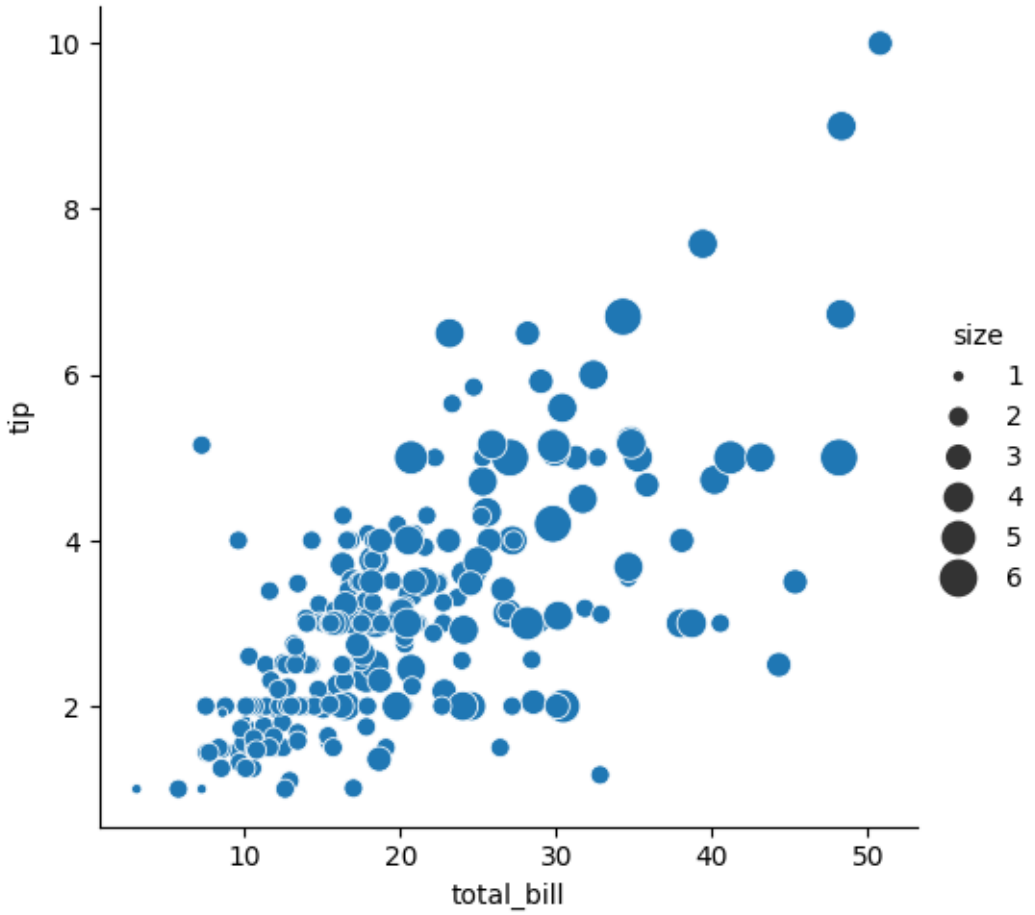
[ ]:
```
sns.relplot(
    data=ds, x="total_bill", y="tip", hue="size",
)
```

[ ]: <seaborn.axisgrid.FacetGrid at 0x7e507593a720>



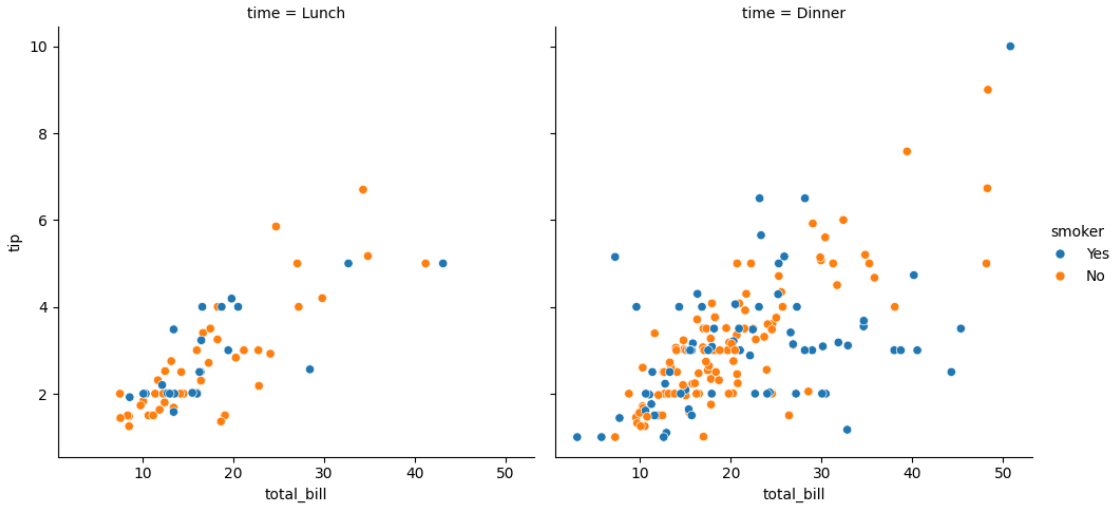
[ ]:
```
sns.relplot(
    data=ds, x="total_bill", y="tip",
    size="size", sizes=(15, 200)
)
```

[ ]: <seaborn.axisgrid.FacetGrid at 0x7e5075ac86e0>



[ ]:
```
sns.relplot(
    data=ds,
    x="total_bill", y="tip", hue="smoker", col="time",
)
```

[ ]: <seaborn.axisgrid.FacetGrid at 0x7e50733e8ad0>



[ ]:
```
import seaborn as sns
fmri = sns.load_dataset('fmri')
```

[ ]:
```
fmri.head()
```

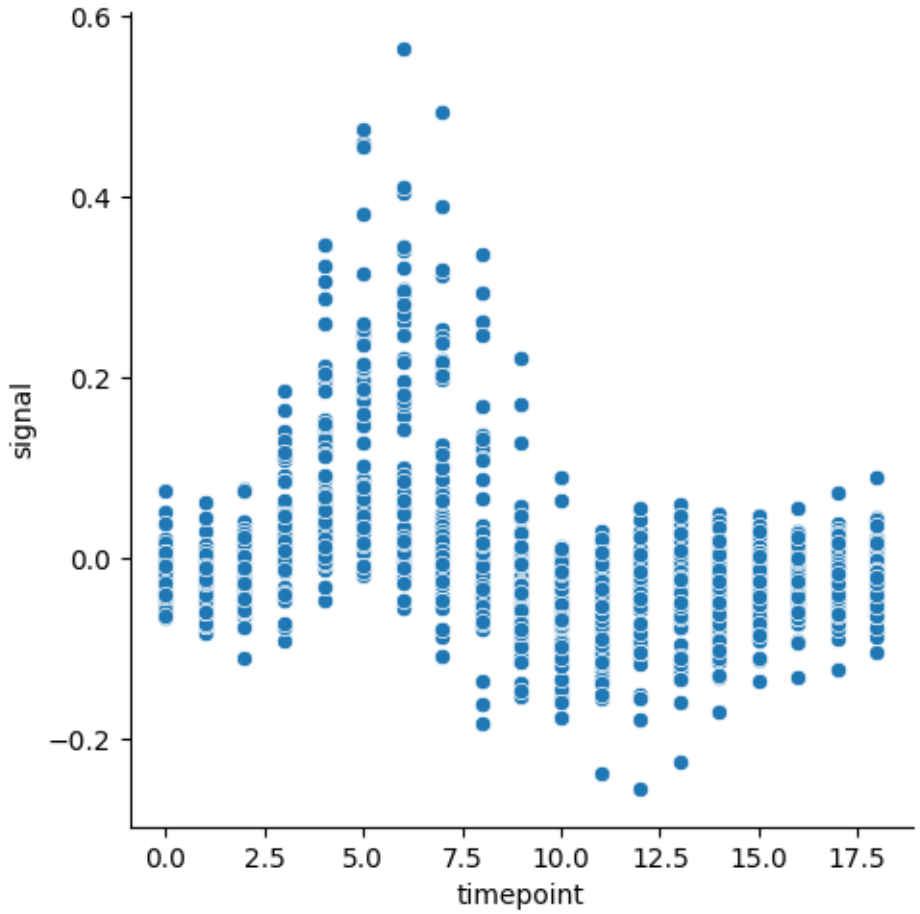
[ ]:
```
  subject  timepoint event    region    signal
0     s13         18  stim  parietal -0.017552
1      s5         14  stim  parietal -0.080883
2     s12         18  stim  parietal -0.081033
3     s11         18  stim  parietal -0.046134
4     s10         18  stim  parietal -0.037970
```

[ ]:
```
fmri.shape
```

[ ]:
```
(1064, 5)
```

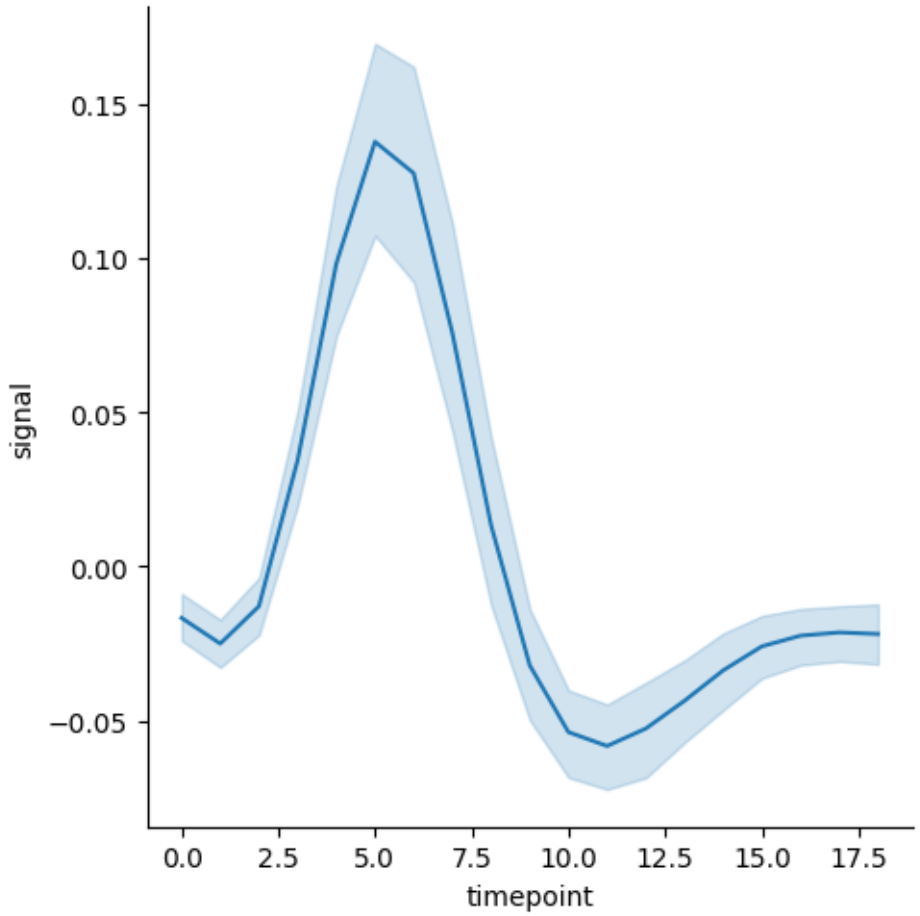
[ ]:
```
sns.relplot(data=fmri, x='timepoint',y='signal')
```

[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x7fd44f415640>
```



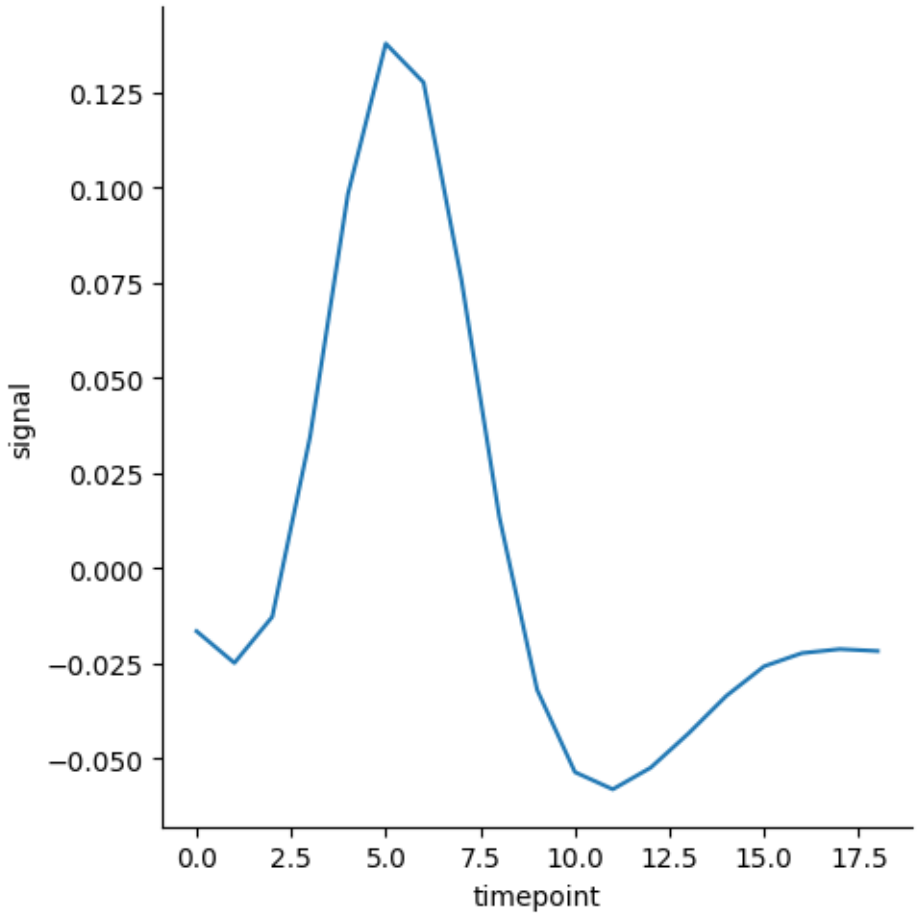
[ ]:
```
sns.relplot(data=fmri, x='timepoint',y='signal',kind='line')
```

[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x7fd44ee06780>
```



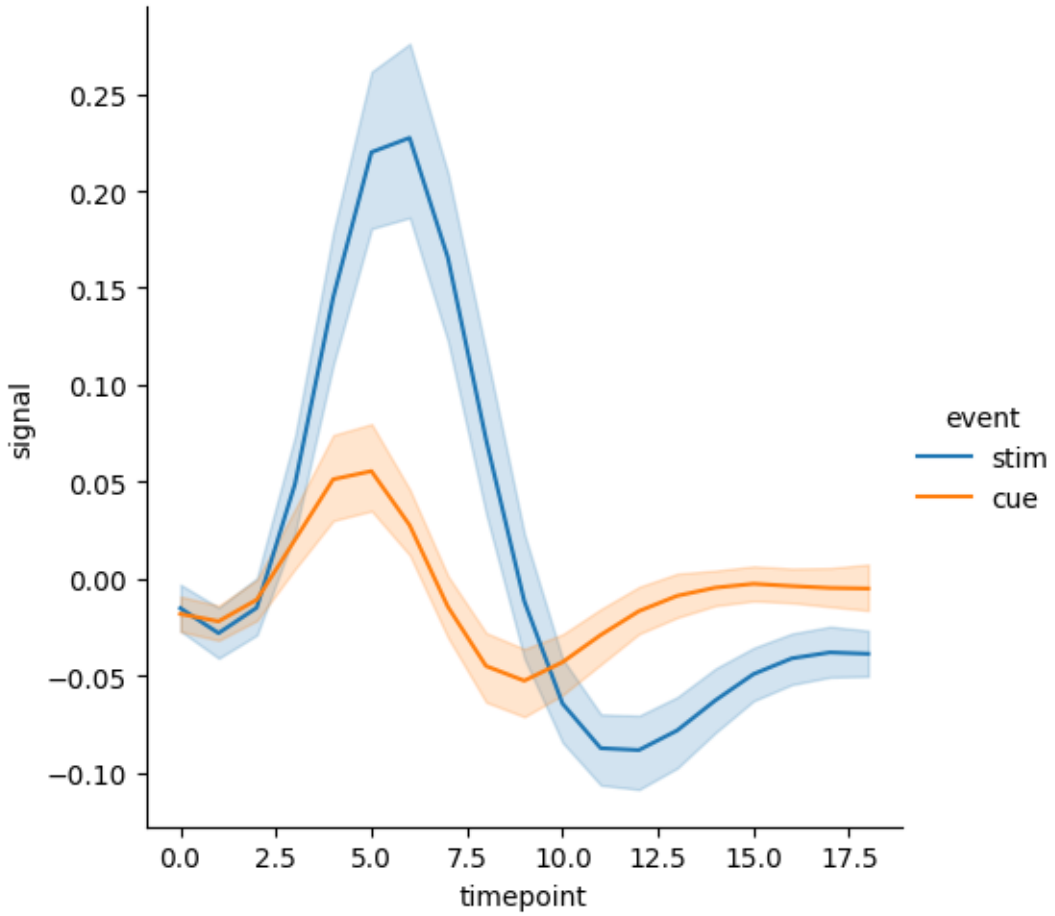
[ ]:
```
# remove error band
sns.relplot(
    data=fmri,kind='line',
    x='timepoint',y='signal',errorbar=None
)
```

[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x7fd44ed89b50>
```



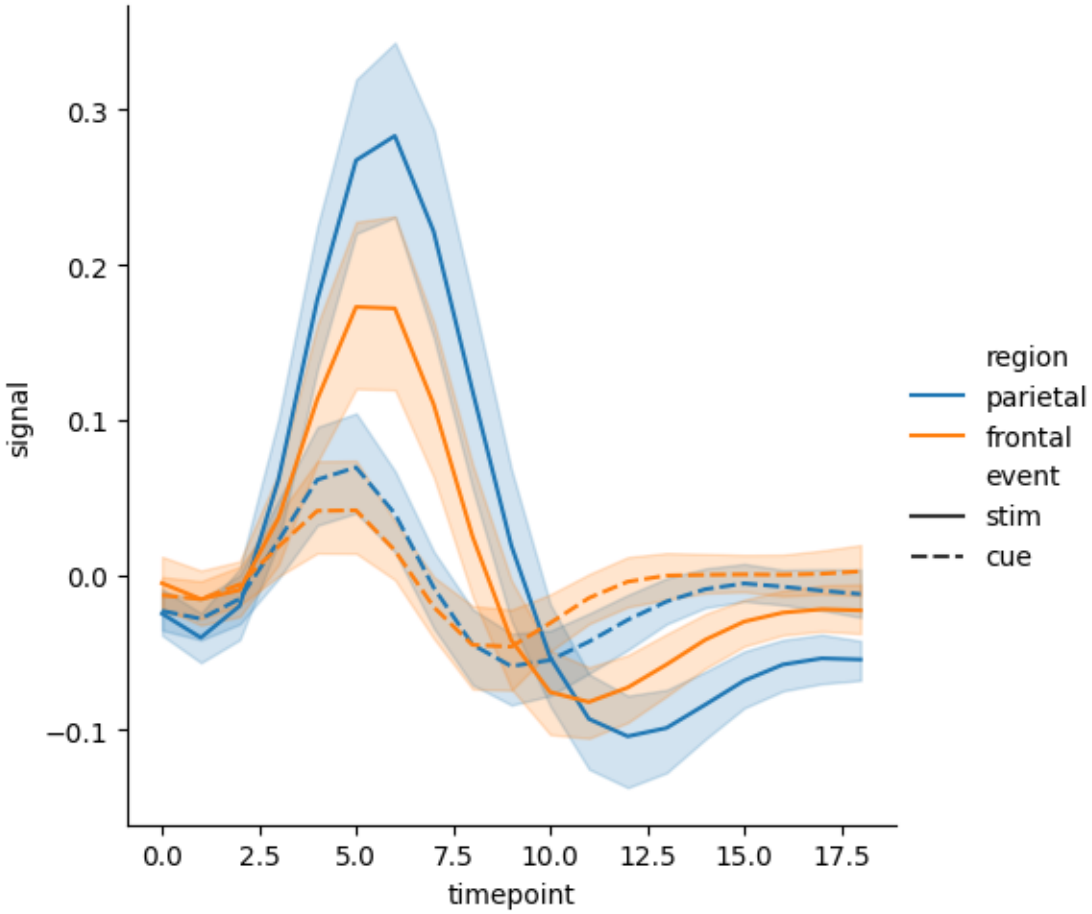
[ ]:
```
#adding a hue sematic with two level splits
#they plot into two lines and error bands

sns.relplot(
    data=fmri,kind='line',
    x='timepoint',y='signal',
    hue='event'
)
```

[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x7fd44cc01c10>
```



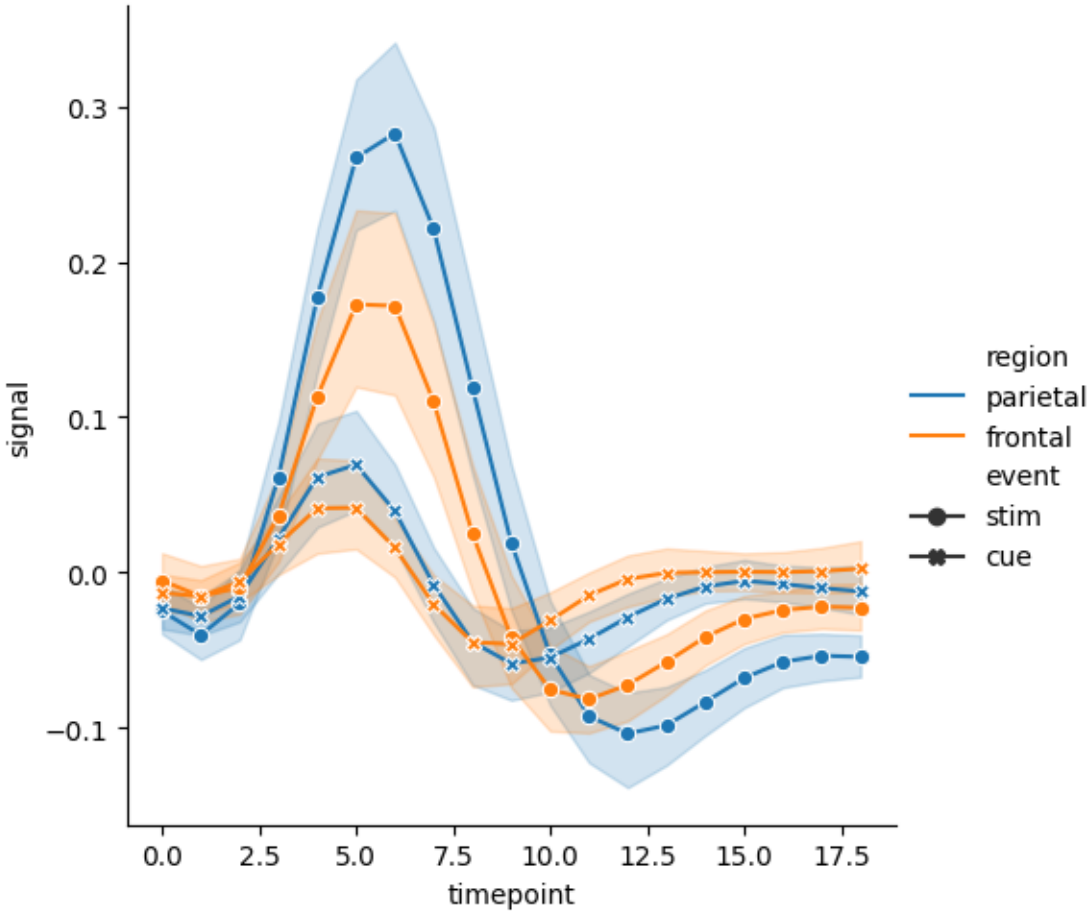
[ ]:
```
sns.relplot(
    data=fmri,kind='line',
    x='timepoint',y='signal',
    hue='region',style='event'
)
```

[ ]: <seaborn.axisgrid.FacetGrid at 0x7fd44c967a10>



[ ]:
```
sns.relplot(
    data=fmri,kind='line',
    x='timepoint',y='signal',
    hue='region',style='event',
    dashes=False,markers=True
)
```

[ ]: <seaborn.axisgrid.FacetGrid at 0x7fd44cc632c0>



[ ]:
```
#categorical scatterplots
#the default representation of the data in catplot()uses a scatterplot.
#there are actually two different categorical scatter plots in seaborn.
```

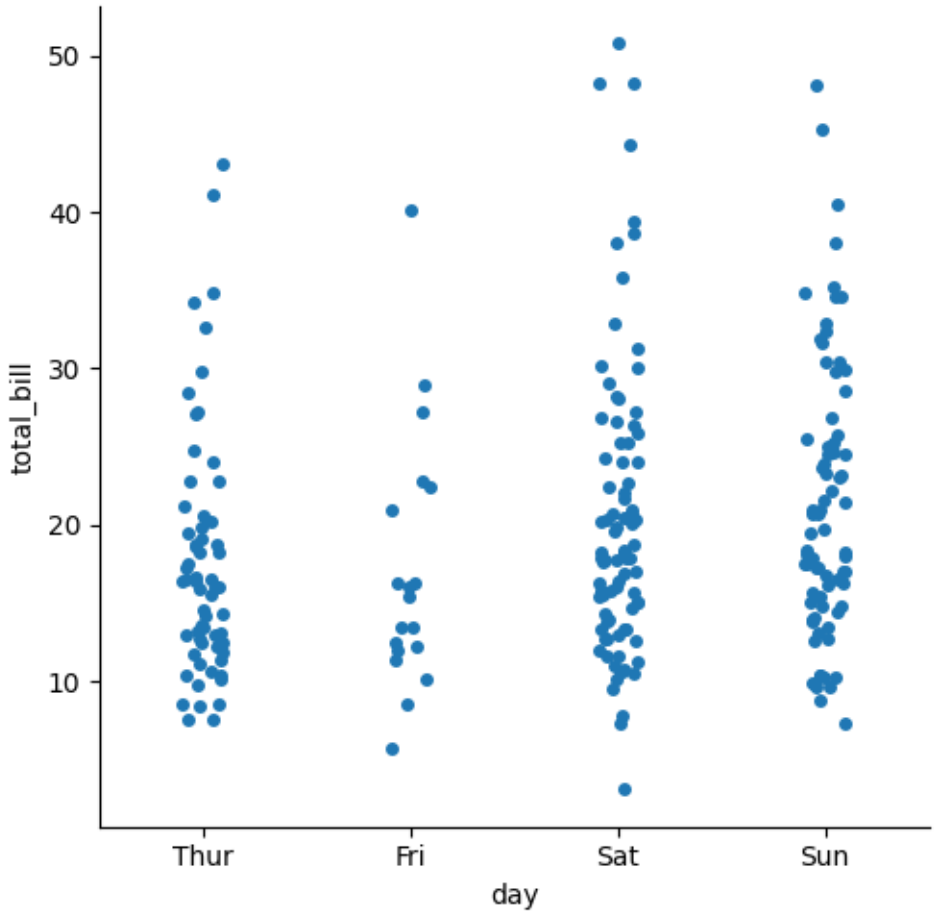
[ ]:
```
import seaborn as sns
tips = sns.load_dataset('tips')
tips.head()
```

[ ]:

	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

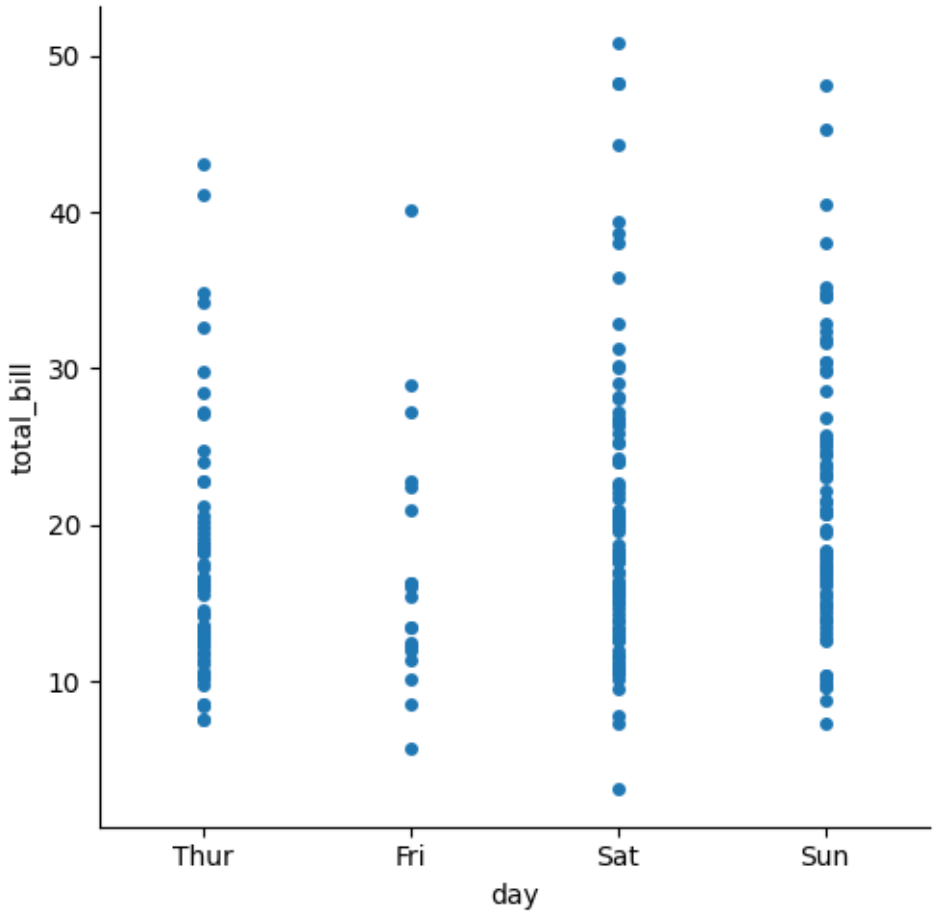
[ ]:
```
sns.catplot(data=tips,x='day',y='total_bill')
```

[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x7fd44cbfe720>
```



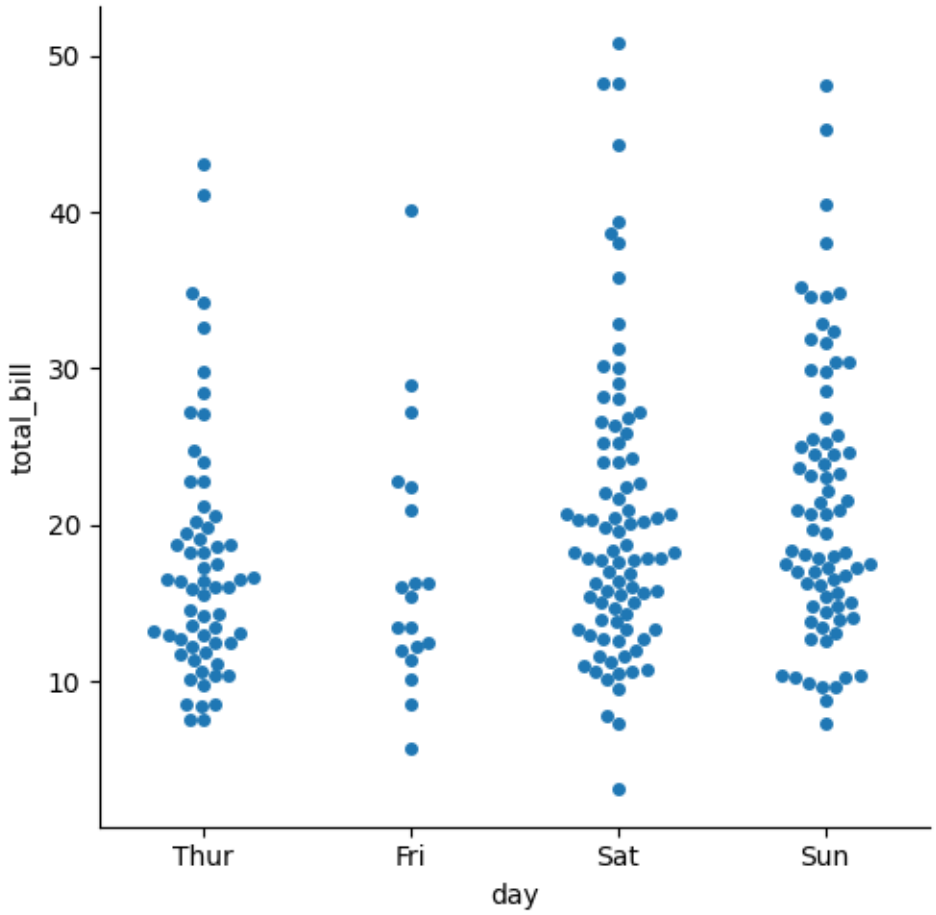
[ ]:
```
#The jitter parameter controls the magnitude of jitter or disables it␣
 ↪altogether:
sns.catplot(data=tips,x='day',y='total_bill',jitter=False)
```

[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x7fd44c9e60f0>
```



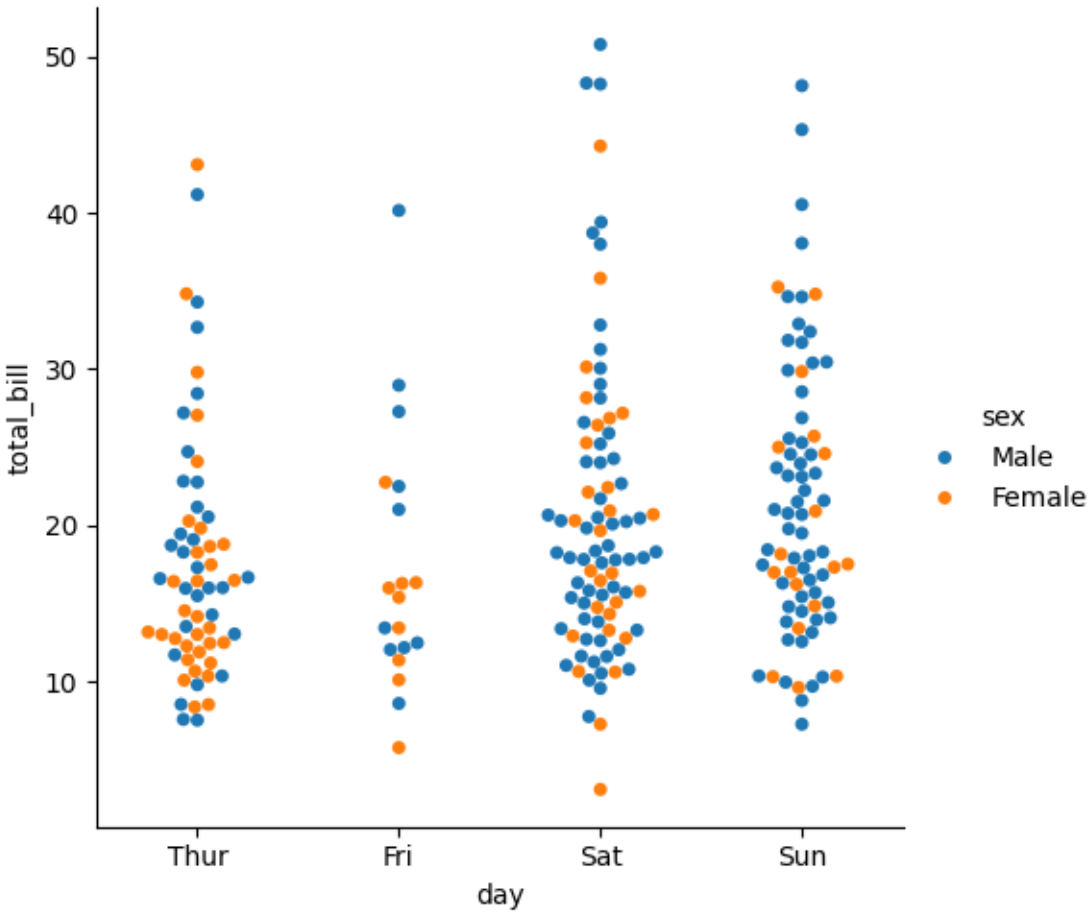
[ ]:
```
#prevent from overlapping(swarm plot)
sns.catplot(data=tips,x='day',y='total_bill',kind='swarm')
```

[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x7fd44c74e060>
```



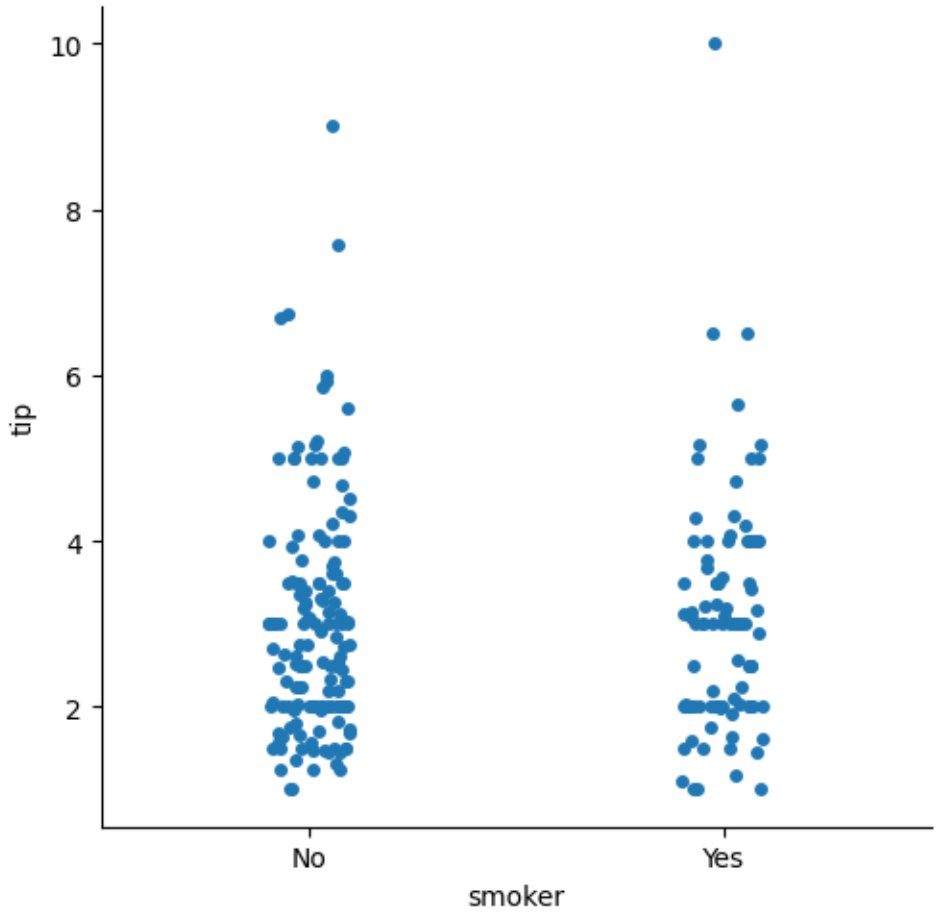
[ ]:
```
#add the hue semantic
import seaborn as sns
tips = sns.load_dataset('tips')
sns.catplot(data=tips,x='day',y='total_bill',hue='sex',kind='swarm')
```

[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x7833d7282e70>
```



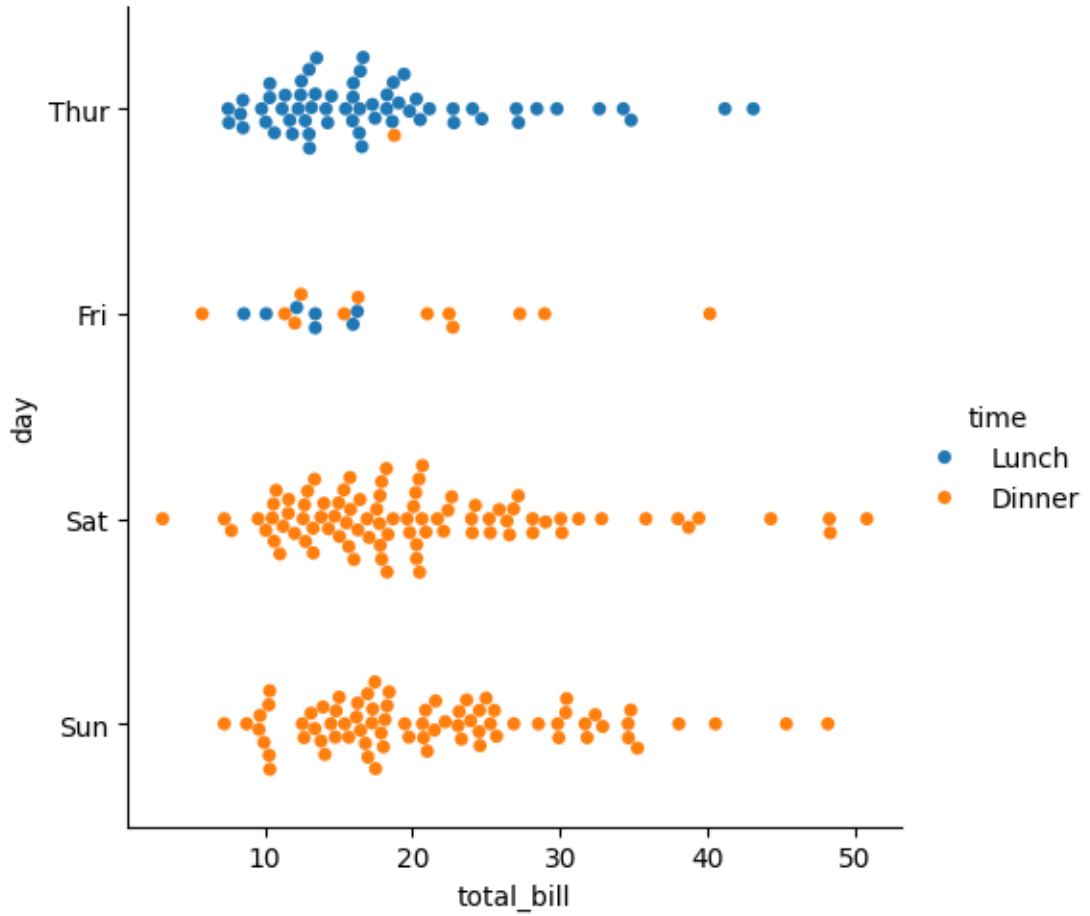
[ ]:
```
#order parameter - to display multiple categorical plot in the same figure
sns.catplot(data=tips,x='smoker',y='tip',order=['No','Yes'])
```

[ ]: <seaborn.axisgrid.FacetGrid at 0x7833d3faa1e0>



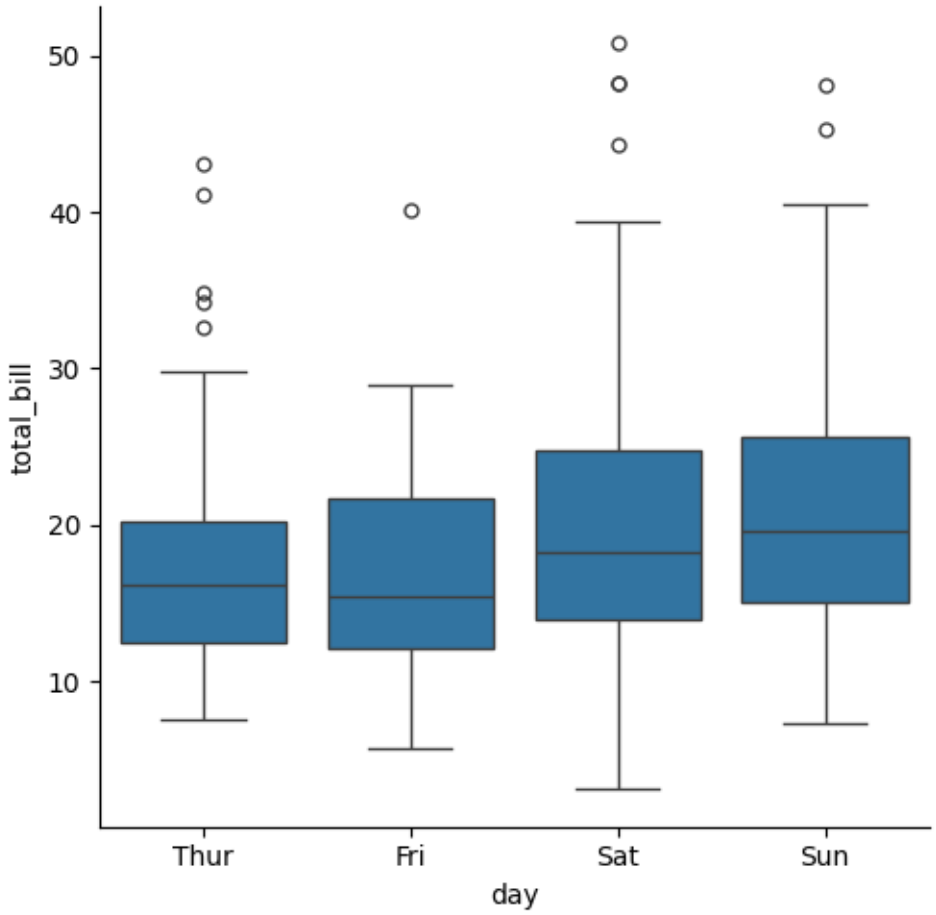
[ ]:
```
#categorical plot on vertical axis
sns.catplot(data=tips,x='total_bill',y='day',hue='time',kind='swarm')
```

[ ]: <seaborn.axisgrid.FacetGrid at 0x7833d3f5fb90>



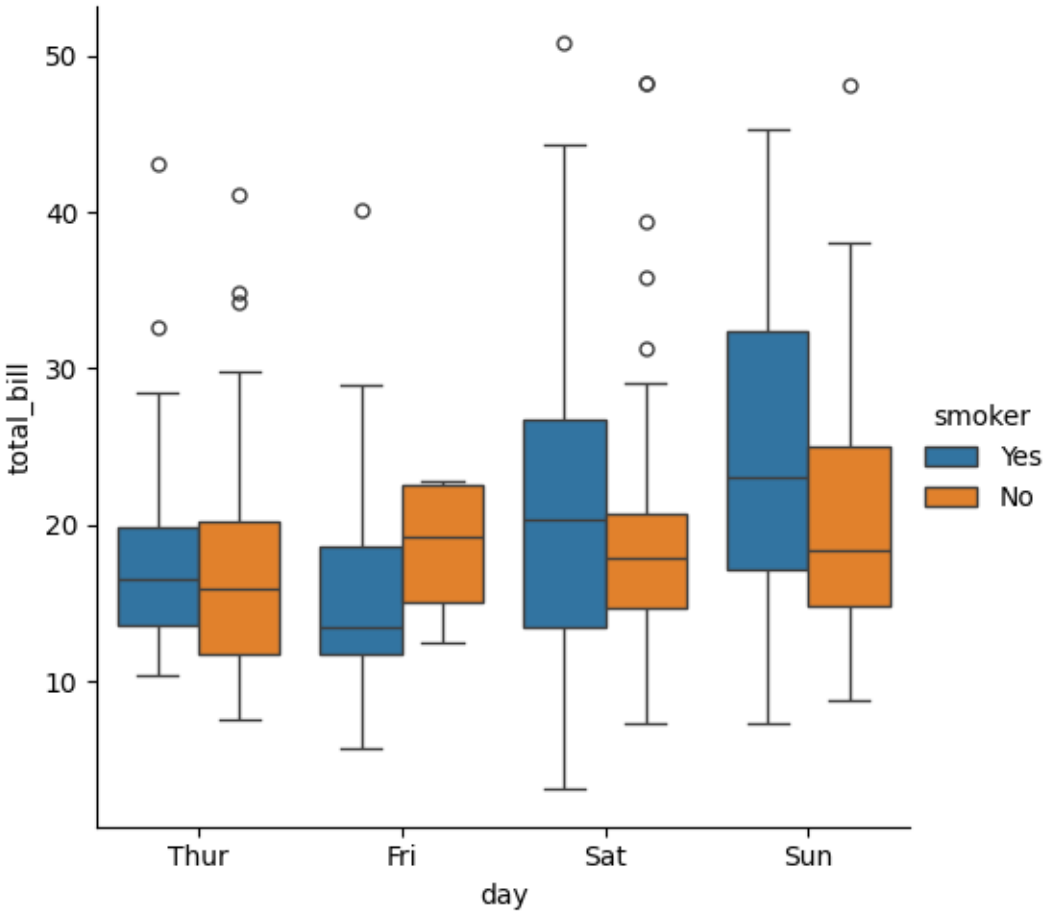
[ ]:
```
#comparing distribution
#box plots
sns.catplot(data=tips,x='day',y='total_bill',kind='box')
```

[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x7833d1c72600>
```



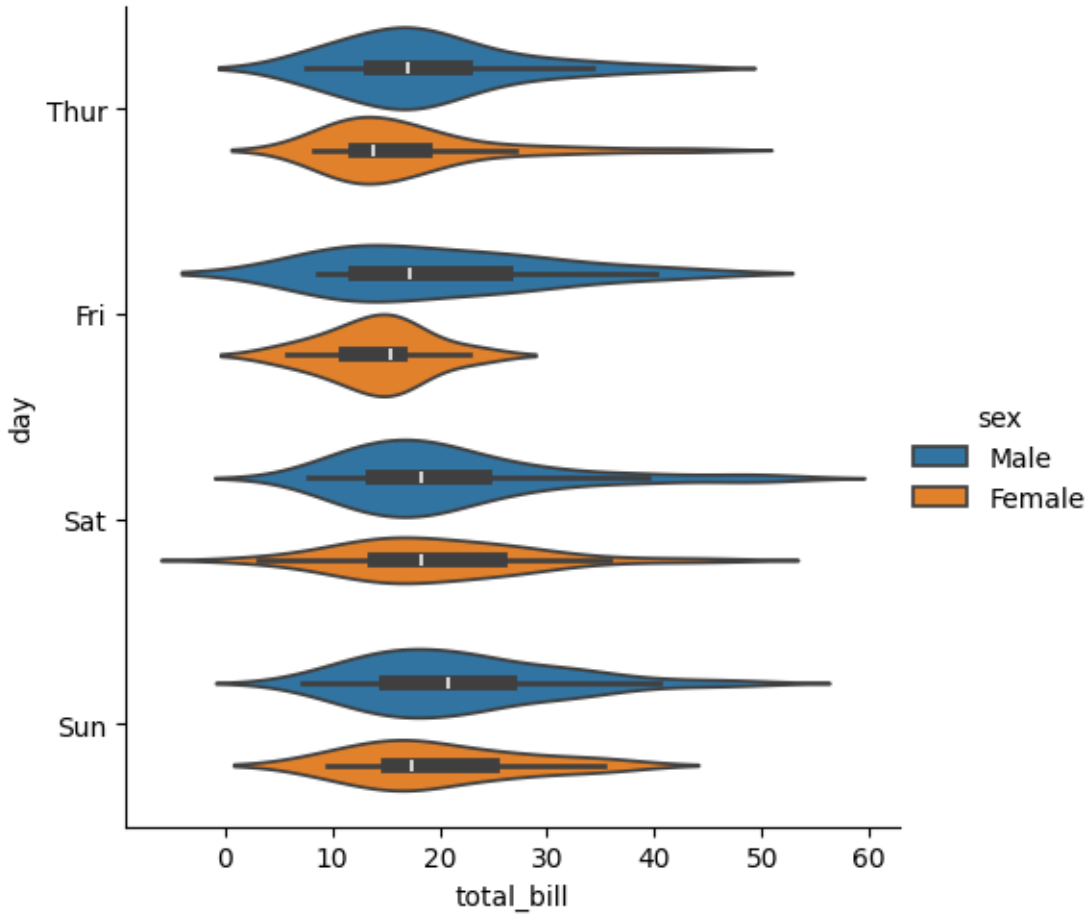
[ ]:
```
#adding hue sematic
sns.catplot(data=tips,x='day',y='total_bill',hue='smoker',kind='box')
```

[ ]: <seaborn.axisgrid.FacetGrid at 0x7833d1b74770>



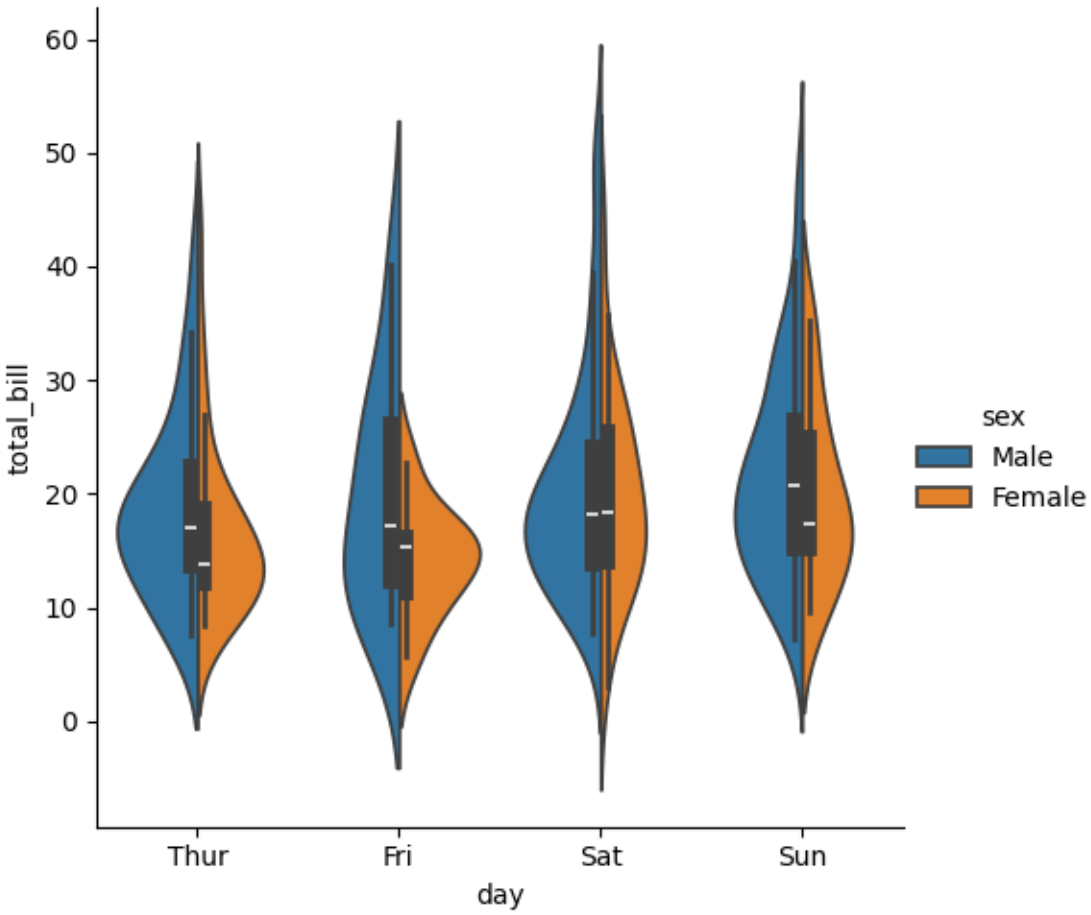
[ ]:
```
#violin plot
sns.catplot(data=tips,x='total_bill',y='day',hue='sex',kind='violin')
```

[ ]: <seaborn.axisgrid.FacetGrid at 0x7833d3fb2c00>



[ ]:
```
#split in the violin plot
sns.catplot(data=tips,x='day',y='total_bill',hue='sex',kind='violin',split=True)
```

[ ]: <seaborn.axisgrid.FacetGrid at 0x7833d184f230>


60
50
40
30
20
10
0
total_bill
Thur
Fri
Sat
Sun
day
sex
Male
Female