Time series

In [2]:
```python
import pandas as pd
myfile=open('C:/Users/NIDHI VIRUPAXI/Desktop/UK-Bank-Customers - Time Series.csv')
df=pd.read_csv(myfile)
print(df)
```

```
      Customer ID       Name   Surname  Gender  Age          Region   \
0       100000001      Simon     Walsh    Male   21         England
1       400000002    Jasmine    Miller  Female   34  Northern Ireland
2       100000003       Liam     Brown    Male   46         England
3       300000004     Trevor      Parr    Male   32           Wales
4       100000005    Deirdre   Pullman  Female   38         England
...           ...        ...       ...     ...  ...             ...
4009    200004010        Sam     Lewis    Male   64        Scotland
4010    200004011      Keith    Hughes    Male   52        Scotland
4011    200004012     Hannah  Springer  Female   50        Scotland
4012    200004013  Christian      Reid    Male   51        Scotland
4013    300004014    Stephen       May    Male   33           Wales

     Job Classification Date Joined    Balance
0          White Collar  2015-01-05  113810.15
1           Blue Collar  2015-01-06   36919.73
2          White Collar  2015-01-07  101536.83
3          White Collar  2015-01-08    1421.52
4           Blue Collar  2015-01-09   35639.79
...                 ...         ...        ...
4009              Other  2015-12-30   19711.66
4010        Blue Collar  2015-12-30   56069.72
4011              Other  2015-12-30   59477.82
4012        Blue Collar  2015-12-30     239.45
4013        Blue Collar  2015-12-30   30293.19

[4014 rows x 9 columns]
```

In [3]:
```python
print(df.isna())
```

```
      Customer ID   Name  Surname  Gender    Age  Region  Job Classification   \
0           False  False    False   False  False   False               False
1           False  False    False   False  False   False               False
2           False  False    False   False  False   False               False
3           False  False    False   False  False   False               False
4           False  False    False   False  False   False               False
...           ...    ...      ...     ...    ...     ...                 ...
4009        False  False    False   False  False   False               False
4010        False  False    False   False  False   False               False
4011        False  False    False   False  False   False               False
4012        False  False    False   False  False   False               False
4013        False  False    False   False  False   False               False

      Date Joined  Balance
0           False    False
1           False    False
2           False    False
3           False    False
4           False    False
...           ...      ...
4009        False    False
4010        False    False
4011        False    False
```

```
4012       False    False
4013       False    False

[4014 rows x 9 columns]
```

In [4]:
```python
print(df.isna().any())
```

```
Customer ID          False
Name                 False
Surname              False
Gender               False
Age                  False
Region               False
Job Classification   False
Date Joined          False
Balance              False
dtype: bool
```

In [5]:
```python
print(df.head(5))
```

```
   Customer ID     Name   Surname  Gender  Age           Region  \
0    100000001    Simon     Walsh    Male   21          England
1    400000002  Jasmine    Miller  Female   34  Northern Ireland
2    100000003     Liam     Brown    Male   46          England
3    300000004   Trevor      Parr    Male   32            Wales
4    100000005  Deirdre   Pullman  Female   38          England

  Job Classification Date Joined    Balance
0       White Collar  2015-01-05  113810.15
1        Blue Collar  2015-01-06   36919.73
2       White Collar  2015-01-07  101536.83
3       White Collar  2015-01-08    1421.52
4        Blue Collar  2015-01-09   35639.79
```

In [6]:
```python
print(df.dtypes)
```

```
Customer ID            int64
Name                  object
Surname               object
Gender                object
Age                    int64
Region                object
Job Classification    object
Date Joined           object
Balance              float64
dtype: object
```

In [7]:
```python
df['Date Joined']=pd.to_datetime(df['Date Joined'])
```

In [8]:
```python
print(df.head(5))
print(df.dtypes)
```

```
   Customer ID     Name   Surname  Gender  Age           Region  \
0    100000001    Simon     Walsh    Male   21          England
1    400000002  Jasmine    Miller  Female   34  Northern Ireland
2    100000003     Liam     Brown    Male   46          England
3    300000004   Trevor      Parr    Male   32            Wales
4    100000005  Deirdre   Pullman  Female   38          England

  Job Classification Date Joined    Balance
```

```
0       White Collar    2015-01-05  113810.15
1        Blue Collar    2015-01-06   36919.73
2       White Collar    2015-01-07  101536.83
3       White Collar    2015-01-08    1421.52
4        Blue Collar    2015-01-09   35639.79
Customer ID                      int64
Name                            object
Surname                         object
Gender                          object
Age                              int64
Region                          object
Job Classification              object
Date Joined             datetime64[ns]
Balance                        float64
dtype: object
```

In [9]:

```python
del df['Date']
```

```
---------------------------------------------------------------------------
KeyError                                  Traceback (most recent call last)
C:\ProgramData\Anaconda3\lib\site-packages\pandas\core\indexes\base.py in get_loc(sel
f, key, method, tolerance)
   3360                try:
-> 3361                    return self._engine.get_loc(casted_key)
   3362                except KeyError as err:

C:\ProgramData\Anaconda3\lib\site-packages\pandas\_libs\index.pyx in pandas._libs.ind
ex.IndexEngine.get_loc()

C:\ProgramData\Anaconda3\lib\site-packages\pandas\_libs\index.pyx in pandas._libs.ind
ex.IndexEngine.get_loc()

pandas\_libs\hashtable_class_helper.pxi in pandas._libs.hashtable.PyObjectHashTable.g
et_item()

pandas\_libs\hashtable_class_helper.pxi in pandas._libs.hashtable.PyObjectHashTable.g
et_item()

KeyError: 'Date'

The above exception was the direct cause of the following exception:

KeyError                                  Traceback (most recent call last)
C:\Users\NIDHIV~1\AppData\Local\Temp/ipykernel_2604/1623641063.py in <module>
----> 1 del df['Date']

C:\ProgramData\Anaconda3\lib\site-packages\pandas\core\generic.py in __delitem__(sel
f, key)
   3961                # there was no match, this call should raise the appropriate
   3962                # exception:
-> 3963                loc = self.axes[-1].get_loc(key)
   3964                self._mgr = self._mgr.idelete(loc)
   3965

C:\ProgramData\Anaconda3\lib\site-packages\pandas\core\indexes\base.py in get_loc(sel
f, key, method, tolerance)
   3361                    return self._engine.get_loc(casted_key)
   3362                except KeyError as err:
-> 3363                    raise KeyError(key) from err
   3364
   3365            if is_scalar(key) and isna(key) and not self.hasnans:

KeyError: 'Date'
```

In [10]:
```python
print(df.head(5))
print(df.dtypes)
```

```
   Customer ID      Name  Surname  Gender  Age            Region  \
0    100000001     Simon    Walsh    Male   21           England
1    400000002   Jasmine   Miller  Female   34  Northern Ireland
2    100000003      Liam    Brown    Male   46           England
3    300000004    Trevor     Parr    Male   32             Wales
4    100000005   Deirdre  Pullman  Female   38           England

  Job Classification Date Joined     Balance
0      White Collar  2015-01-05   113810.15
1       Blue Collar  2015-01-06    36919.73
2      White Collar  2015-01-07   101536.83
3      White Collar  2015-01-08     1421.52
4       Blue Collar  2015-01-09    35639.79
Customer ID                    int64
Name                          object
Surname                       object
Gender                        object
Age                            int64
Region                        object
Job Classification            object
Date Joined           datetime64[ns]
Balance                      float64
dtype: object
```

In [11]:
```python
df.set_index('Date Joined',inplace=True)
```

In [12]:
```python
print(df.head(5))
```

```
            Customer ID      Name  Surname  Gender  Age            Region  \
Date Joined
2015-01-05    100000001     Simon    Walsh    Male   21           England
2015-01-06    400000002   Jasmine   Miller  Female   34  Northern Ireland
2015-01-07    100000003      Liam    Brown    Male   46           England
2015-01-08    300000004    Trevor     Parr    Male   32             Wales
2015-01-09    100000005   Deirdre  Pullman  Female   38           England

            Job Classification     Balance
Date Joined
2015-01-05        White Collar   113810.15
2015-01-06         Blue Collar    36919.73
2015-01-07        White Collar   101536.83
2015-01-08        White Collar     1421.52
2015-01-09         Blue Collar    35639.79
```

In [15]:
```python
import matplotlib.pyplot as plt

df_subset=df['2015-01':'2015-03']
ax=df_subset.plot(fontsize=14,marker='v',color='r',linestyle='--')
plt.show()
```
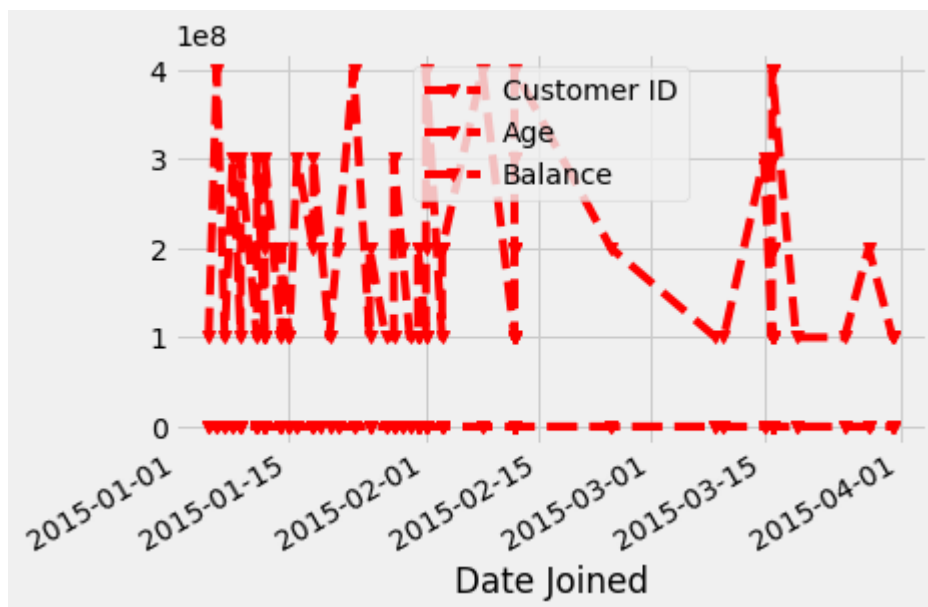
BAR PLOT

In [16]:
```python
import matplotlib.pyplot as plt
fig,ax=plt.subplots()
movie_type=['comedy','action','romance','drama','scifi']
responses=[4,5,6,1,4]
ax.bar(movie_type,responses)
ax.set_ylabel("survey responses")
ax.set_xticklabels(movie_type,rotation=60)
plt.show()
```

C:\Users\NIDHIV~1\AppData\Local\Temp/ipykernel_2604/1146163628.py:7: UserWarning: Fix
edFormatter should only be used together with FixedLocator
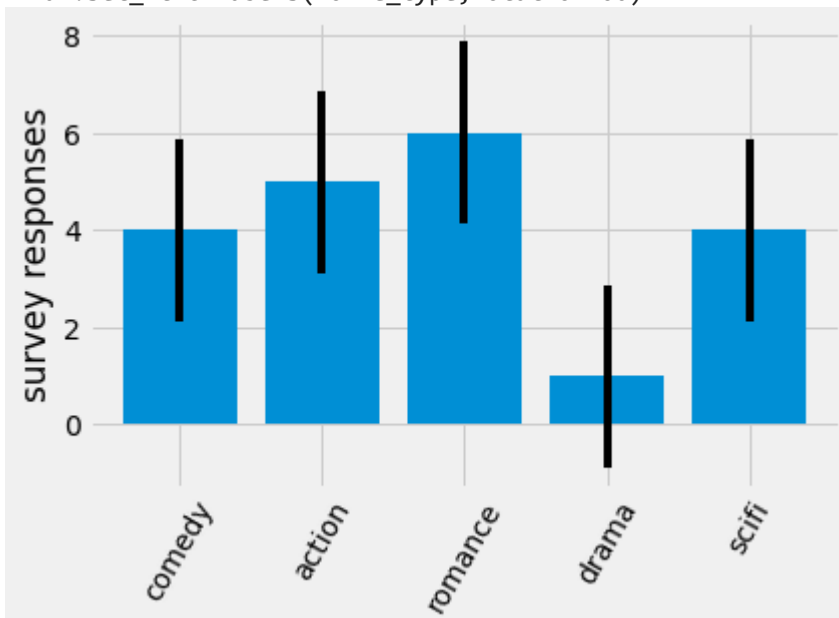 ax.set_xticklabels(movie_type,rotation=60)

In [17]:
```python
import matplotlib.pyplot as plt
import statistics as stat
fig,ax=plt.subplots()
movie_type=['comedy','action','romance','drama','scifi']
responses=[4,5,6,1,4]
response_mean=stat.mean(responses)
response_std=stat.stdev(responses)
```

```python
ax.bar(movie_type,responses,yerr=True)
ax.set_ylabel("survey responses")
ax.set_xticklabels(movie_type,rotation=60)
plt.show()
```

C:\Users\NIDHIV~1\AppData\Local\Temp/ipykernel_2604/2518951414.py:10: UserWarning: Fi
xedFormatter should only be used together with FixedLocator
  ax.set_xticklabels(movie_type,rotation=60)
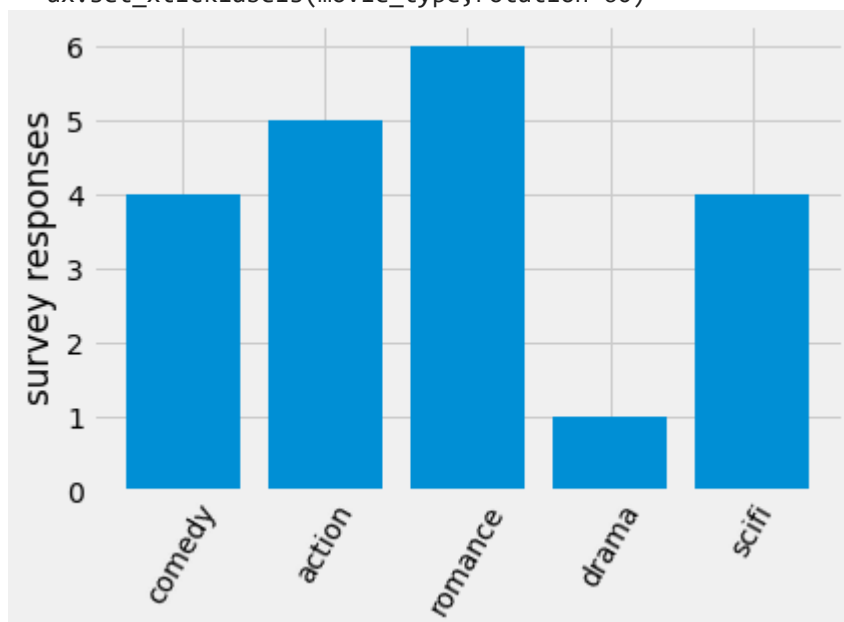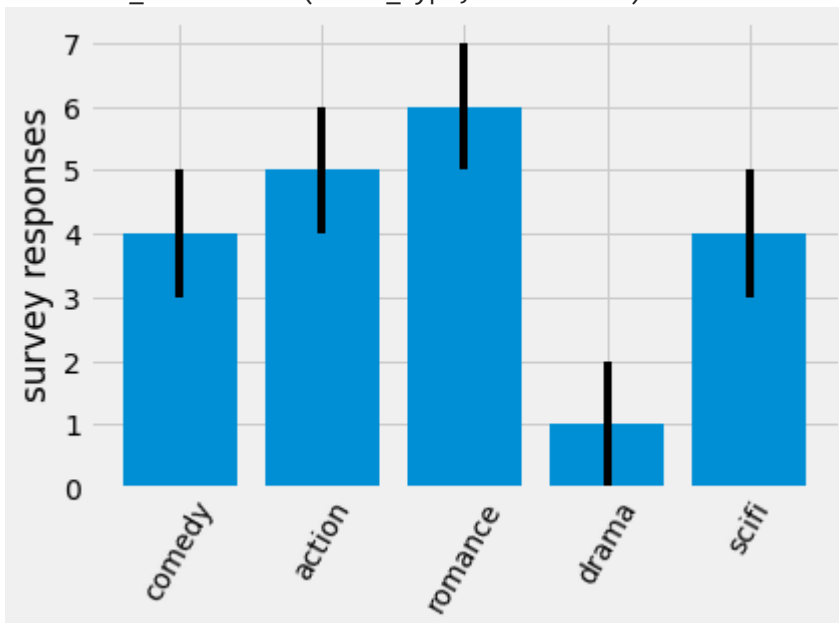
In [18]:
```python
import matplotlib.pyplot as plt
import statistics as stat
fig,ax=plt.subplots()
movie_type=['comedy','action','romance','drama','scifi']
responses=[4,5,6,1,4]
response_mean=stat.mean(responses)
response_std=stat.stdev(responses)
ax.bar(movie_type,responses,yerr=response_std)
ax.set_ylabel("survey responses")
ax.set_xticklabels(movie_type,rotation=60)
plt.show()
```

C:\Users\NIDHIV~1\AppData\Local\Temp/ipykernel_2604/4216033623.py:10: UserWarning: Fi
xedFormatter should only be used together with FixedLocator
  ax.set_xticklabels(movie_type,rotation=60)

STACKED BAR PLOT

In [19]:
```python
import matplotlib.pyplot as plt
fig,ax=plt.subplots()
movie_type=['comedy','action','romance','drama','scifi']
men_responses=[4,5,6,1,4]
women_responses=[8,2,7,2,1]
ax.bar(movie_type,men_responses,color='b',width=0.25)
ax.bar(movie_type,women_responses,color='r',width=0.25)
ax.set_ylabel("survey responses")
ax.set_xticklabels(movie_type,rotation=60)
plt.show()
```

C:\Users\NIDHIV~1\AppData\Local\Temp/ipykernel_2604/2921853938.py:9: UserWarning: Fix
edFormatter should only be used together with FixedLocator
  ax.set_xticklabels(movie_type,rotation=60)
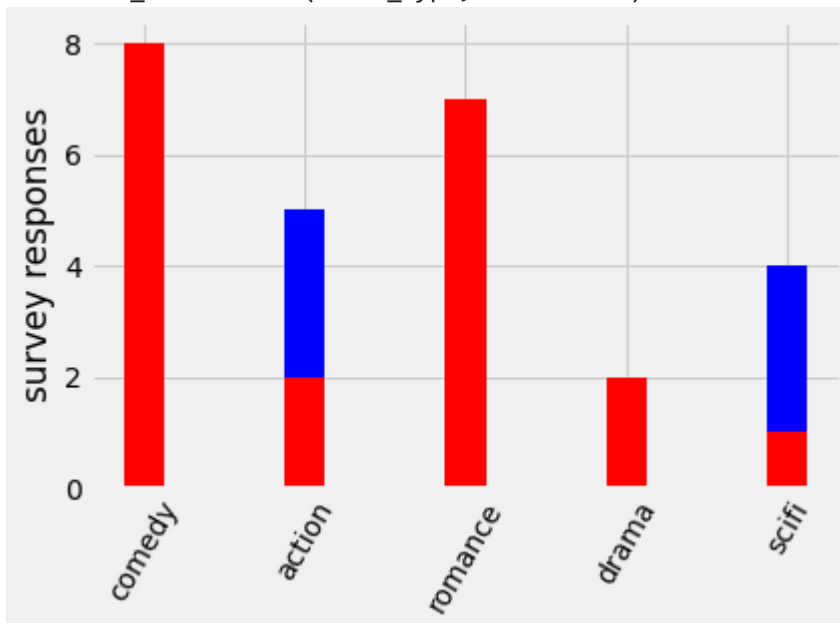
VIOLIN PLOT

In [20]:
```python
import matplotlib.pyplot as plt
import numpy as np
np.random.seed(10)
c_1=np.random.normal(100,10,200)
c_2=np.random.normal(80,30,200)
c_3=np.random.normal(90,20,200)
c_4=np.random.normal(70,25,200)
data_to_plot=[c_1,c_2,c_3,c_4]
fig=plt.figure()
ax=fig.add_axes([0,0,1,1])
ax.violinplot(data_to_plot)
plt.show()
```
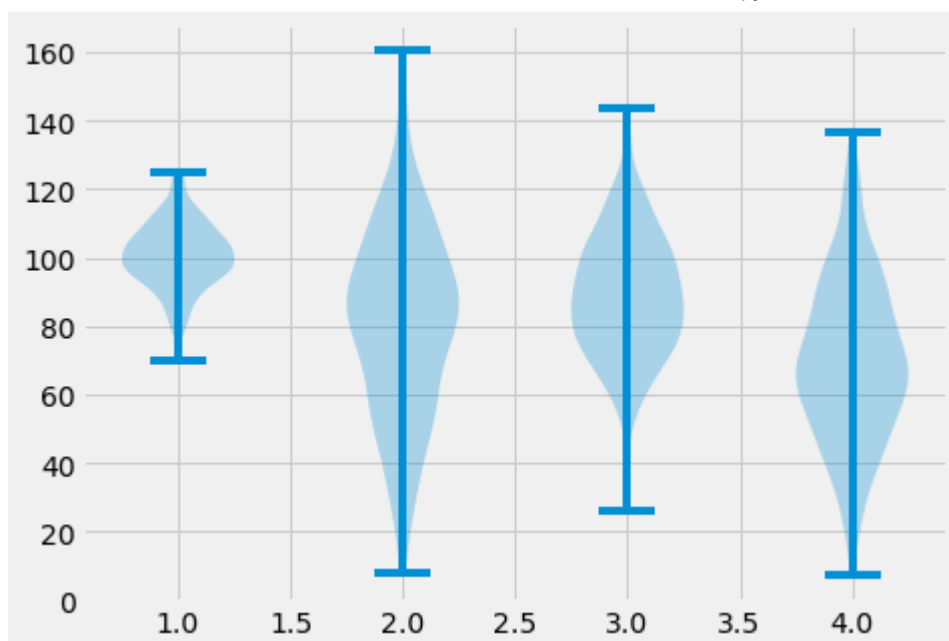
HISTOGRAM PLOT

In [21]:
```python
import matplotlib.pyplot as plt
import numpy as np
fig,ax=plt.subplots(1,1)
a=np.array([22,87,5,43,56,73,55,54,11,20,51,5,79,31,27])
ax.hist(a,bins=5)
ax.set_title("histogram of result")
plt.show()
```
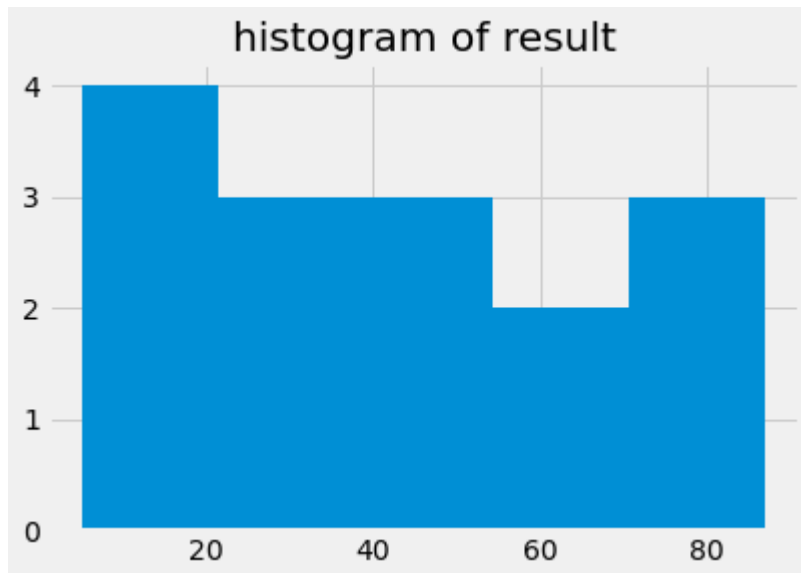

SCATTER PLOT

In [22]:
```python
import matplotlib.pyplot as plt
girls_grade=[89,90,70,89,100,80,90,100,80,34]
boys_grade=[30,29,48,49,100,48,38,45,20,30]
grades=[10,20,30,40,50,60,70,80,90,100]
fig,ax=plt.subplots()
ax.scatter(grades,girls_grade,color='r',label='girls grade')
ax.scatter(grades,boys_grade,color='b',label='boys grade')
ax.legend()
plt.show()
```
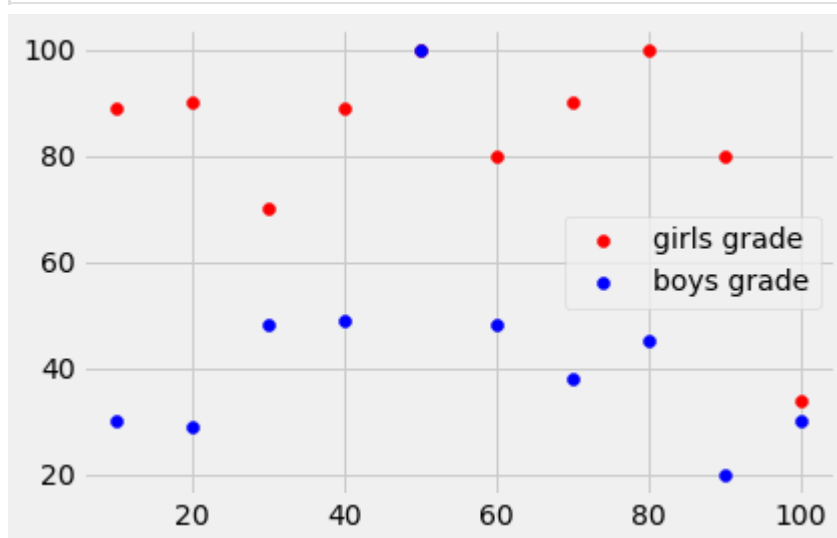
MESHGRID PLOT

In [23]:
```python
import matplotlib.pyplot as plt
import numpy as np
xlist=np.linspace(-3.0,3.0,100)
ylist=np.linspace(-3.0,3.0,100)
x,y=np.meshgrid(xlist,ylist)
z=np.sqrt(x**2+y**2)
fig,ax=plt.subplots(1,1)
cp=ax.contourf(x,y,z)
fig.colorbar(cp)
plt.show()
```
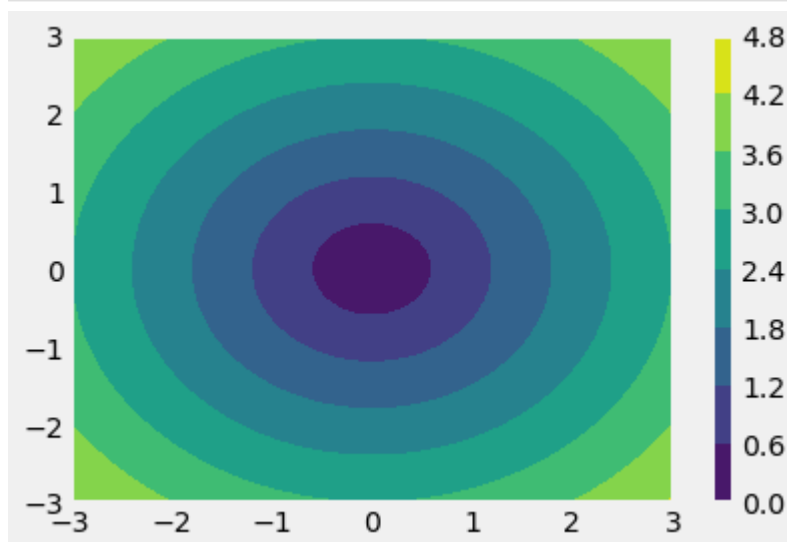

In [24]:
```python
import matplotlib.pyplot as plt
import numpy as np
xlist=np.linspace(-3.0,3.0,100)
ylist=np.linspace(-3.0,3.0,100)
x,y=np.meshgrid(xlist,ylist)
z=np.sqrt(x**2+y**2)
fig,ax=plt.subplots(1,1)
cp=ax.contour(x,y,z)
fig.colorbar(cp)
plt.show()
```
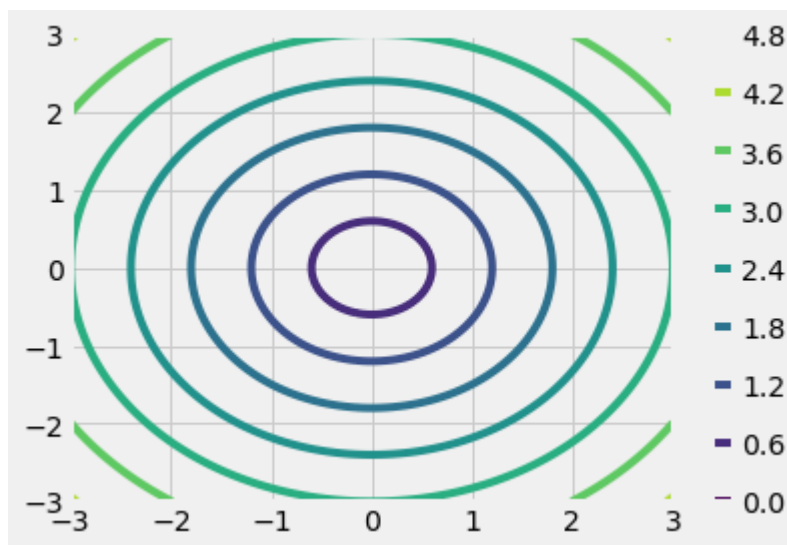
ANNOTATE

In [25]:
```python
import matplotlib.pyplot as plt
fig,ax=plt.subplots(1,1)
x=[5,2,9,4,7]
y=[10,5,8,4,2]
ax.plot(x,y,marker='v',color='r',linestyle='--')
ax.set_ylabel("xlabel")
ax.annotate("local max",xy=(2,5),xytext=(4.5,4),arrowprops=dict(facecolor='black',sh
plt.show()
```
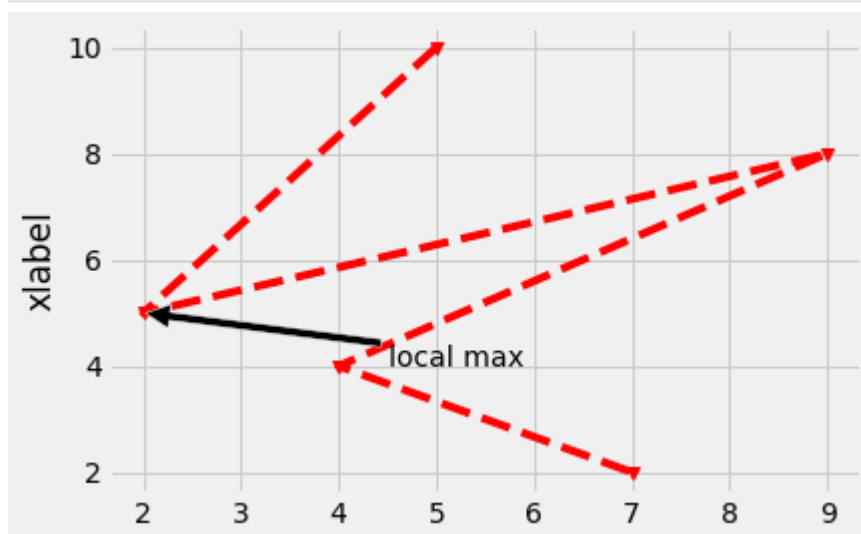

In [26]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
height=[62,64,69,75,66,68,65,71,76,73]
weight=[120,136,148,175,137,165,154,172,200,187]
sns.scatterplot(x=height,y=weight)
plt.show()
```
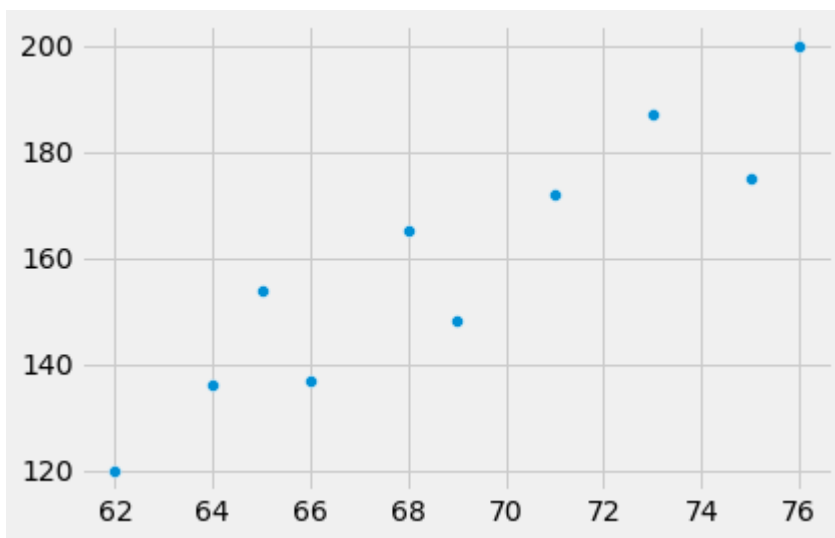
COUNTPLOT

In [27]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
gender=["female","female","female","Male","Male","Male","Male","Male","Male","Male"]
sns.countplot(x=gender)
plt.show()
```
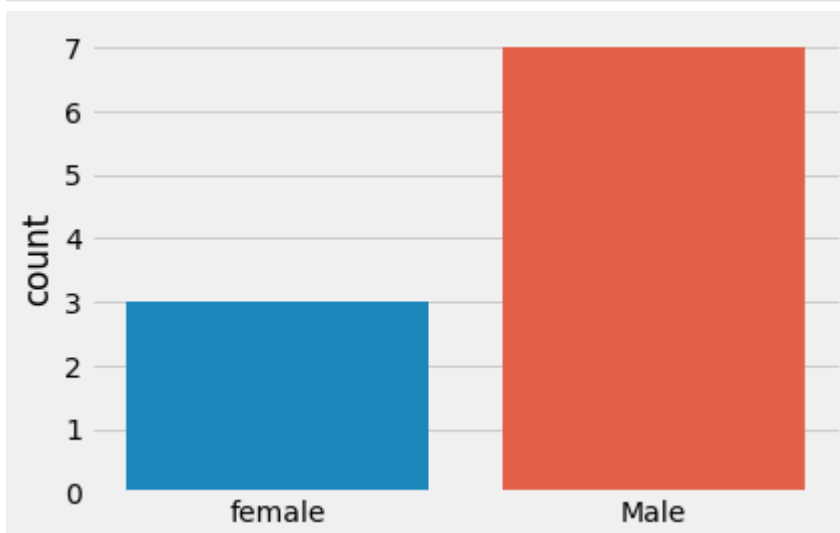

SEABORN

In [28]:
```python
import seaborn as sb
df=sb.load_dataset('tips')
print(df.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
```

In [29]:
```python
print(sb.get_dataset_names())
```

```
['anagrams', 'anscombe', 'attention', 'brain_networks', 'car_crashes', 'diamonds', 'd
ots', 'dowjones', 'exercise', 'flights', 'fmri', 'geyser', 'glue', 'healthexp', 'iri
```

s', 'mpg', 'penguins', 'planets', 'seaice', 'taxis', 'tips', 'titanic', 'anagrams',
'anagrams', 'anscombe', 'anscombe', 'attention', 'attention', 'brain_networks', 'brai
n_networks', 'car_crashes', 'car_crashes', 'diamonds', 'diamonds', 'dots', 'dots', 'd
owjones', 'dowjones', 'exercise', 'exercise', 'flights', 'flights', 'fmri', 'fmri',
'geyser', 'geyser', 'glue', 'glue', 'healthexp', 'healthexp', 'iris', 'iris', 'mpg',
'mpg', 'penguins', 'penguins', 'planets', 'planets', 'seaice', 'seaice', 'taxis', 'ta
xis', 'tips', 'tips', 'titanic', 'titanic', 'anagrams', 'anscombe', 'attention', 'bra
in_networks', 'car_crashes', 'diamonds', 'dots', 'dowjones', 'exercise', 'flights',
'fmri', 'geyser', 'glue', 'healthexp', 'iris', 'mpg', 'penguins', 'planets', 'seaic
e', 'taxis', 'tips', 'titanic']

In [30]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.scatterplot(x="total_bill",y="tip",data=df)
plt.show()
```
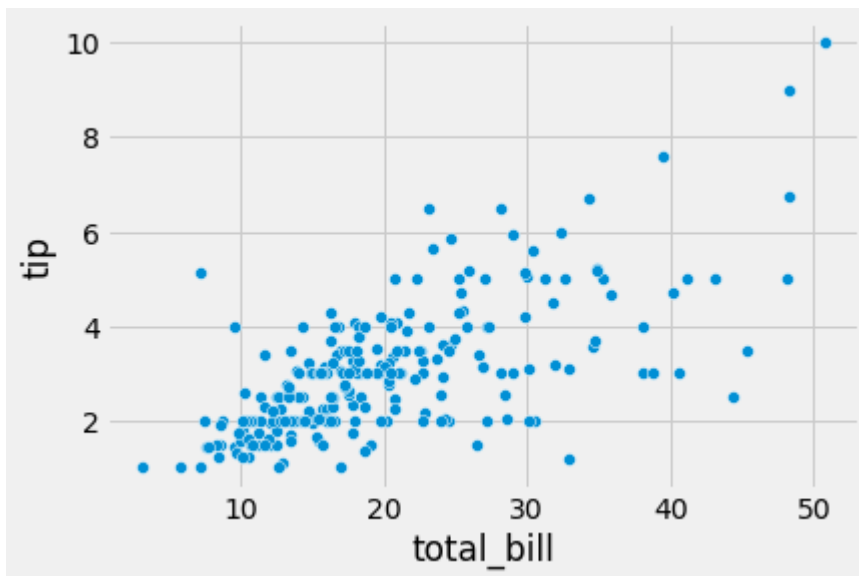

In [31]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.relplot(x="total_bill",y="tip",data=df,kind="scatter")
plt.show()
```
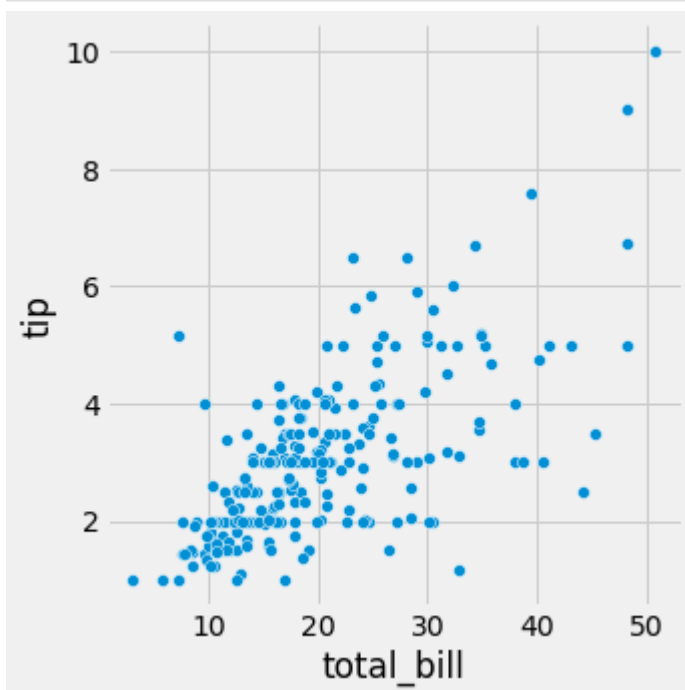
RELPLOT

In [32]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.relplot(x="total_bill",y="tip",data=df,kind="scatter",col="smoker")
plt.show()
```
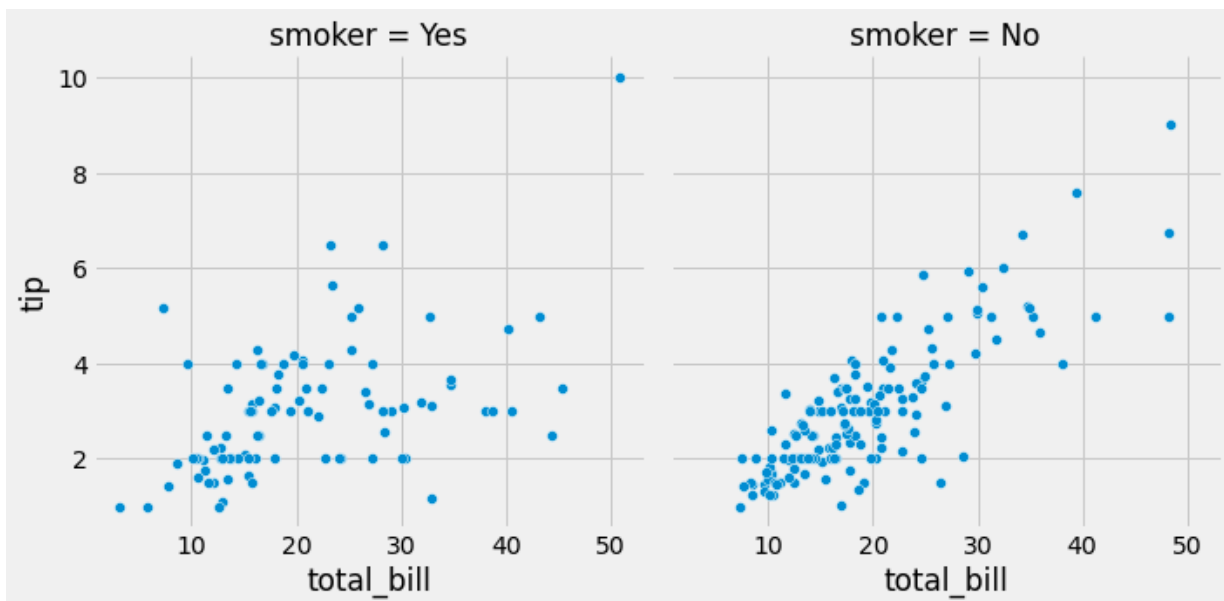

In [33]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.relplot(x="total_bill",y="tip",data=df,kind="scatter",row="smoker")
plt.show()
```
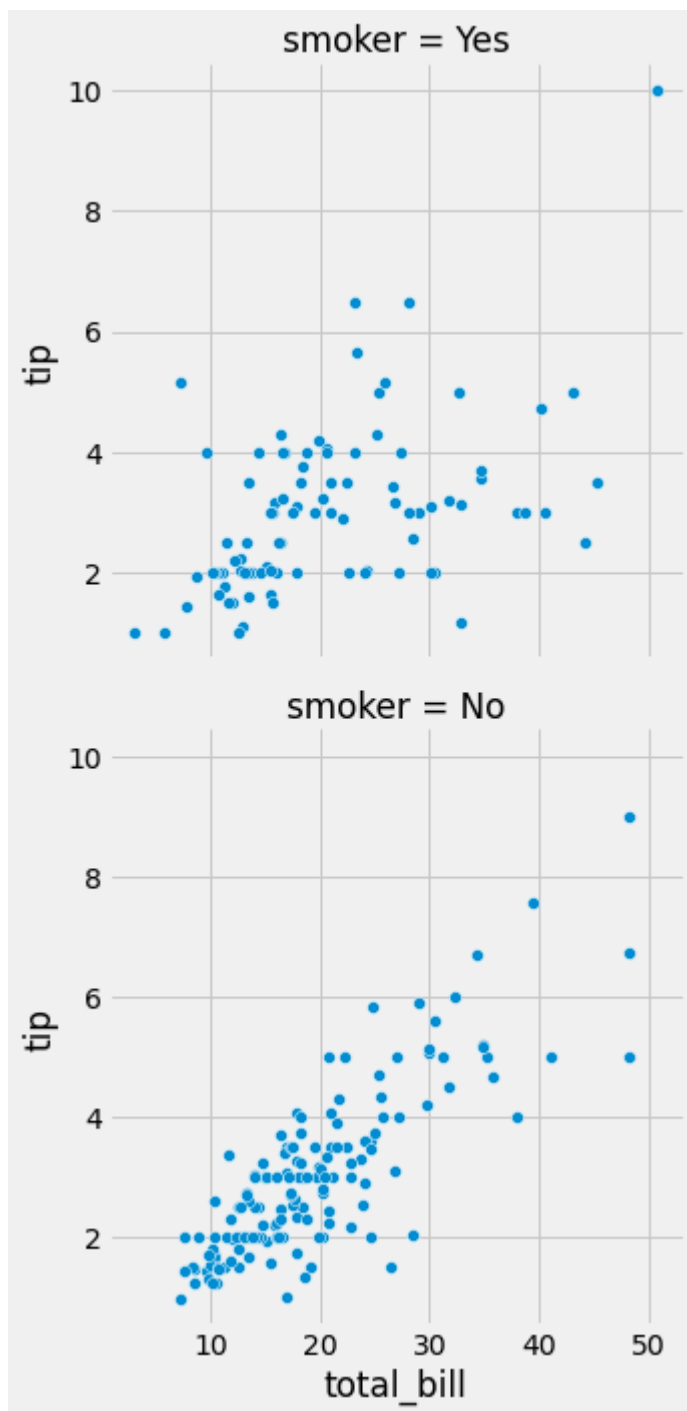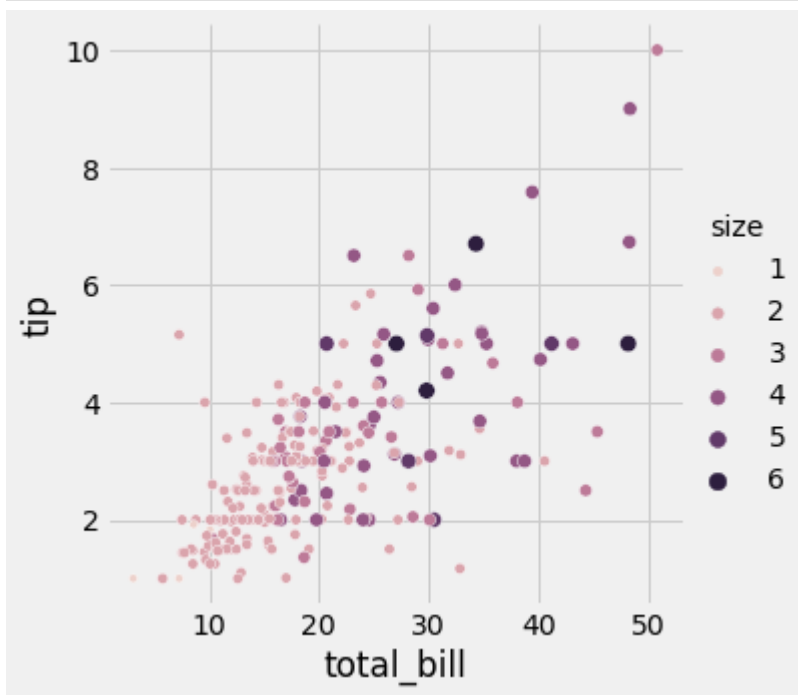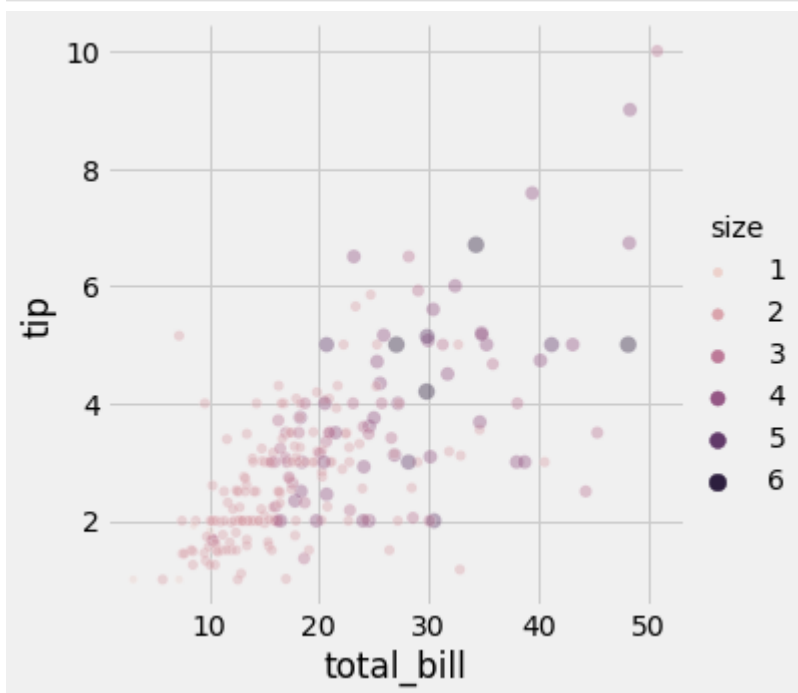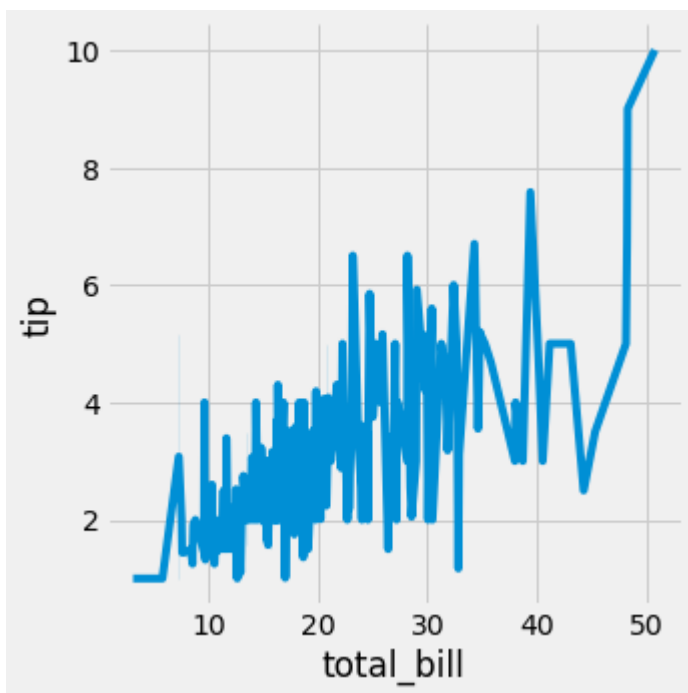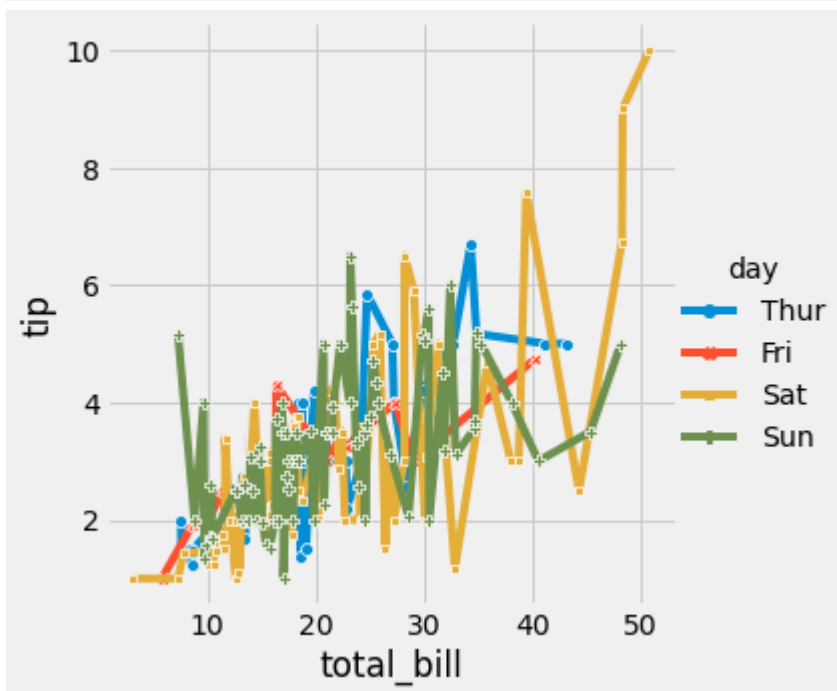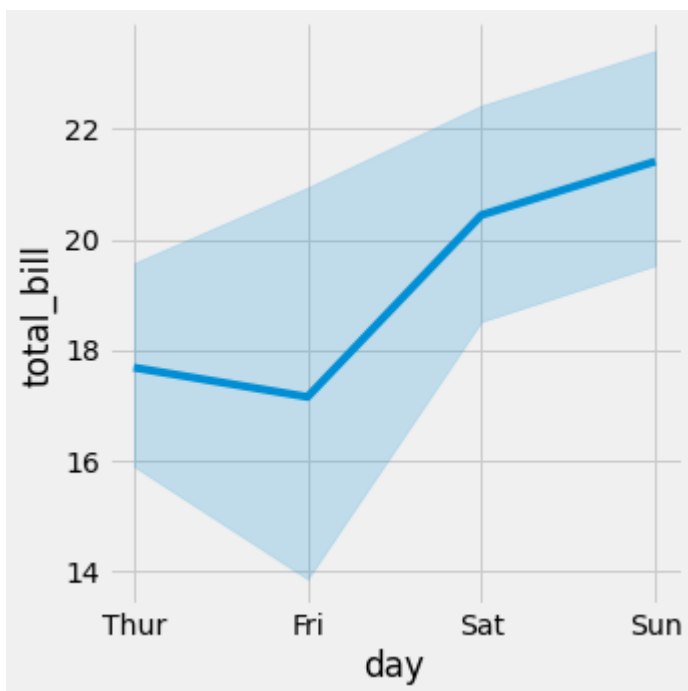
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.relplot(x="total_bill",y="tip",data=df,kind="scatter",col="smoker",row="time")
plt.show()
```
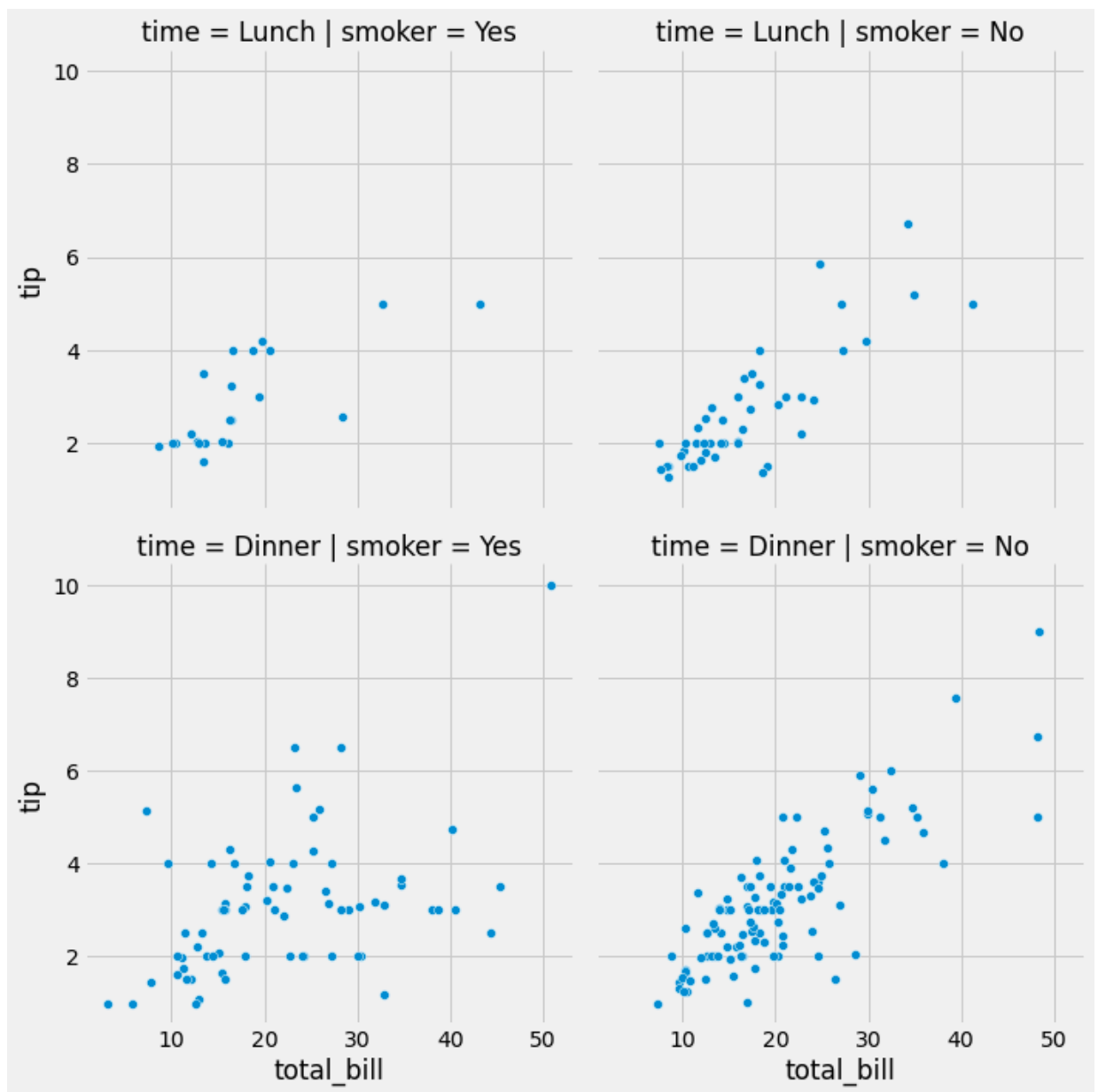
```python
In [35]:   import matplotlib.pyplot as plt
           import seaborn as sns
           sns.relplot(x="total_bill",y="tip",data=df,kind="scatter",col="smoker",row="day")
           plt.show()
```
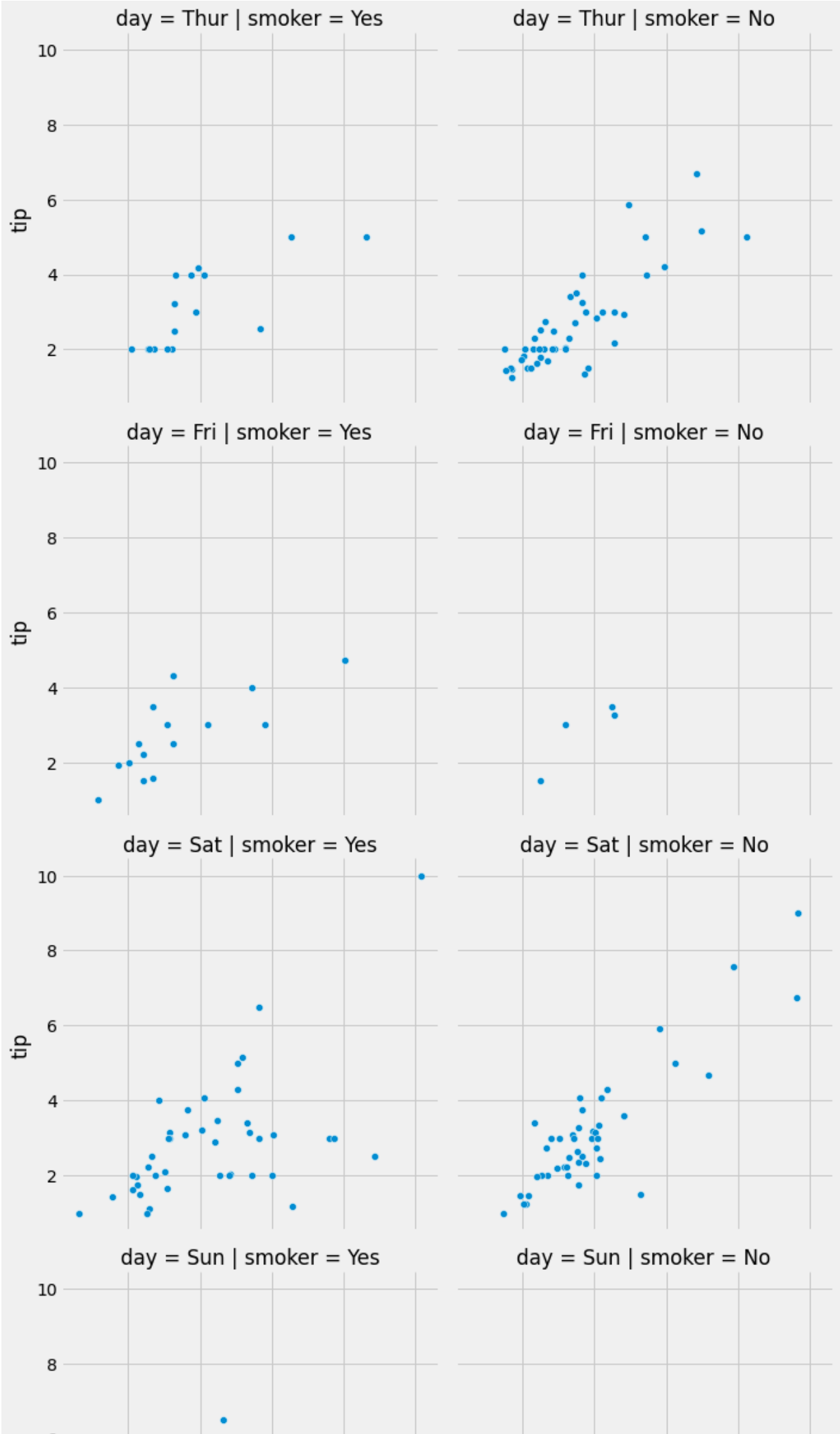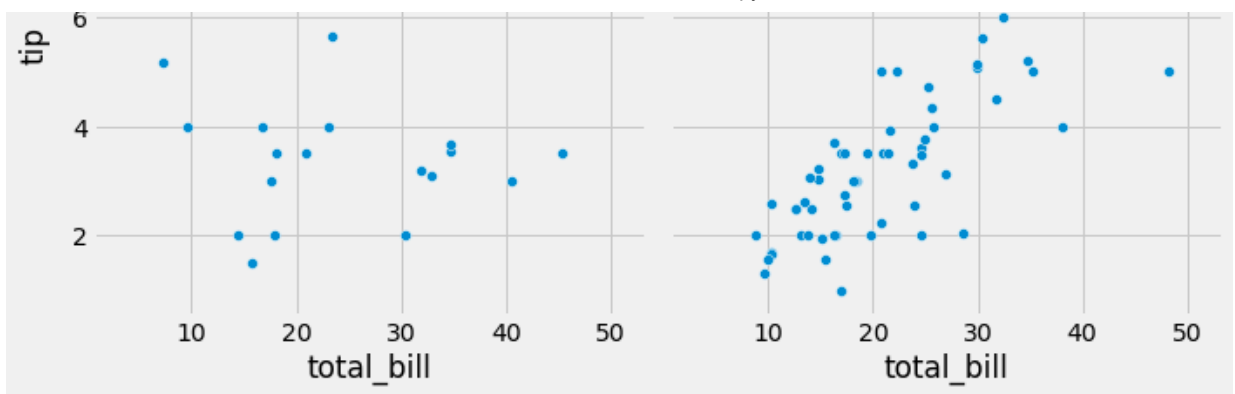
In [39]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.relplot(x="total_bill",y="tip",data=df,kind="scatter",col="day",col_wrap=2,col_o
plt.show()
```
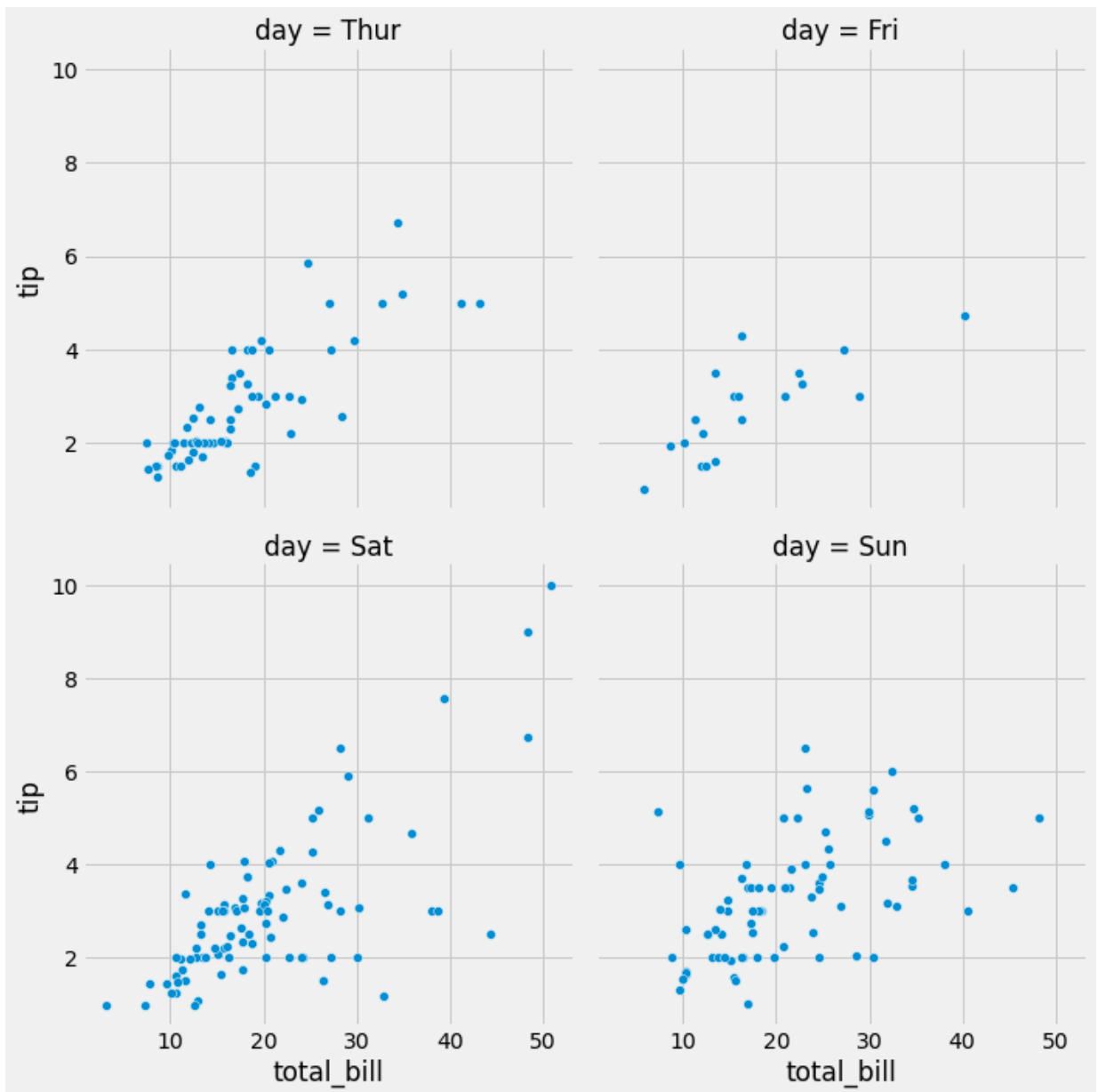

USING HUE

In [40]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.relplot(x="total_bill",y="tip",data=df,kind="scatter",size="size",hue="size")
plt.show()
```

In [41]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.relplot(x="total_bill",y="tip",data=df,kind="scatter",size="size",hue="size",alp
plt.show()
```


Line plot in seaborn
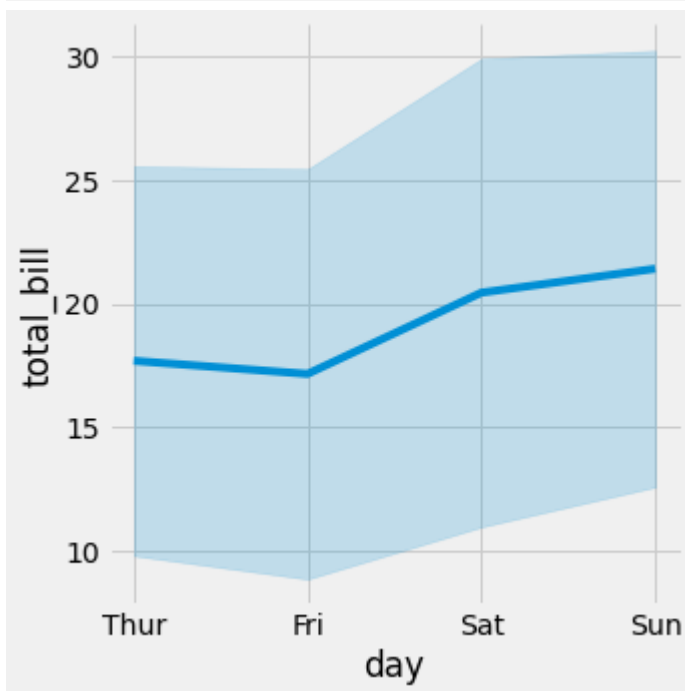
In [43]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.relplot(x="total_bill",y="tip",data=df,kind="line")
plt.show()
```

In [44]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.relplot(x="total_bill",y="tip",data=df,kind="line",style="day",hue="day",markers
plt.show()
```
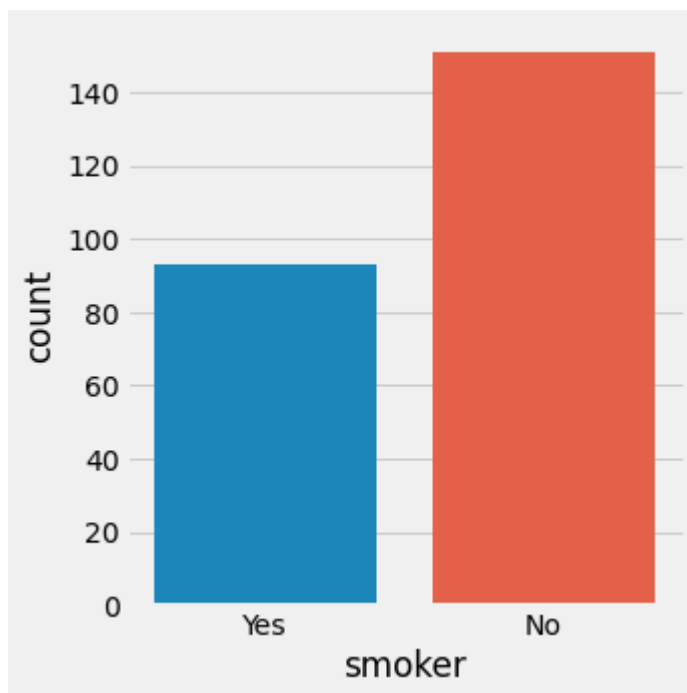

In [45]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.relplot(x="day",y="total_bill",data=df,kind="line")
plt.show()
```
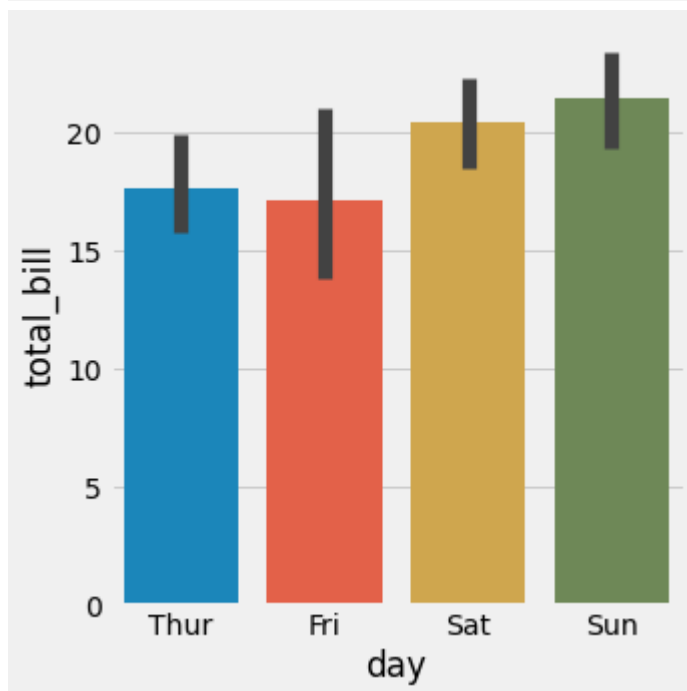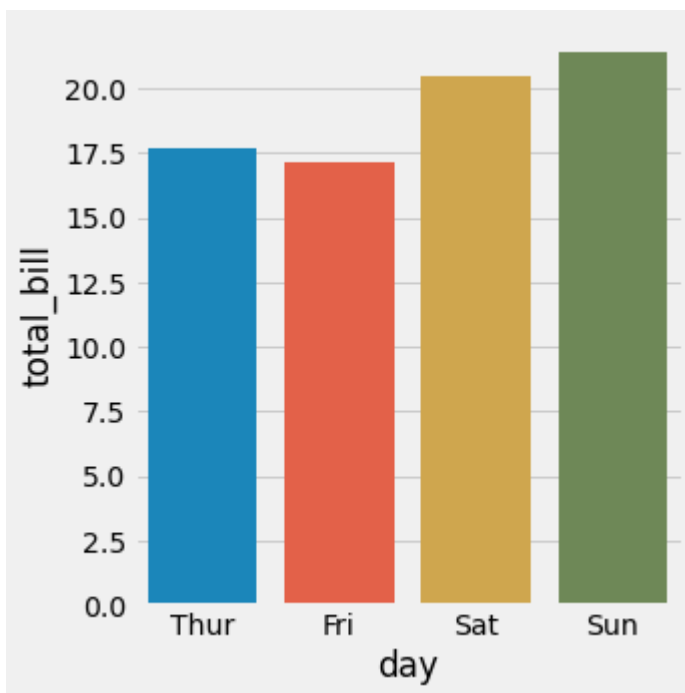
In [46]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.relplot(x="day",y="total_bill",data=df,kind="scatter")
plt.show()
```
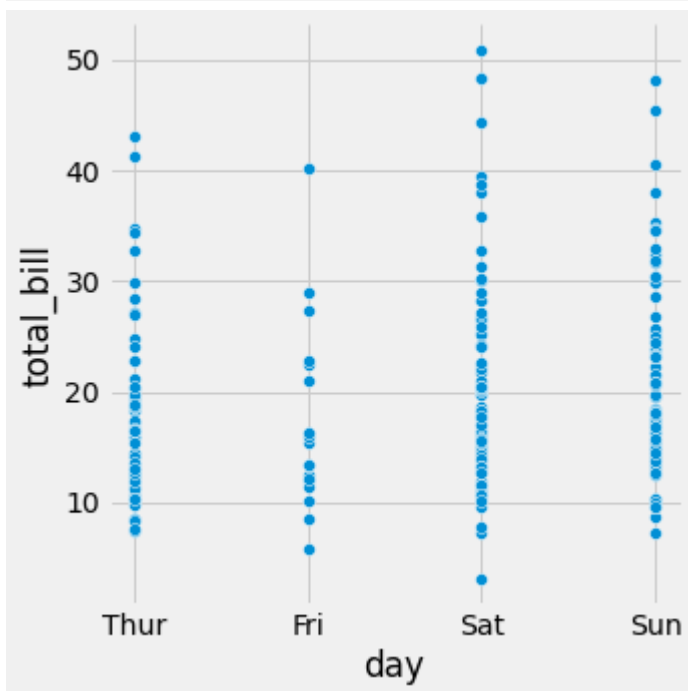

In [47]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.relplot(x="day",y="total_bill",data=df,kind="line",ci=None)
plt.show()
```
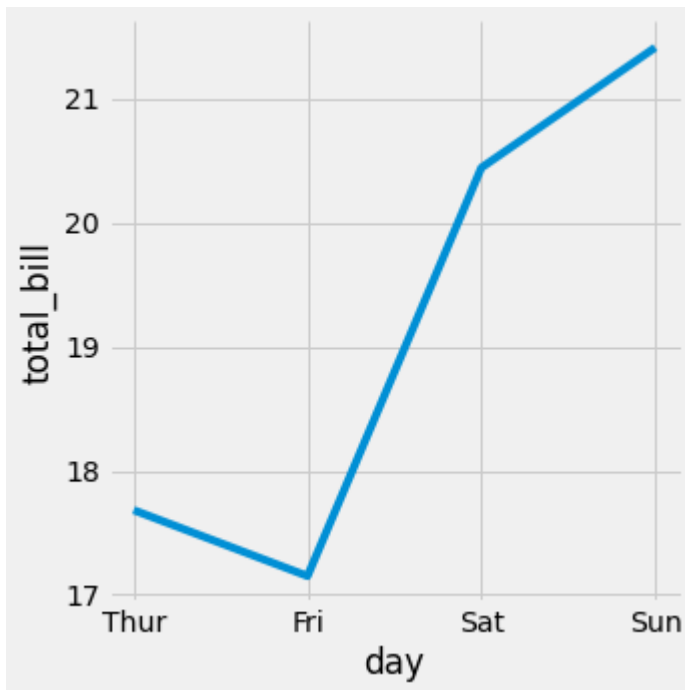
In [48]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.relplot(x="day",y="total_bill",data=df,kind="line",ci='sd')
plt.show()
```


BAR Plot

In [55]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.catplot(x="smoker",data=df,kind='count')
plt.show()
```
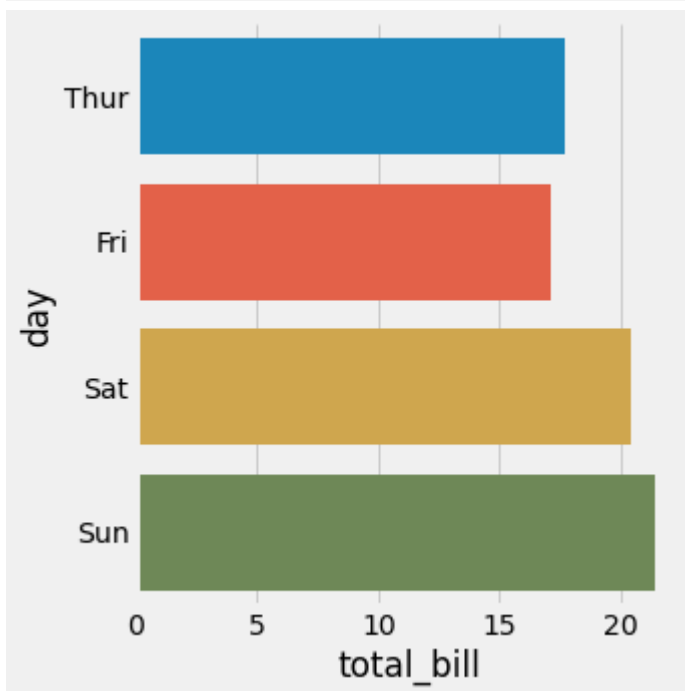
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.catplot(x="day",y="total_bill",data=df,kind='bar')
plt.show()
```

```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.catplot(x="day",y="total_bill",data=df,kind='bar',ci=None)
plt.show()
```
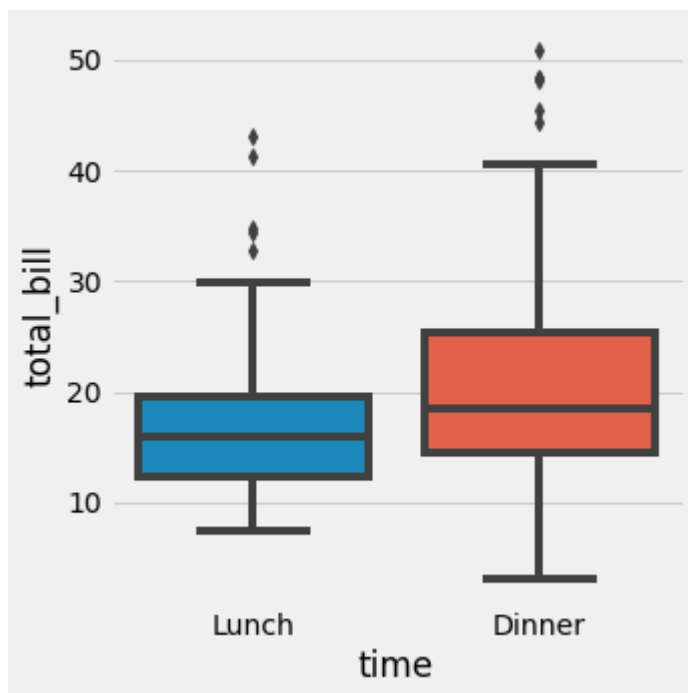
```
In [66]:   import matplotlib.pyplot as plt
           import seaborn as sns
           sns.catplot(x="total_bill",y="day",data=df,kind='bar',ci=None)
           plt.show()
```
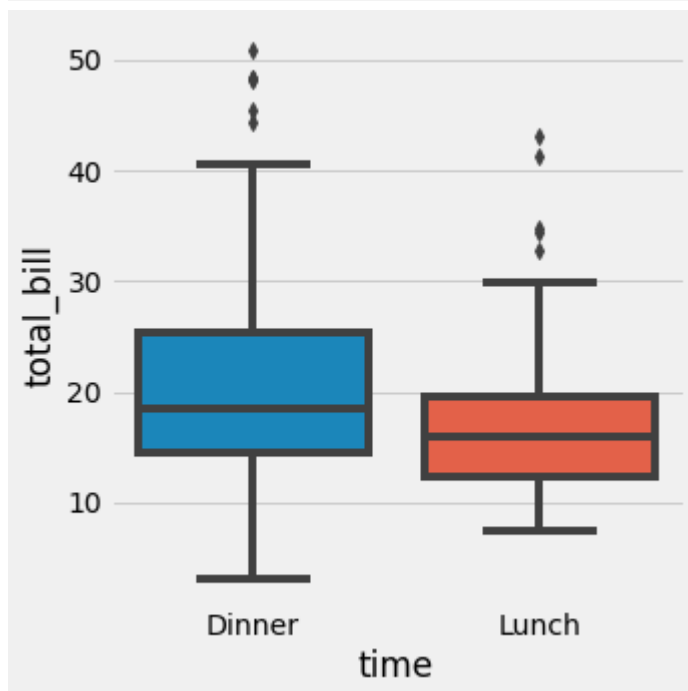

BOX PLOT

```
In [68]:   import matplotlib.pyplot as plt
           import seaborn as sns
           sns.catplot(x='time',y="total_bill",data=df,kind='box')
           plt.show()
```
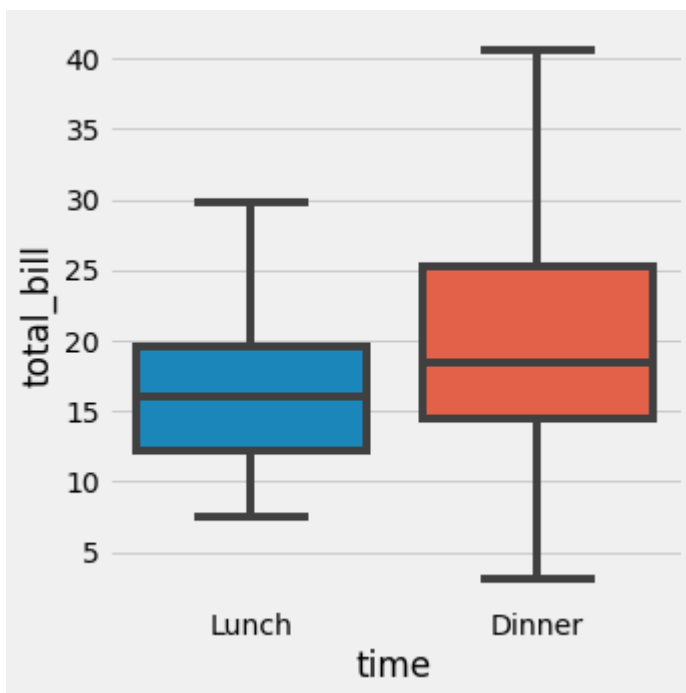
In [69]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.catplot(x='time',y="total_bill",data=df,kind='box',order=['Dinner','Lunch'])
plt.show()
```
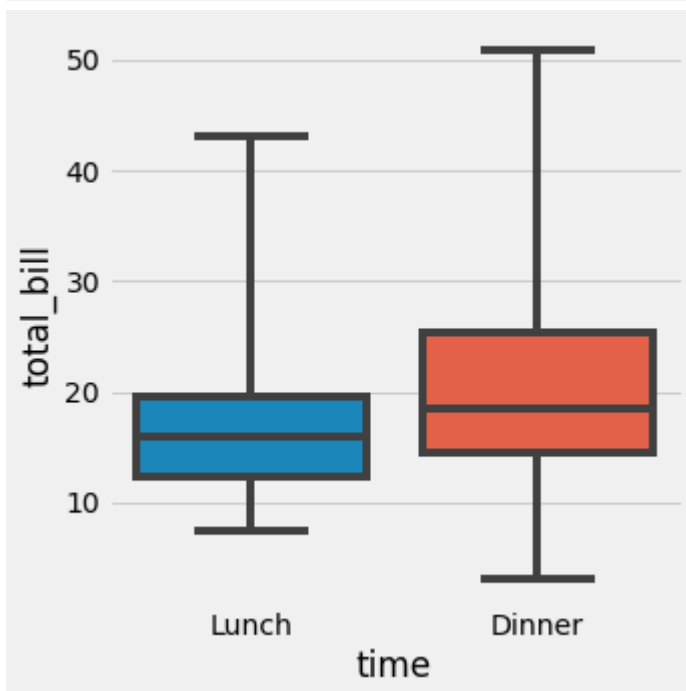

In [70]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.catplot(x='time',y="total_bill",data=df,kind='box',sym="")
plt.show()
```
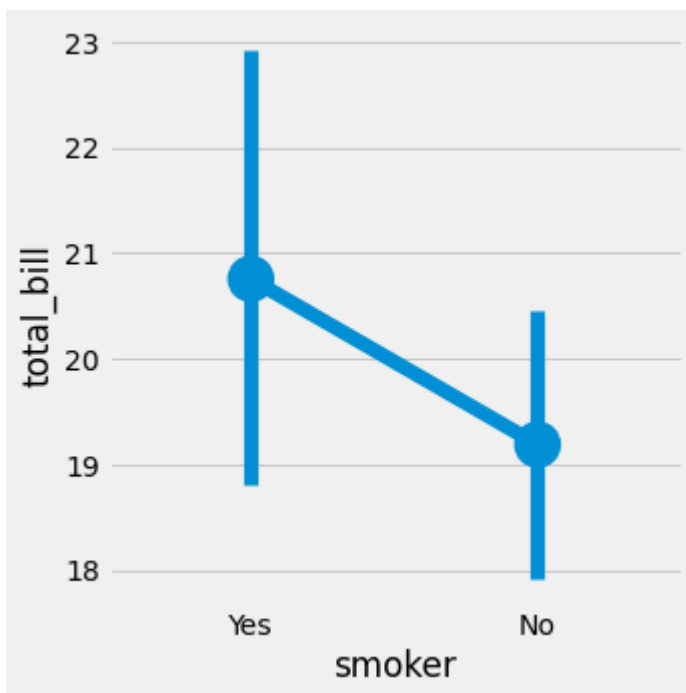
In [71]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.catplot(x='time',y="total_bill",data=df,kind='box',sym="",whis=[0,100])
plt.show()
```


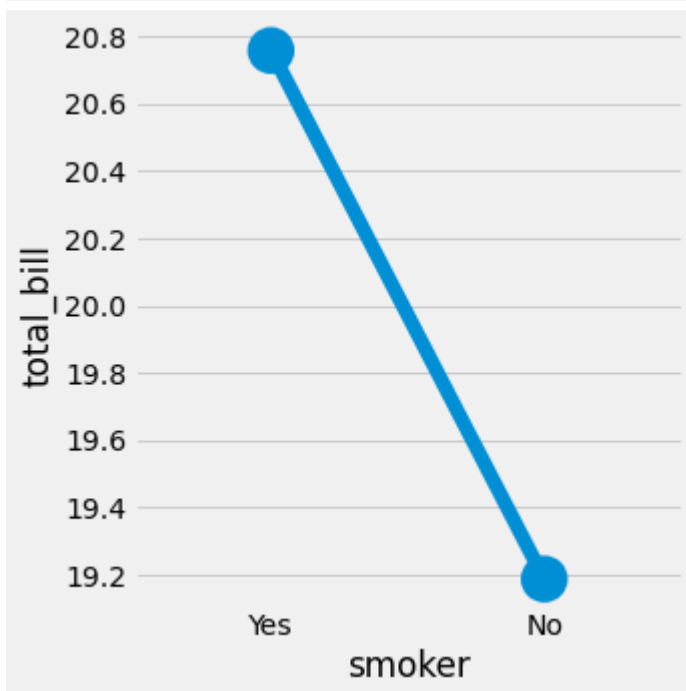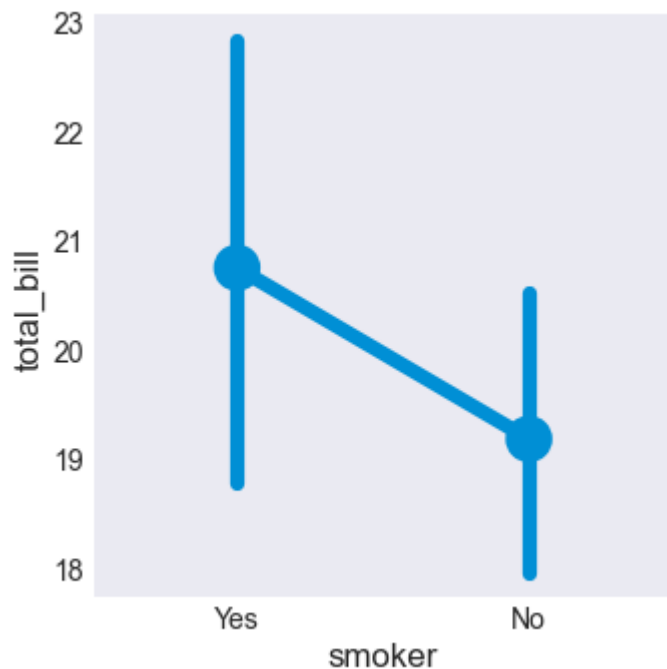# POINT PLOT

In [72]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.catplot(x='smoker',y="total_bill",data=df,kind='point')
plt.show()
```

In [73]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.catplot(x='smoker',y="total_bill",data=df,kind='point',ci=None)
plt.show()
```


In [76]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.catplot(x='smoker',y="total_bill",data=df,kind='point')
sns.set_style("darkgrid")
plt.show()
```
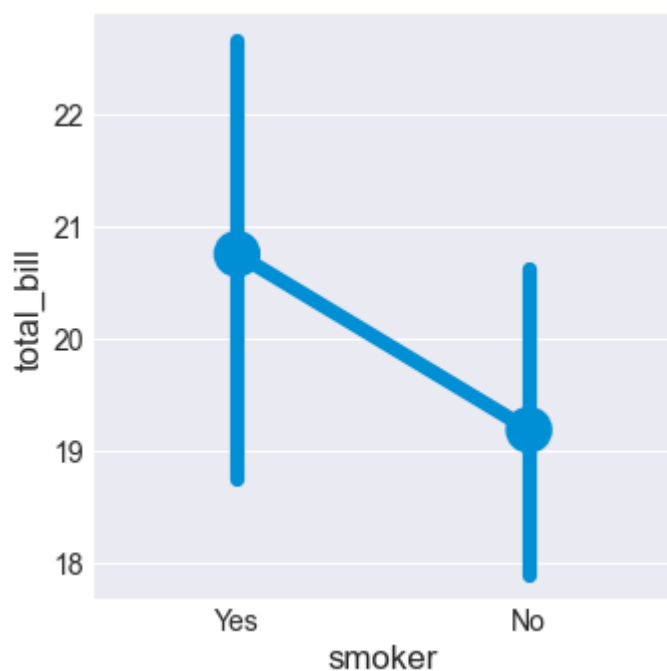
```
In [77]:  import matplotlib.pyplot as plt
          import seaborn as sns
          sns.catplot(x='smoker',y="total_bill",data=df,kind='point')
          sns.set_style("ticks")
          plt.show()
```


SETTING PALETTE COLOR

```
In [79]:  import matplotlib.pyplot as plt
          import seaborn as sns
          sns.catplot(x="day",y="total_bill",data=df,kind='bar',ci=None)
          sns.set_palette("PRGn_r")
          plt.show()
```

In [84]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.scatterplot(x="total_bill",y="tip",data=df)
sns.set_palette("RdBu")
plt.show()
```
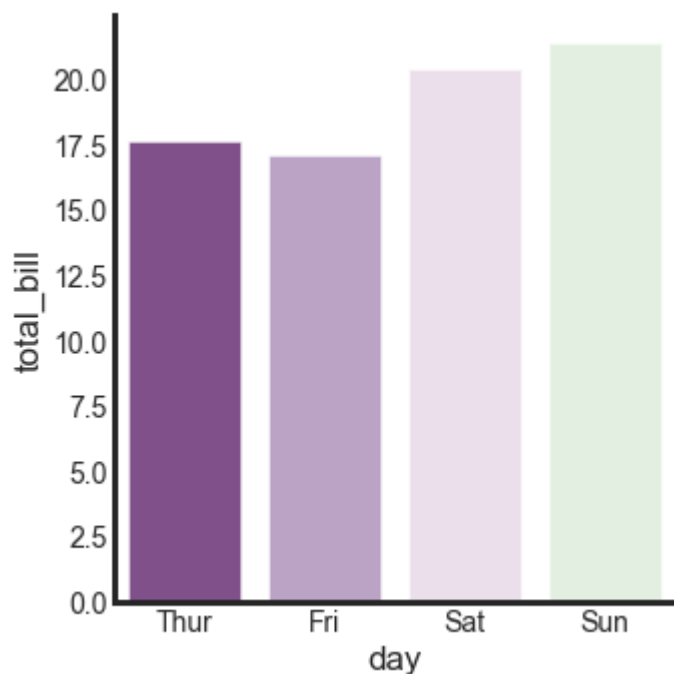

In [87]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
sns.catplot(x='smoker',y="total_bill",data=df,kind='point')
sns.set_context("talk")
plt.show()
```

BOKEH

In [99]:
```python
from bokeh.plotting import figure, output_file,show
x=[1,2,3,4,5]
y=[2,4,6,8,10]
output_file('line.html')
fig=figure(title="line plot",x_axis_label='x',y_axis_label='y')
fig.line(x,y)
show(fig)
```
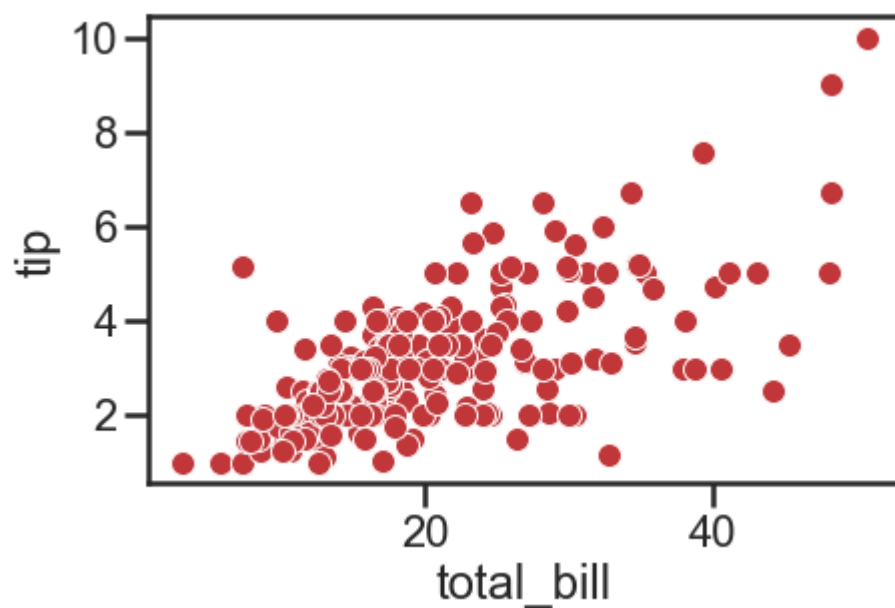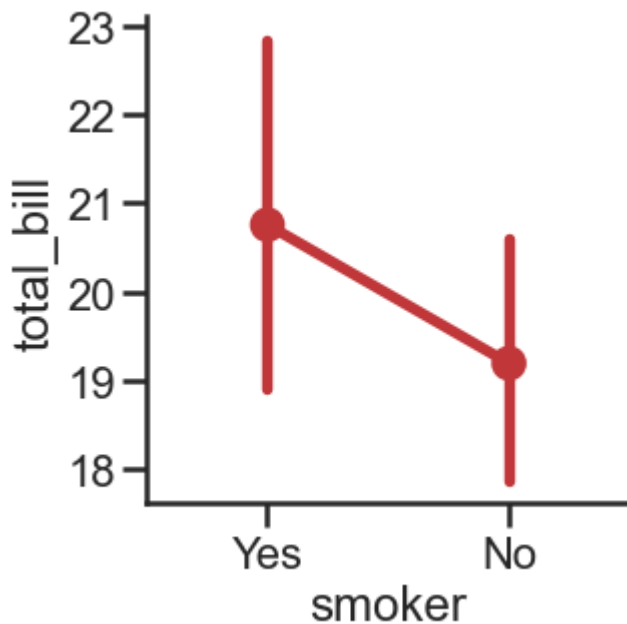
In [91]:
```python
from bokeh.plotting import figure, output_file,show
output_file('bar.html')
fig=figure(plot_width=400,plot_height=200)
fig.hbar(y=[2,4,6],height=1,left=0,right=[1,2,3],color='pink')
show(fig)
```

In [96]:
```python
from bokeh.plotting import figure, output_file,show
output_file('bar1.html')
fig=figure(plot_width=200,plot_height=400)
fig.vbar(x=[1,2,3],width=0.5,bottom=0,top=[2,4,6],color='black')
show(fig)
```

In [98]:
```python
from bokeh.plotting import figure, output_file,show
output_file('patch.html')
fig=figure(plot_width=300,plot_height=300)
fig.patch(x=[1,3,2,4],y=[2,3,5,7],color='yellow')
show(fig)
```

In [102...
```python
from bokeh.plotting import figure, output_file,show
xs=[[5,3,4],[2,4,3],[2,3,5,4]]
ys=[[6,4,2],[3,6,7],[2,4,7,8]]
output_file('patch_plot.html')
fig=figure()
fig.patches(xs,ys,fill_color=['yellow','black','pink'],line_color='white')
show(fig)
```

In [105…

```python
from bokeh.plotting import figure, output_file,show
output_file('scatter.html')
fig=figure()
fig.scatter([1,4,3,2,5],[6,5,2,4,7],marker='square',size=50,fill_color='red')
show(fig)
```

In [110…

```python
from bokeh.plotting import figure, output_file,show
output_file('area.html')
x=[1,2,3,4,5]
y1=[2,6,4,3,5]
y2=[1,4,2,2,3]
fig=figure()
fig.varea(x=x,y1=y1,y2=y2,fill_color="pink")
show(fig)
```

In [112…

```python
from bokeh.plotting import figure, output_file,show
output_file('area.html')
y=[1,2,3,4,5]
x1=[2,6,4,3,5]
x2=[1,4,2,2,3]
fig=figure()
fig.harea(x1=x1,x2=x2,y=y,fill_color="pink")
show(fig)
```

In [113…

```python
from bokeh.plotting import figure, output_file,show
output_file('circle.html')
plot=figure(plot_width=300,plot_height=300)
plot.circle(x=[1,2,3],y=[3,7,5],size=20,fill_color="red")
plot.circle_cross(x=[2,4,6],y=[5,8,9],size=20,fill_color="blue",fill_alpha=0.2,line_
plot.circle_x(x=[5,7,2],y=[2,4,9],size=20,fill_color="yellow",fill_alpha=0.5,line_wi
show(plot)
```

In [1]:

```python
from bokeh.plotting import figure, output_file,show
output_file('rectangle.html')
p=figure(plot_width=400,plot_height=400)
p.quad(top=[2,3,4],bottom=[1,2,3],left=[1,2,3],right=[1.2,2.5,3.7],color='#B3DE69')
show(p)
```

In [2]:

```python
from math import pi
from bokeh.plotting import figure, output_file,show
output_file('rectangle.html')
p=figure(plot_width=400,plot_height=400)
p.oval(x=[1,2,3],y=[1,2,3],width=0.2,height=40,color='#CAB2D6',angle=pi/3,height_uni
show(p)
```

```
BokehDeprecationWarning: 'Oval' is deprecated and will be removed in Bokeh 3.0, use t
he Ellipse glyph instead
BokehDeprecationWarning: 'Oval' is deprecated and will be removed in Bokeh 3.0, use t
he Ellipse glyph instead
BokehDeprecationWarning: 'Oval' is deprecated and will be removed in Bokeh 3.0, use t
he Ellipse glyph instead
```

In [5]:

```python
from math import pi
from bokeh.plotting import figure, output_file,show
output_file('oval.html')
```

```python
p=figure(plot_width=400,plot_height=400)
p.ellipse(x=[1,2,3],y=[1,2,3],width=[0.2,0.3,0.1],height=0.3,color='#CAB2D6',angle=p
show(p)
```

In [6]:
```python
from bokeh.plotting import figure, output_file,show
output_file('arc.html')
p=figure(plot_width=400,plot_height=400)
p.arc(x=[1,2,3],y=[1,2,3],radius=0.1,start_angle=0.4,end_angle=4.8,color='navy')
show(p)
```

In [9]:
```python
from bokeh.plotting import figure, output_file,show
output_file('arc.html')
p=figure(plot_width=400,plot_height=400)
p.wedge(x=[1,2,3],y=[1,2,3],radius=0.2,start_angle=0.4,end_angle=4.8,color='navy',al
show(p)
```