Data vizualization using Seaborn

In [ ]:
```
import warnings
warnings.filterwarnings('ignore')
```

In [ ]:
```
import seaborn as sns
import matplotlib as plt
plt.style.use('ggplot')
```

In [ ]:
```
tips= sns.load_dataset('tips')
iris= sns.load_dataset('iris')
```

In [ ]:
```
tips.sample(2)
```

Out[ ]:

	total_bill	tip	sex	smoker	day	time	size
19	20.65	3.35	Male	No	Sat	Dinner	3
190	15.69	1.50	Male	Yes	Sun	Dinner	2

In [ ]:
```
iris.sample(2)
```

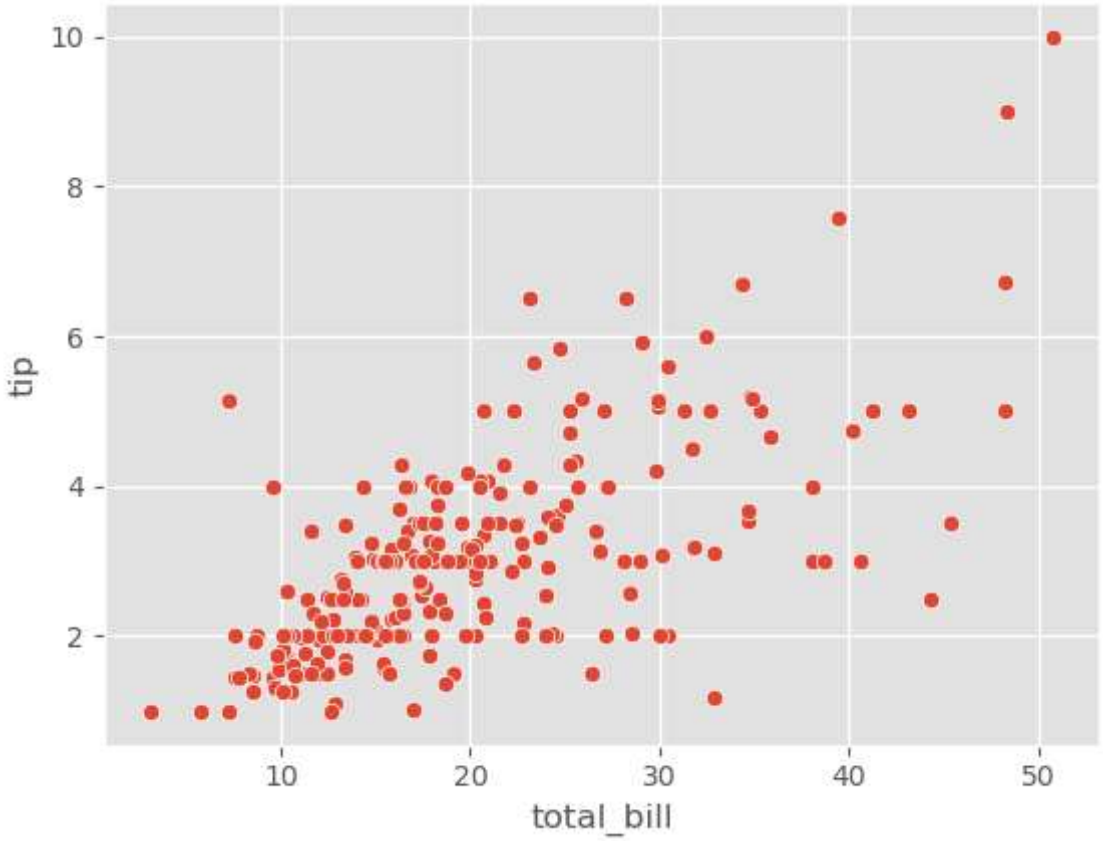
Out[ ]:

	sepal_length	sepal_width	petal_length	petal_width	species
61	5.9	3.0	4.2	1.5	versicolor
13	4.3	3.0	1.1	0.1	setosa

Categorical Scatter plots

In [ ]:
```
# on numberical data
sns.scatterplot(data=tips,x='total_bill',y='tip')
```

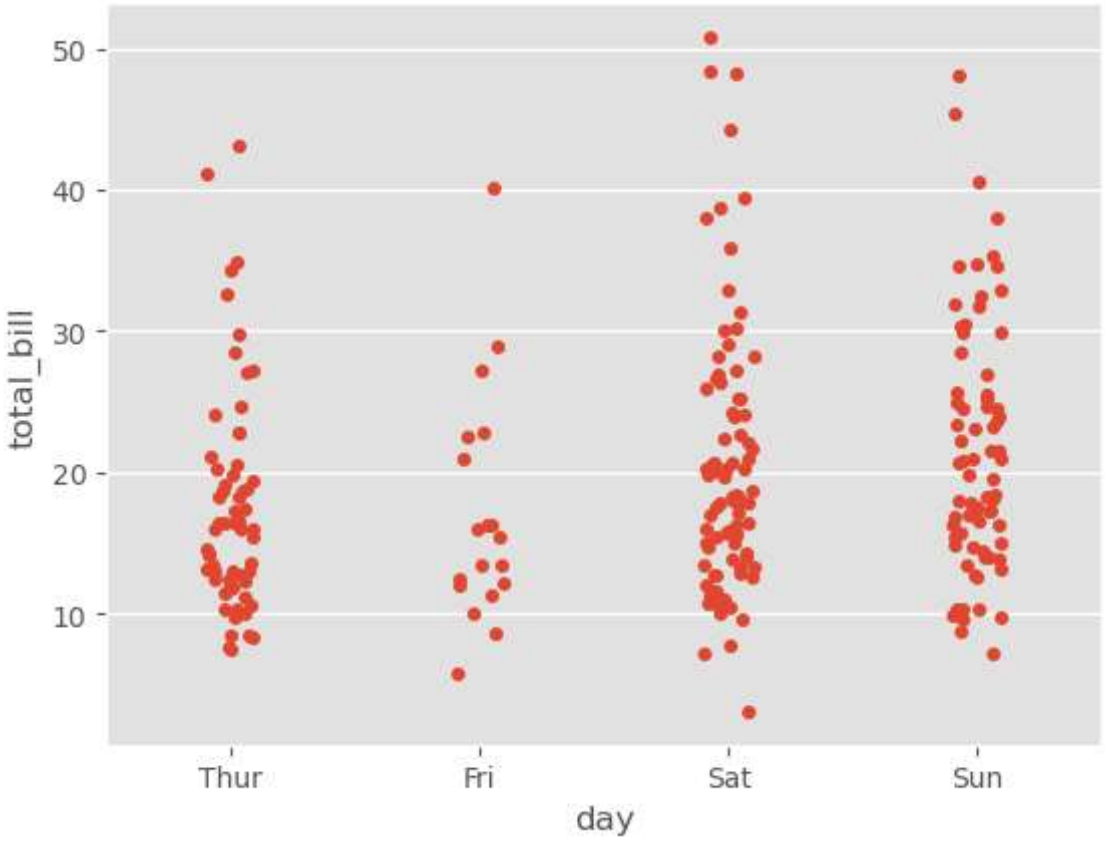
Out[ ]:
```
<Axes: xlabel='total_bill', ylabel='tip'>
```



1. Strip plot

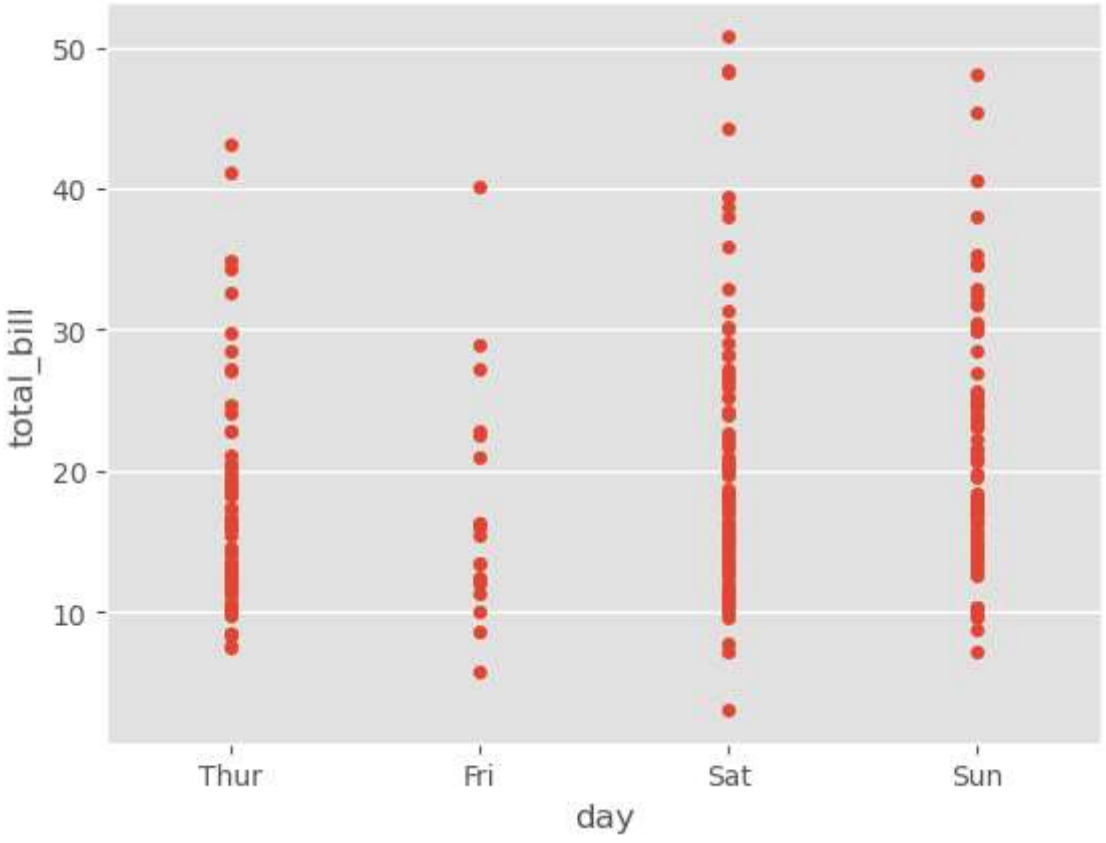
In [ ]:
```
# axes level function
# on categorical data
sns.stripplot(data=tips,x='day',y='total_bill')
```

Out[ ]:
```
<Axes: xlabel='day', ylabel='total_bill'>
```



In [ ]:
```
# jitter
sns.stripplot(data=tips,x='day',y='total_bill',jitter=False)
```

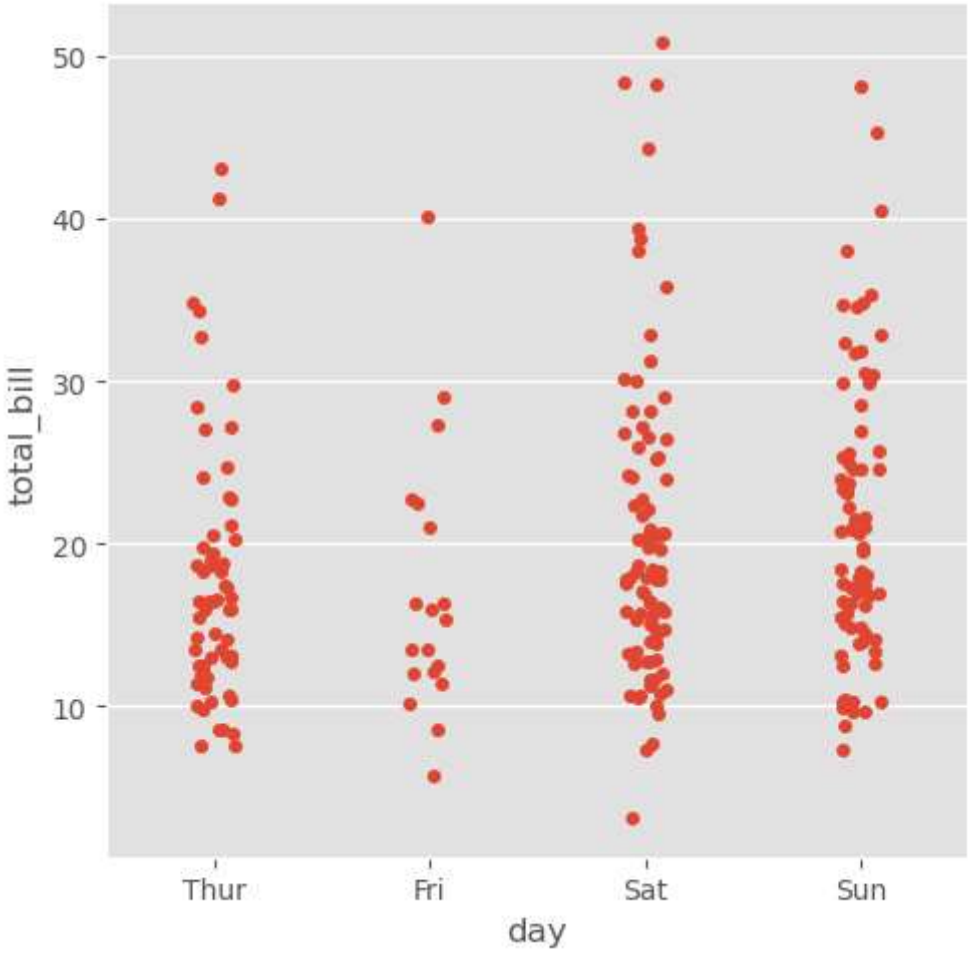
Out[ ]: <Axes: xlabel='day', ylabel='total_bill'>



Catplot

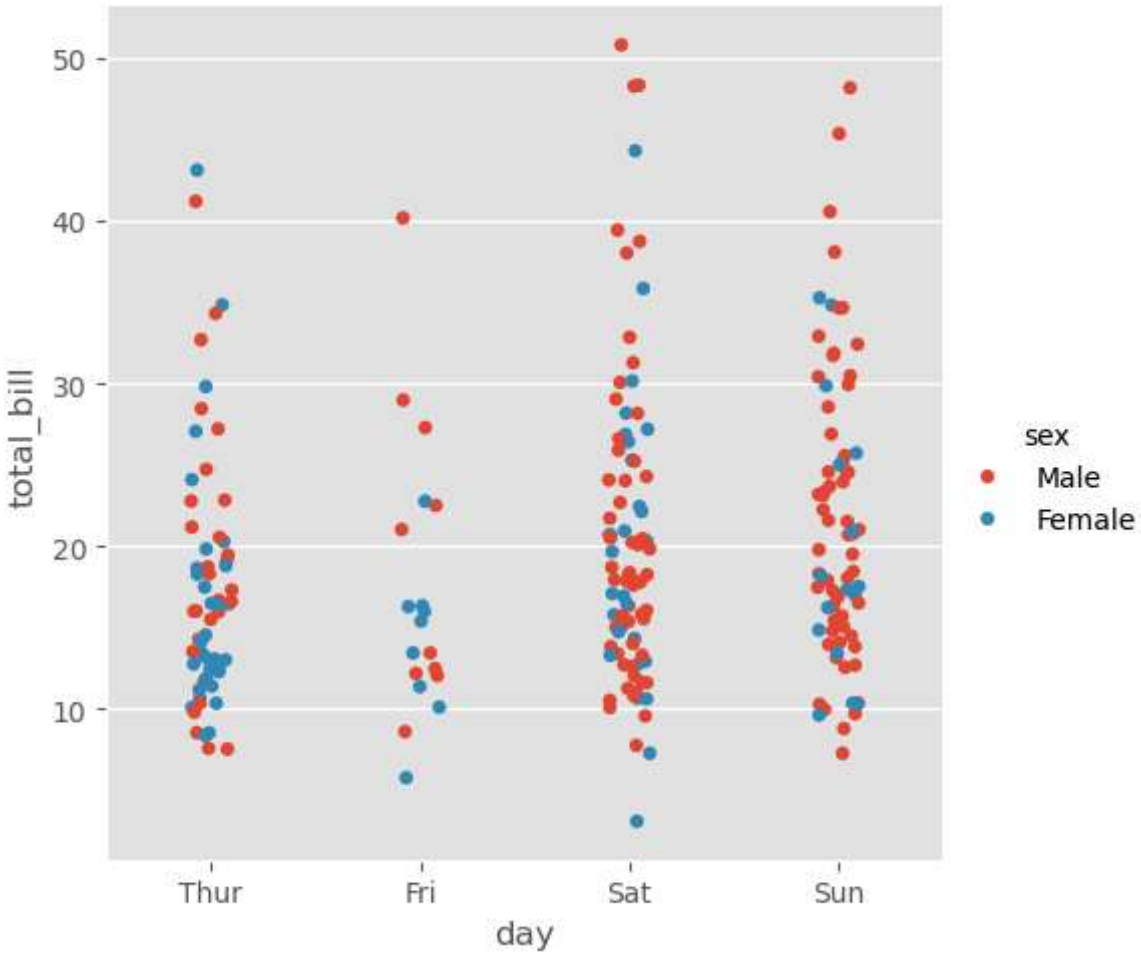
In [ ]:
```
# catplot -categorical plot
# figure level functions
sns.catplot(data=tips,x='day',y='total_bill',kind='strip')
```

Out[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x22e67c79f50>
```



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

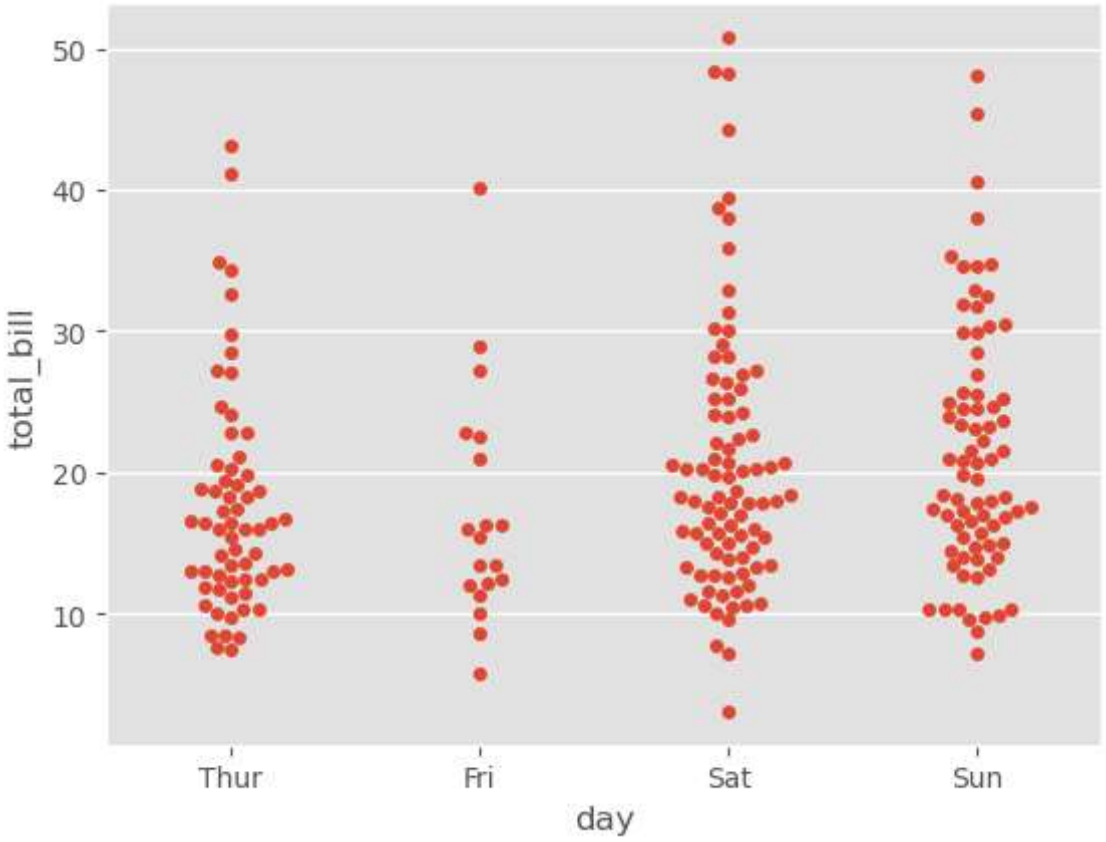
Out[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x22e67d19b90>
```



2. swarm plot

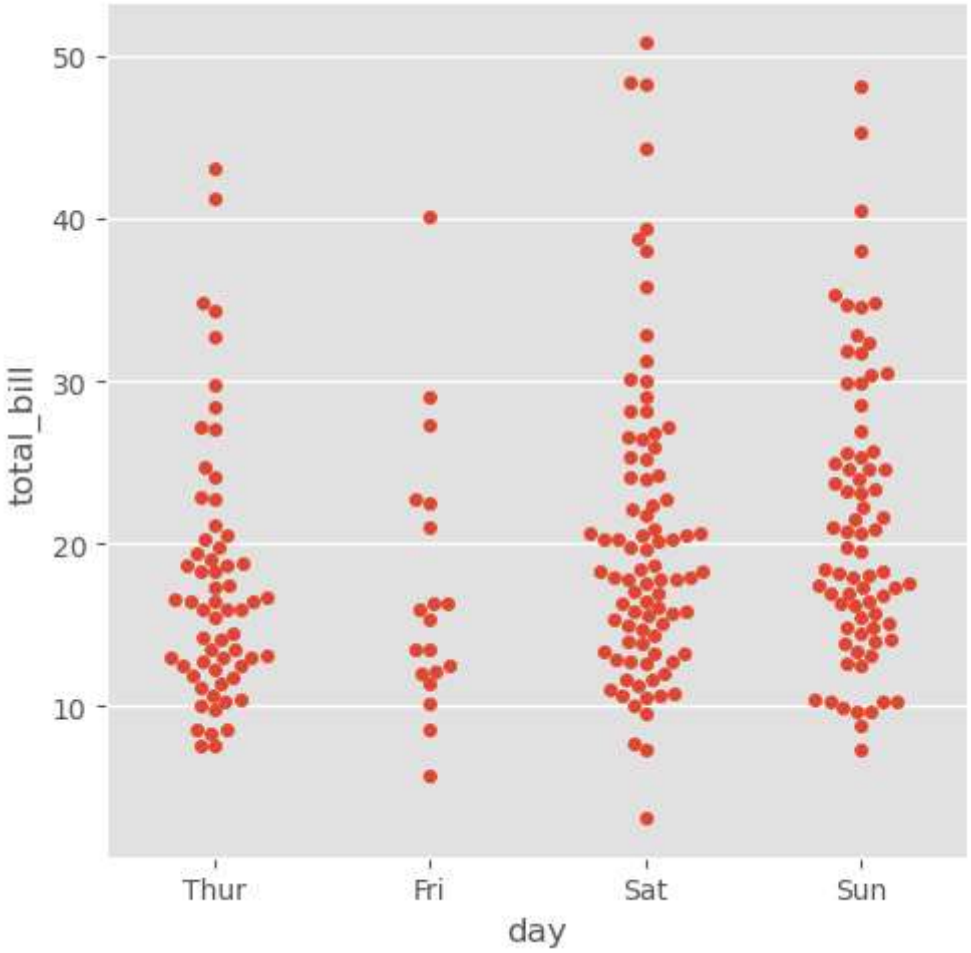
```
In [ ]: sns.swarmplot(data=tips,x='day',y='total_bill')
```

```
Out[ ]: <Axes: xlabel='day', ylabel='total_bill'>
```



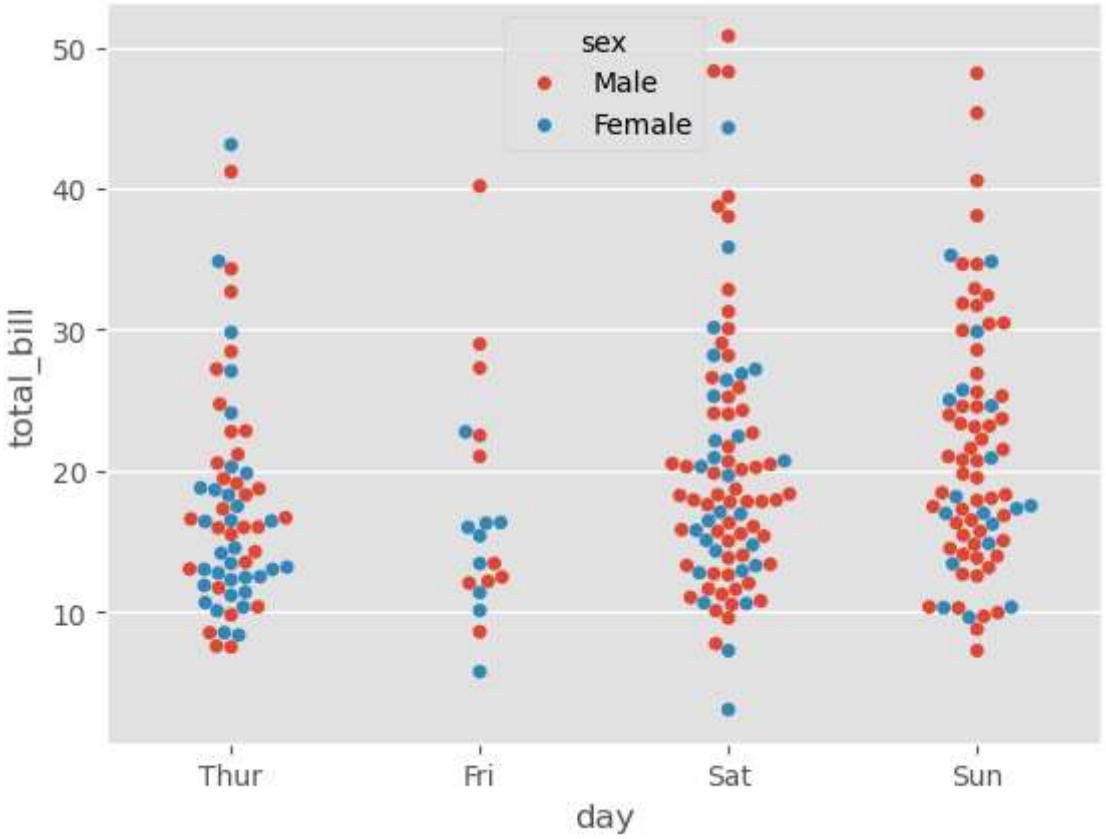
In [ ]:
```
# use by catplot
sns.catplot(data=tips,x='day',y='total_bill',kind='swarm')
```

Out[ ]: <seaborn.axisgrid.FacetGrid at 0x22e6d584b90>



In [ ]:
```
# hue
sns.swarmplot(data=tips,x ='day', y='total_bill',hue='sex')
```

Out[ ]:
```
<Axes: xlabel='day', ylabel='total_bill'>
```

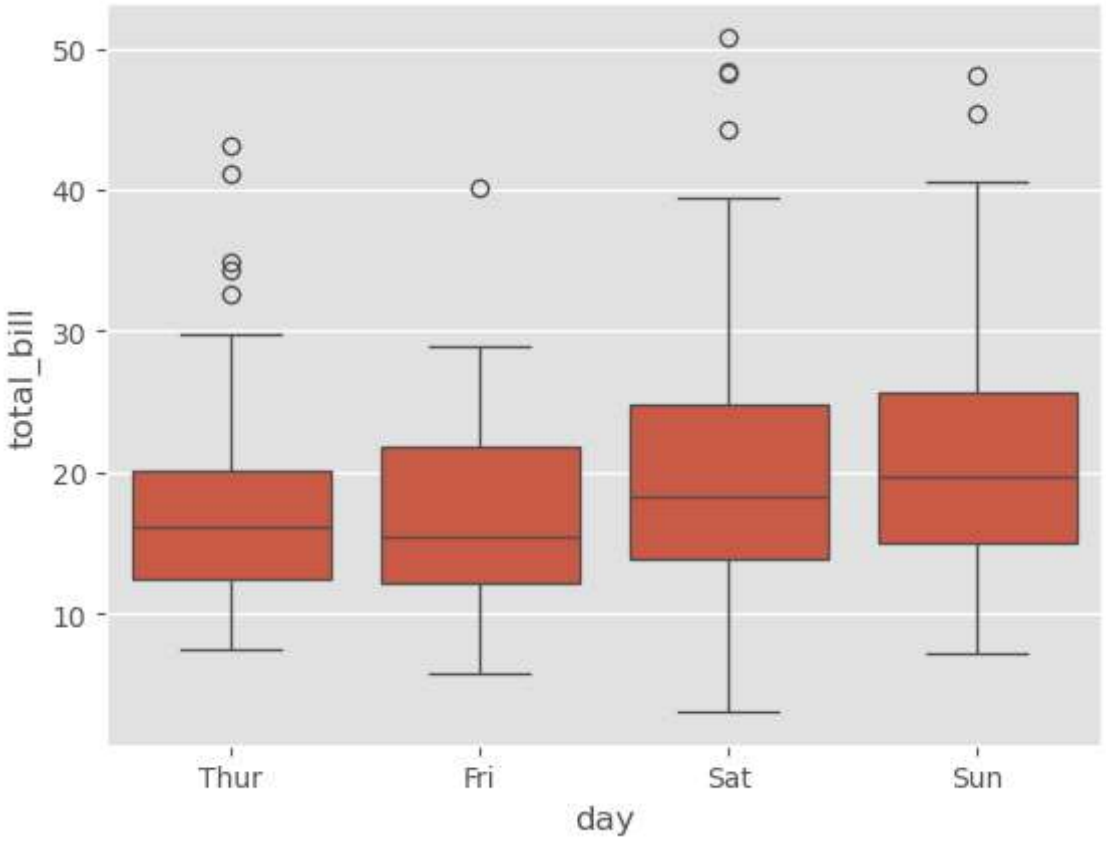


Categorical Distribution plots

1. Boxplot

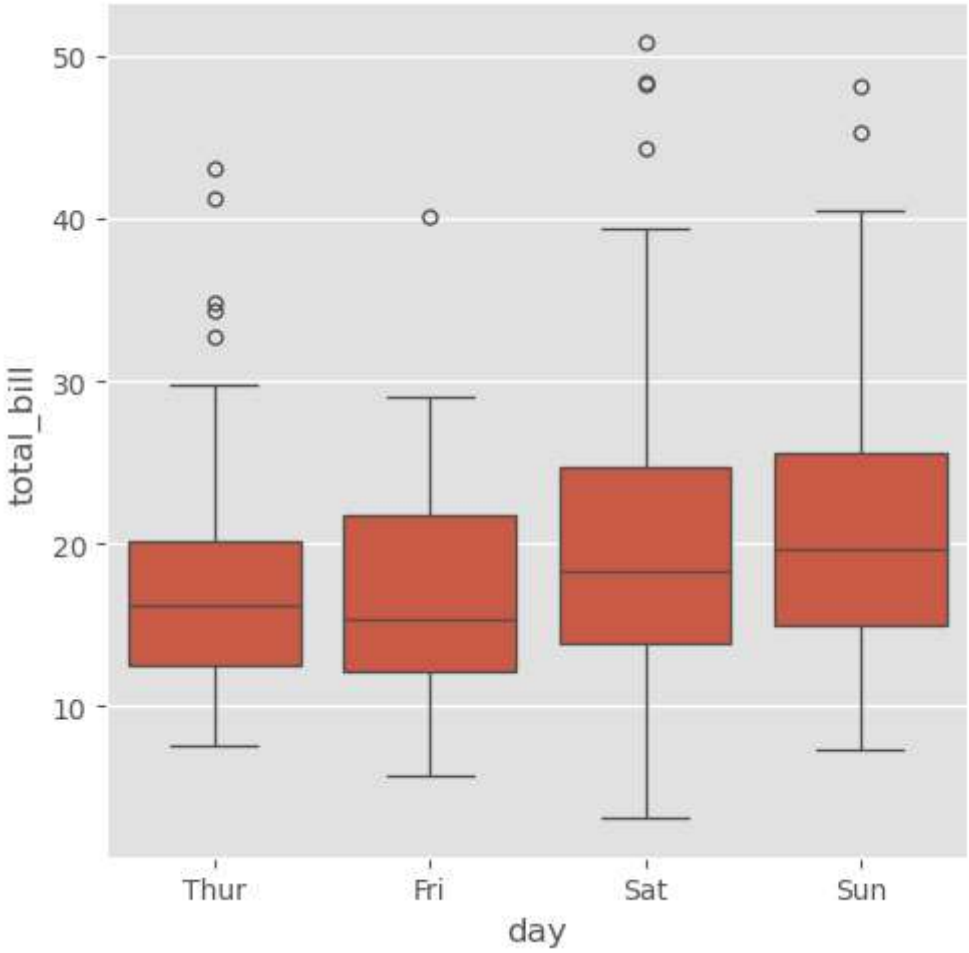
In [ ]:
```
#Box plot
sns.boxplot(data=tips,x='day',y='total_bill')
```

Out[ ]:
```
<Axes: xlabel='day', ylabel='total_bill'>
```



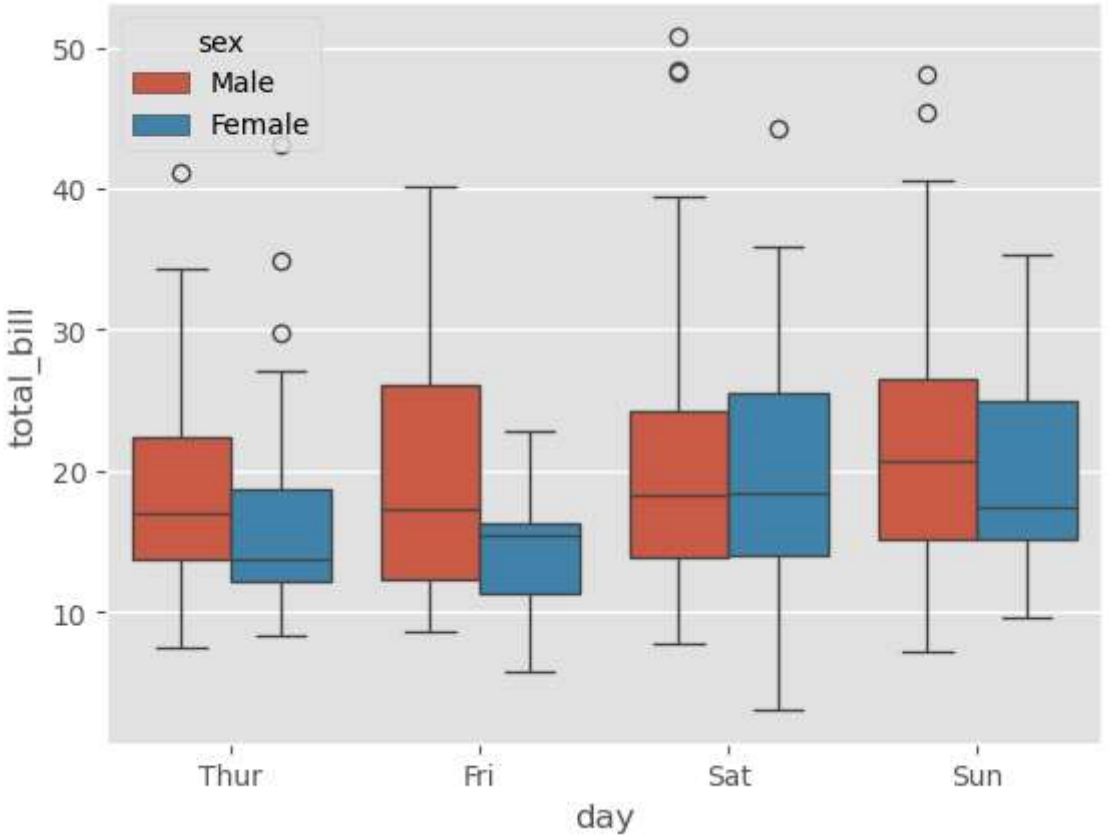
In [ ]:
```
# Using catplot - Figure level
sns.catplot(data=tips,x='day',y='total_bill',kind='box')
```

Out[ ]: <seaborn.axisgrid.FacetGrid at 0x22e6d889f50>



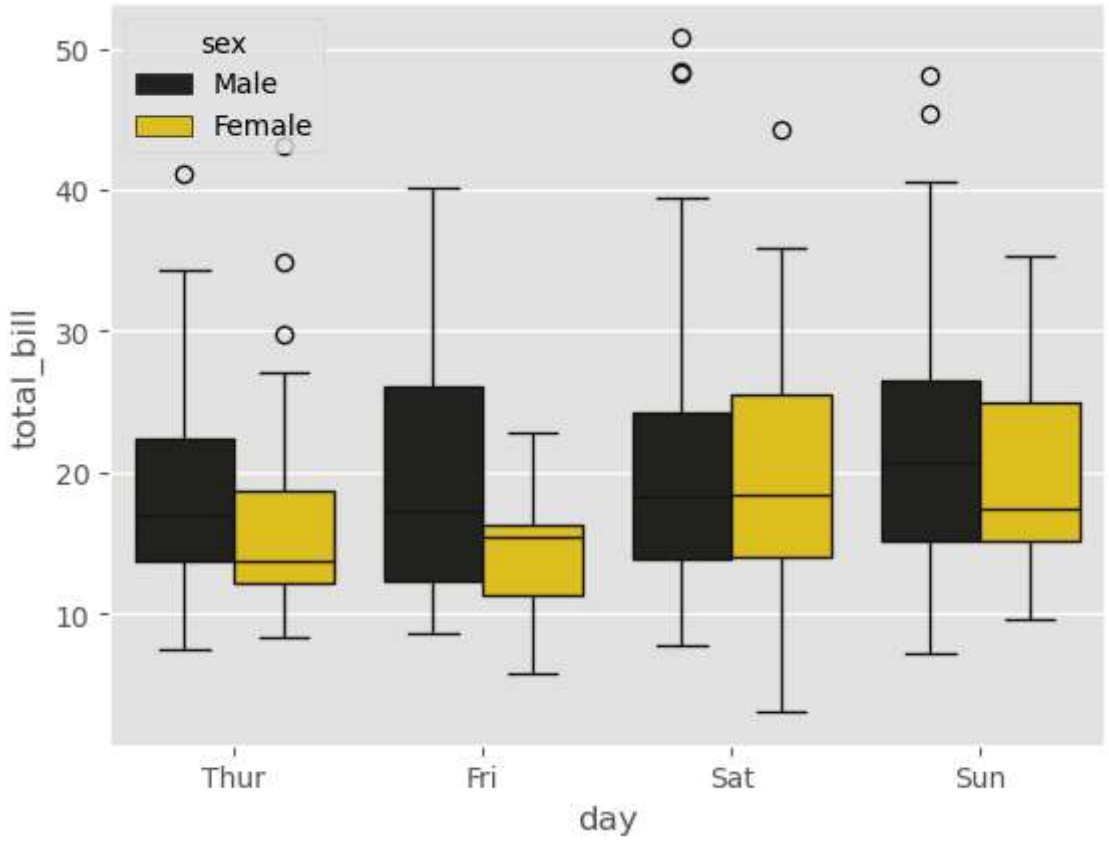
In [ ]:
```
# hue
sns.boxplot(data=tips,x='day',y='total_bill',hue='sex')
```

Out[ ]:
```
<Axes: xlabel='day', ylabel='total_bill'>
```



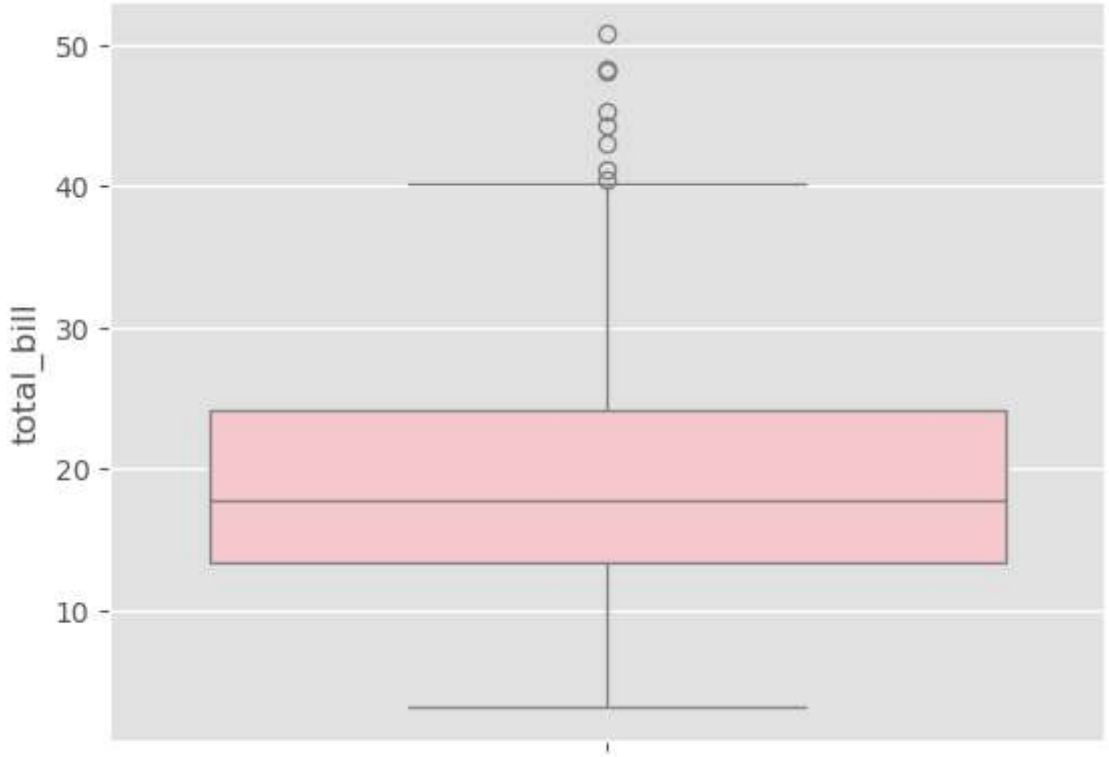
In [ ]:
```
# color
sns.boxplot(data=tips,x='day',y='total_bill',hue='sex', color = 'gold')
```

Out[ ]:
```
<Axes: xlabel='day', ylabel='total_bill'>
```



In [ ]:
```
# single boxplot -> numerical col
sns.boxplot(data=tips , y='total_bill', color ='pink')
```

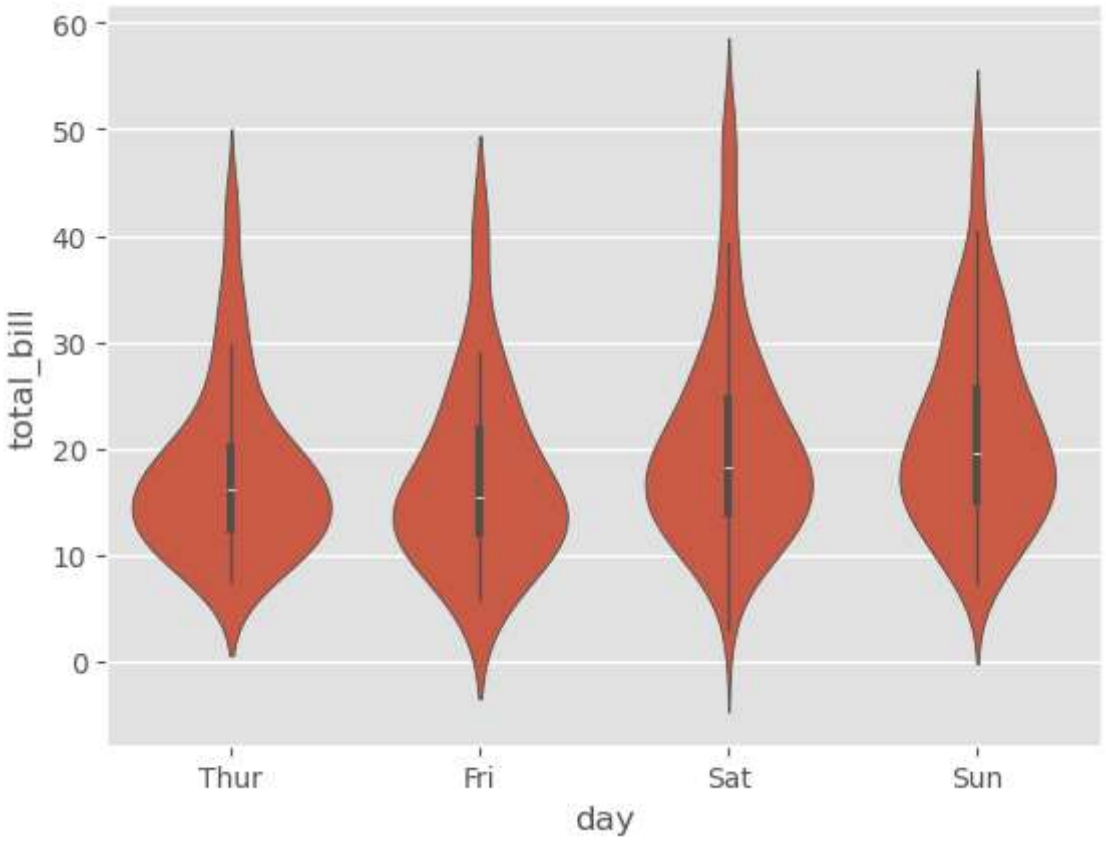
Out[ ]: <Axes: ylabel='total_bill'>



2. Violin Plot

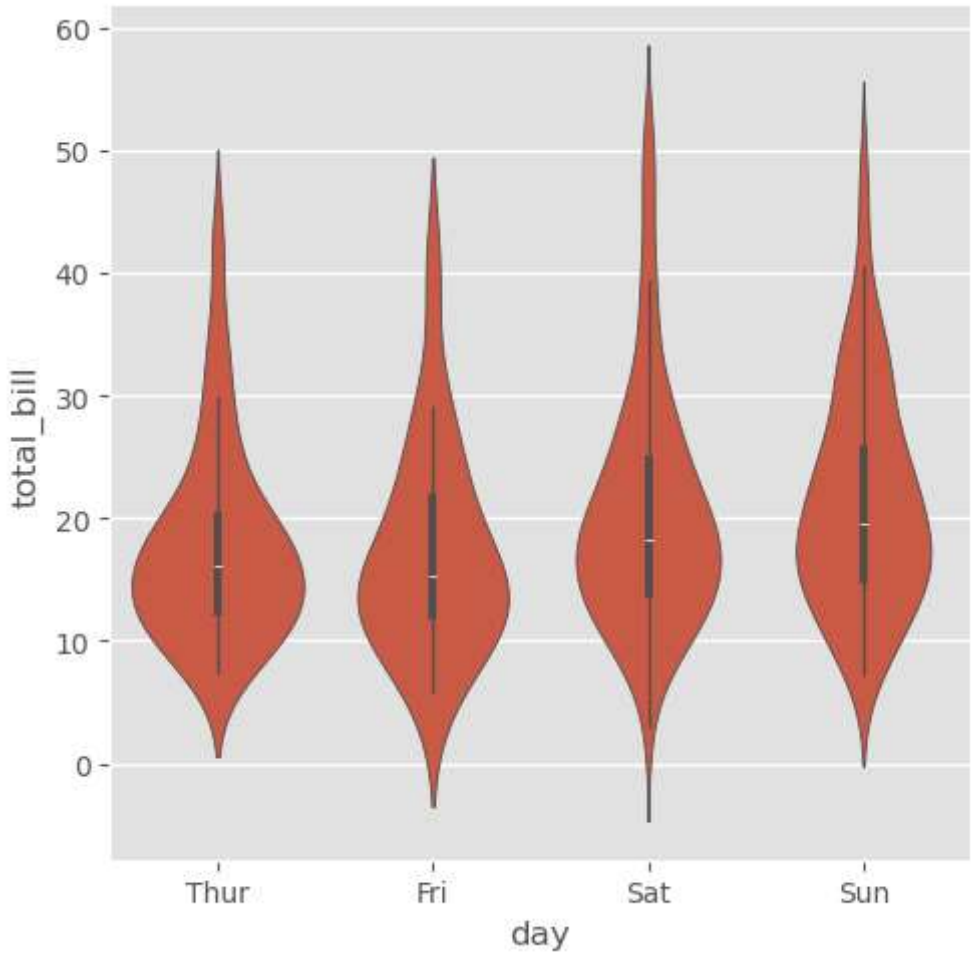
In [ ]:
```
# Violinplot = (Boxplot + KDEplot)
sns.violinplot(data=tips,x='day',y='total_bill')
```

Out[ ]:
```
<Axes: xlabel='day', ylabel='total_bill'>
```



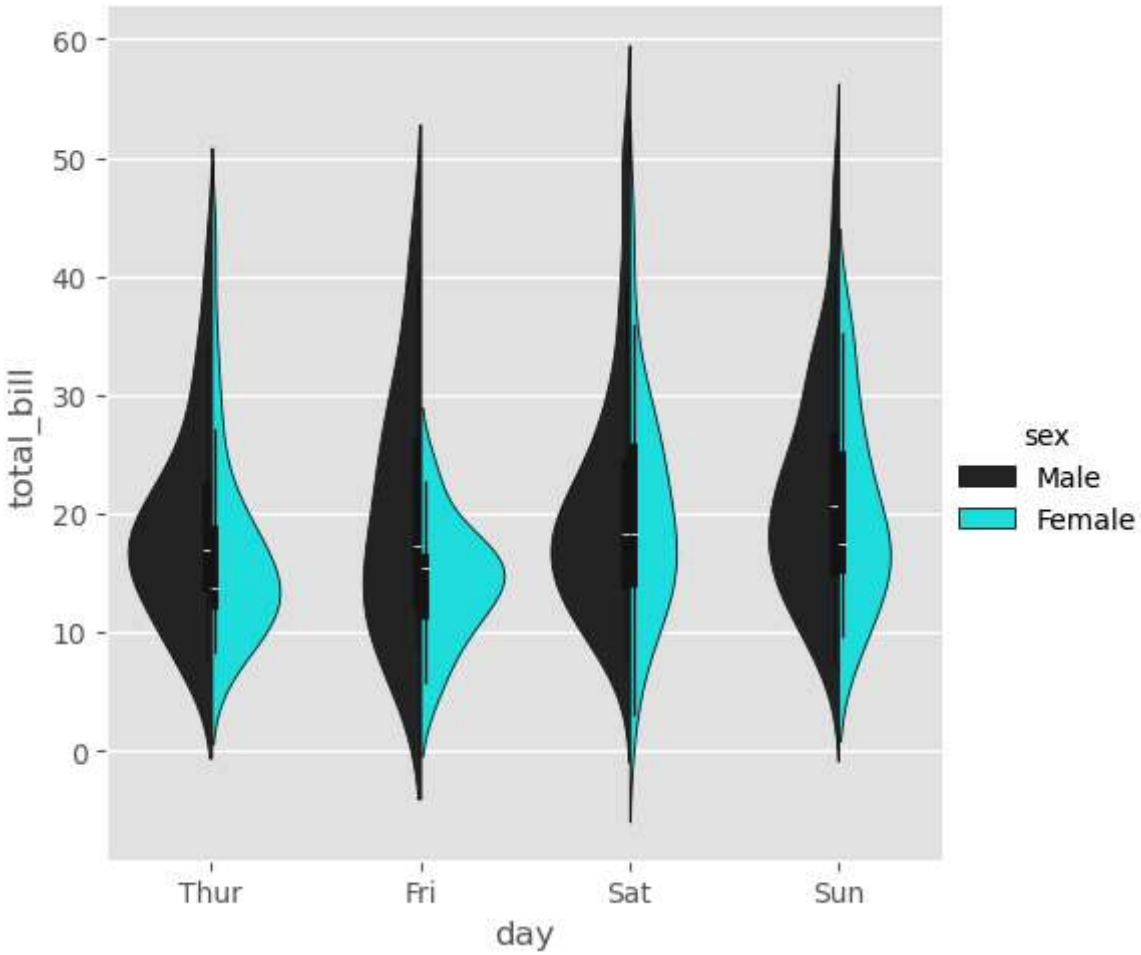
In [ ]:
```
# catplot -figure level function
sns.catplot(data=tips,x='day',y='total_bill',kind ='violin')
```

Out[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x22e6eb238d0>
```



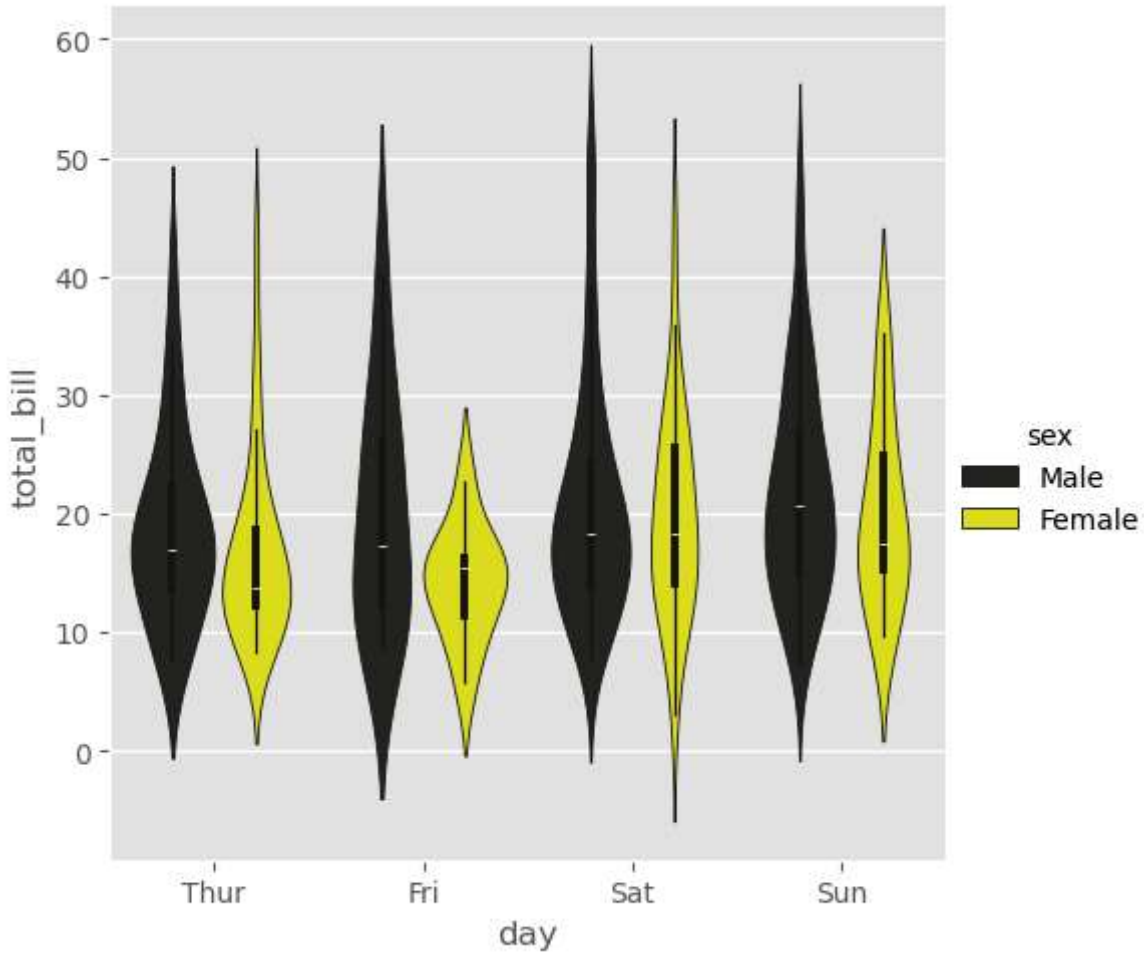
In [ ]:
```
# Color
sns.catplot(data=tips,x='day',y='total_bill',kind ='violin', hue ='sex', split =
```

Out[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x22e6ead5fd0>
```



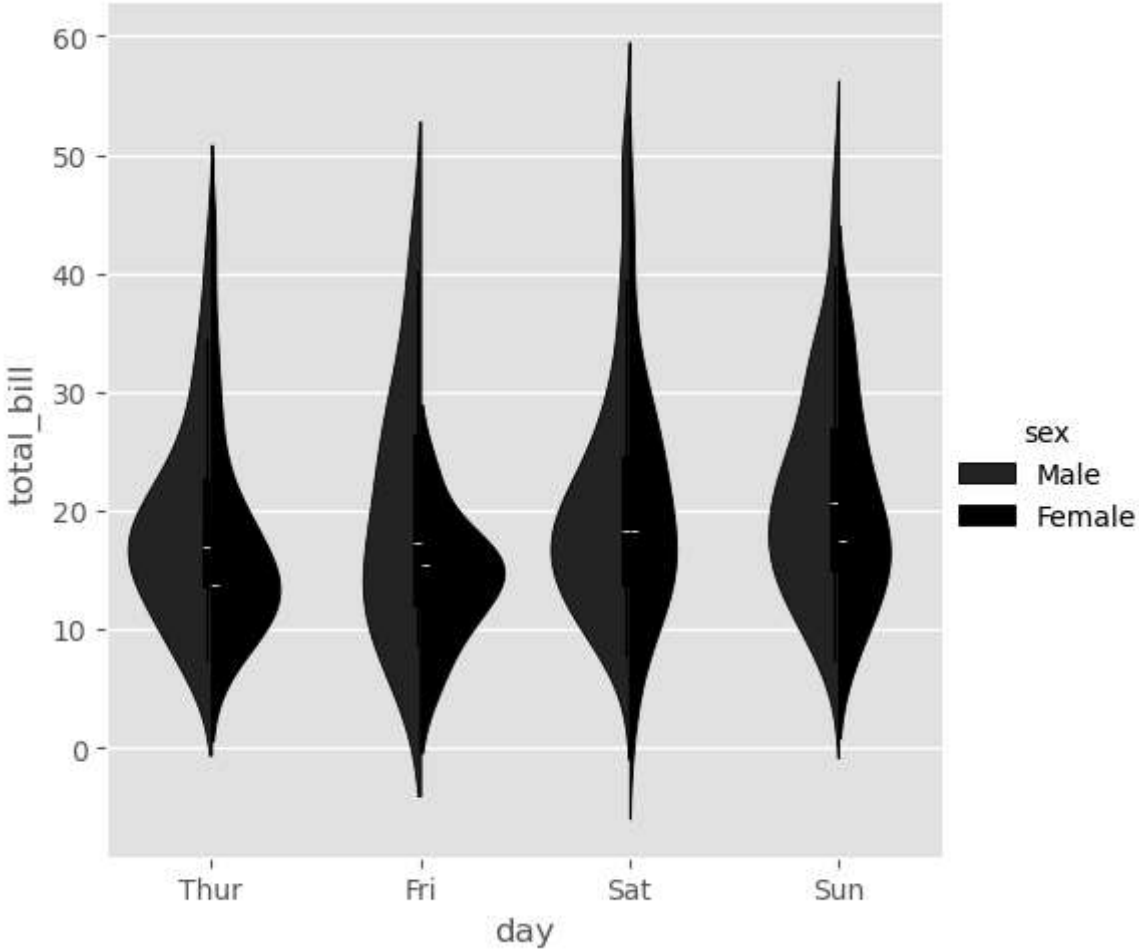
In [ ]:
```
# hue
sns.catplot(data=tips,x='day',y='total_bill',kind ='violin',hue ='sex' , color =
```

Out[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x22e7051ddd0>
```



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

Out[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x22e7052f4d0>
```

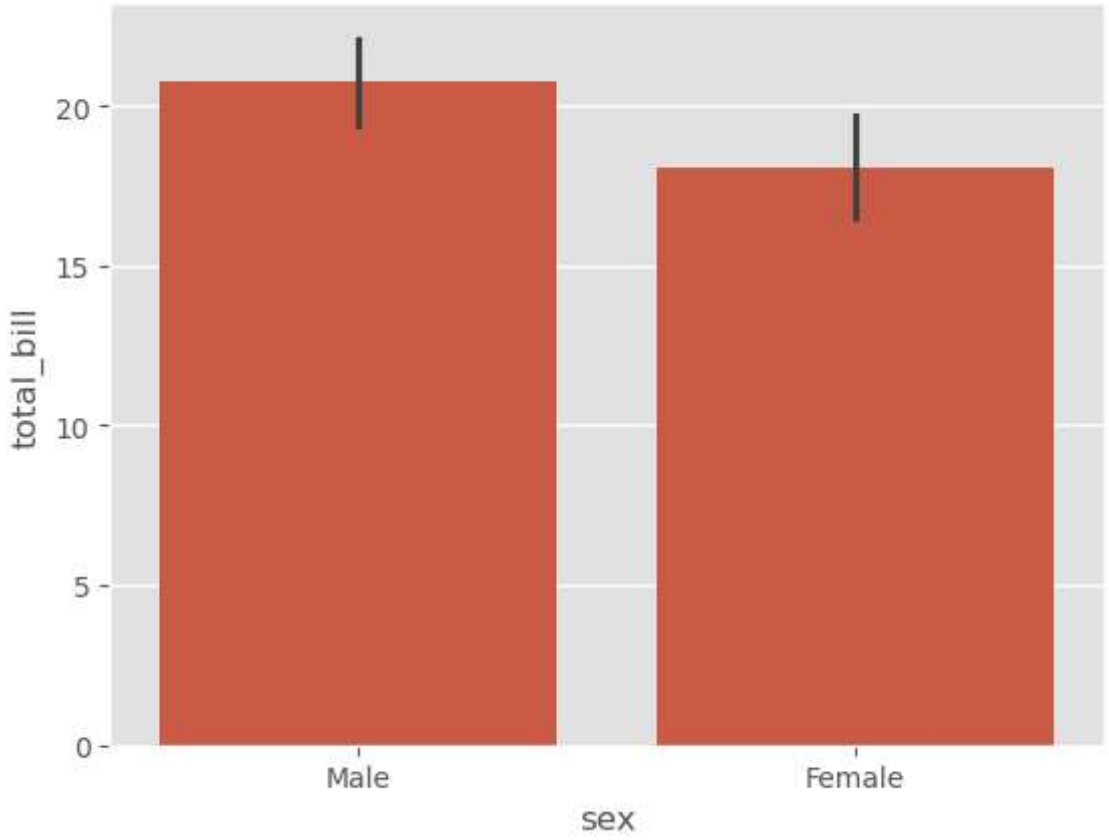


Categorical Estimate plot

1.Barplot

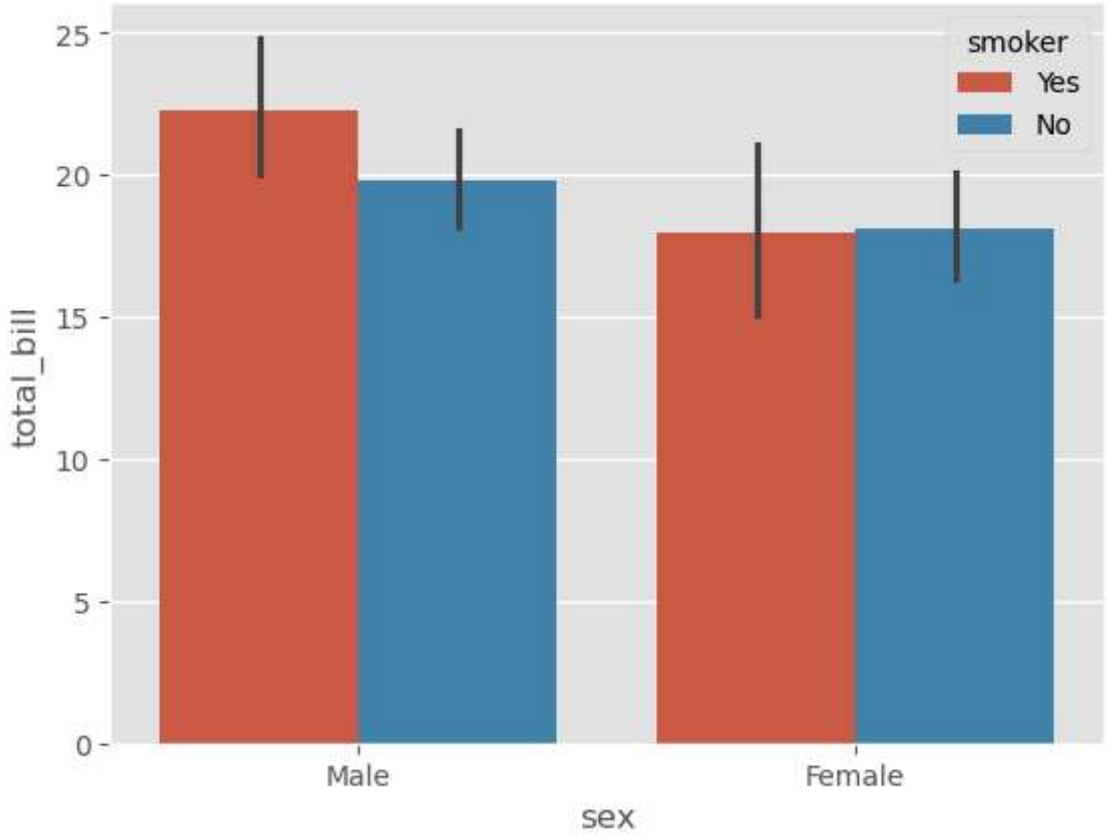
In [ ]:
```
sns.barplot(data=tips, x='sex', y='total_bill')
```

Out[ ]:
```
<Axes: xlabel='sex', ylabel='total_bill'>
```



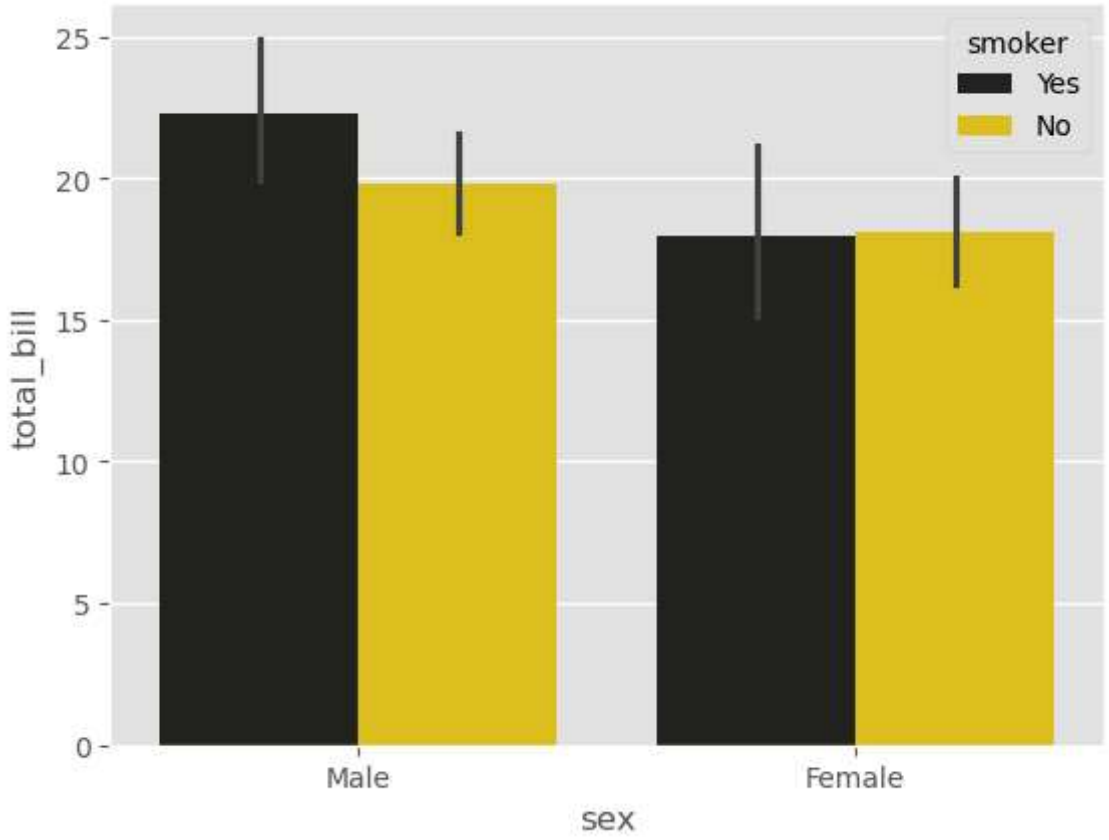
In [ ]:
```
# hue
sns.barplot(data=tips, x='sex', y='total_bill',hue='smoker')
```

Out[ ]: <Axes: xlabel='sex', ylabel='total_bill'>



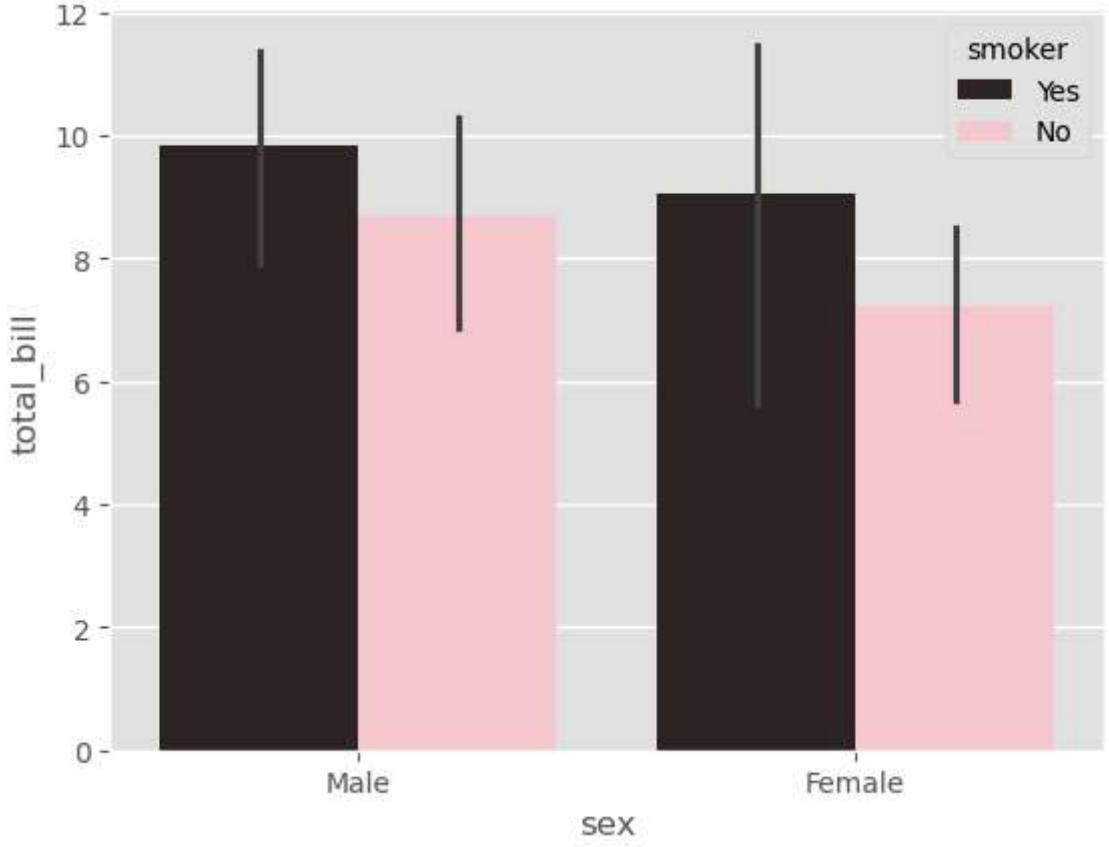
In [ ]:
```
# color
sns.barplot(data=tips, x='sex', y='total_bill',hue='smoker',color ='gold')
```

Out[ ]: <Axes: xlabel='sex', ylabel='total_bill'>



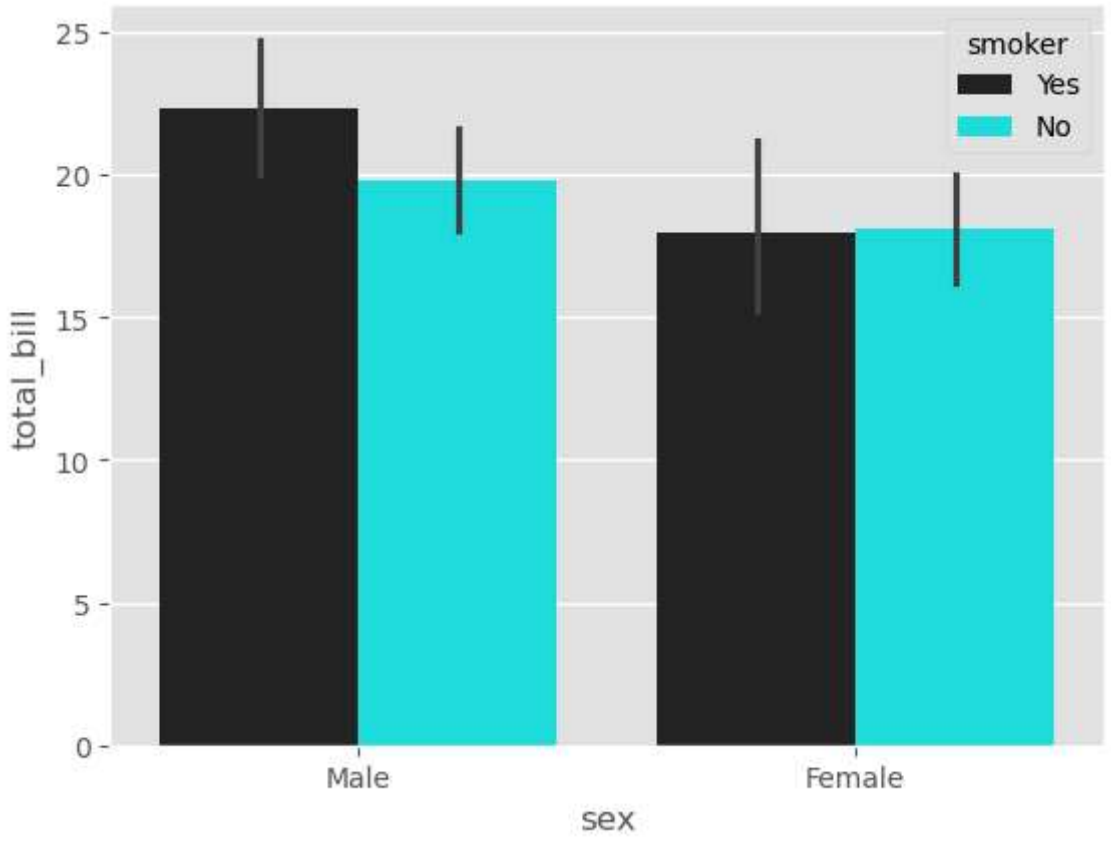
In [ ]:
```
# estimator
import numpy as np
sns.barplot(data=tips, x='sex', y='total_bill',hue='smoker', color ='pink', esti
```

Out[ ]: <Axes: xlabel='sex', ylabel='total_bill'>



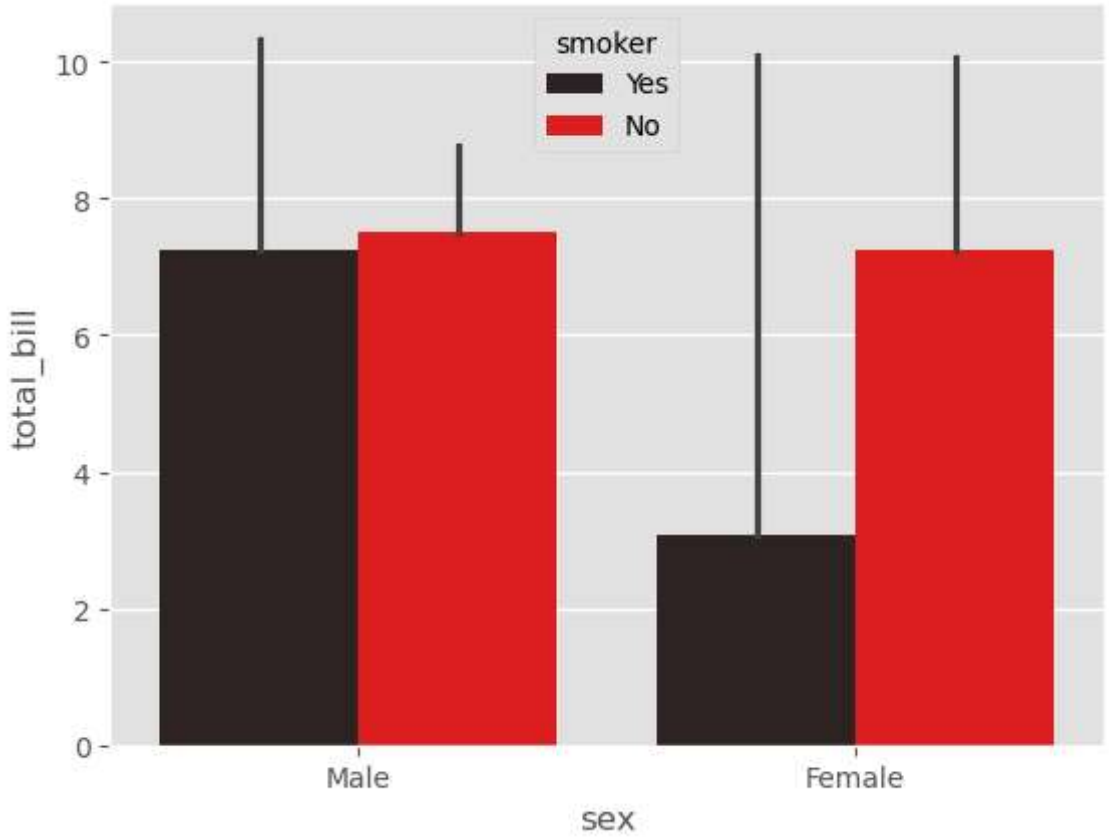
In [ ]:
```
# estimator ( mean)
sns.barplot(data=tips, x='sex', y='total_bill',hue='smoker',color ='cyan',estima
```

Out[ ]:
```
<Axes: xlabel='sex', ylabel='total_bill'>
```



In [ ]:
```
# estimator ( min)
sns.barplot(data=tips, x='sex', y='total_bill',hue='smoker',color ='red',estimat
```

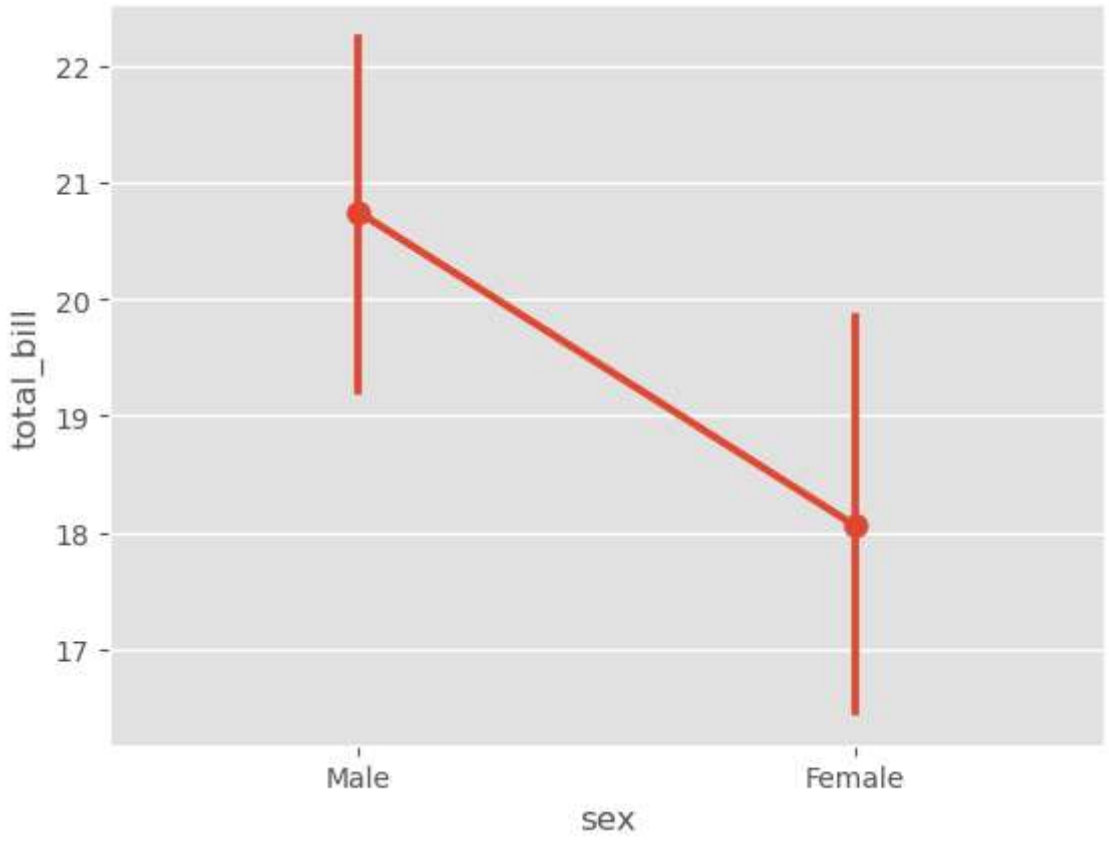
Out[ ]:
```
<Axes: xlabel='sex', ylabel='total_bill'>
```



2. Point plot

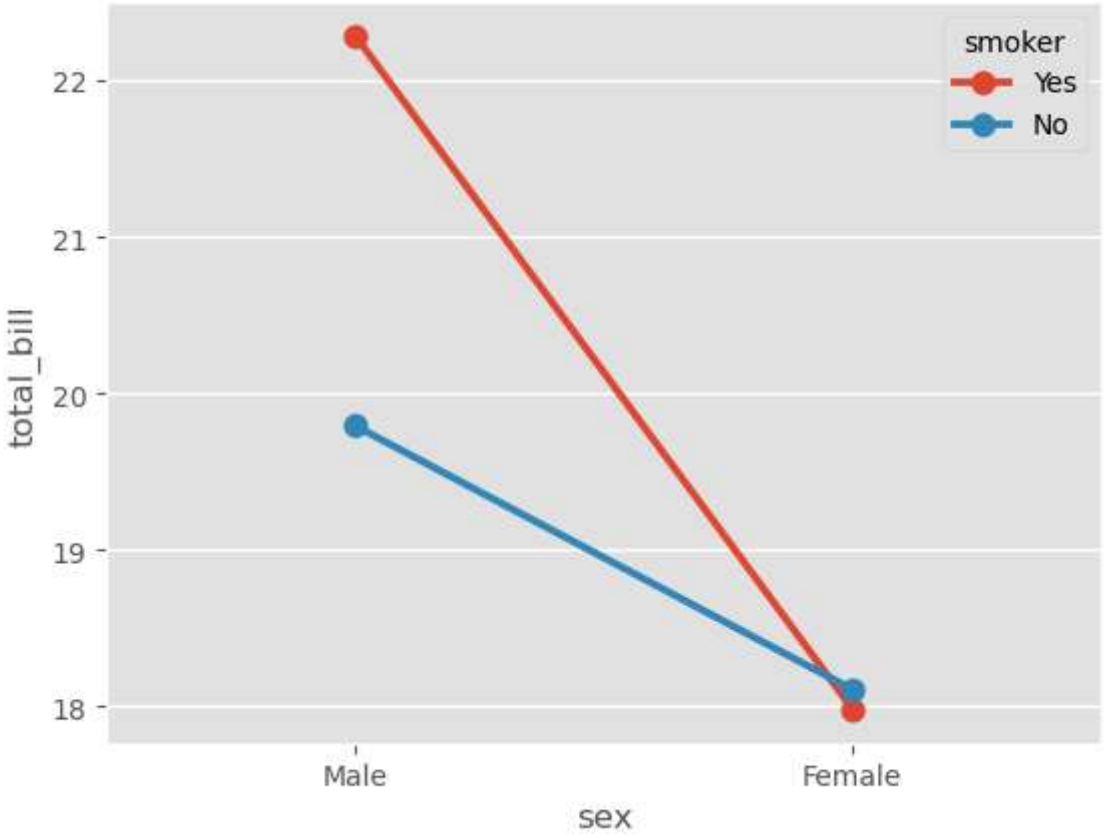
```
In [ ]: sns.pointplot(data=tips, x='sex', y='total_bill')
```

```
Out[ ]: <Axes: xlabel='sex', ylabel='total_bill'>
```



In [ ]:
```
# CI ---> for removing error bars
sns.pointplot(data=tips, x='sex', y='total_bill' , hue ='smoker', ci =None)
```

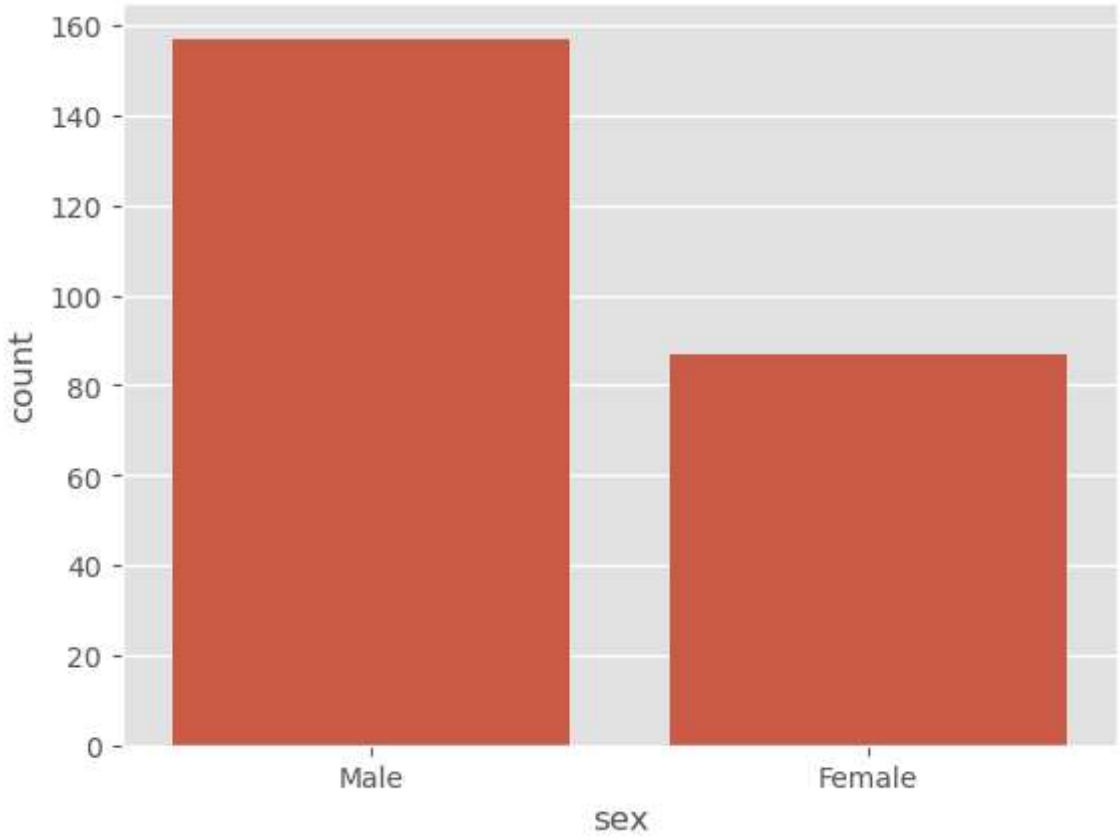
Out[ ]:
```
<Axes: xlabel='sex', ylabel='total_bill'>
```



3. Count Plot

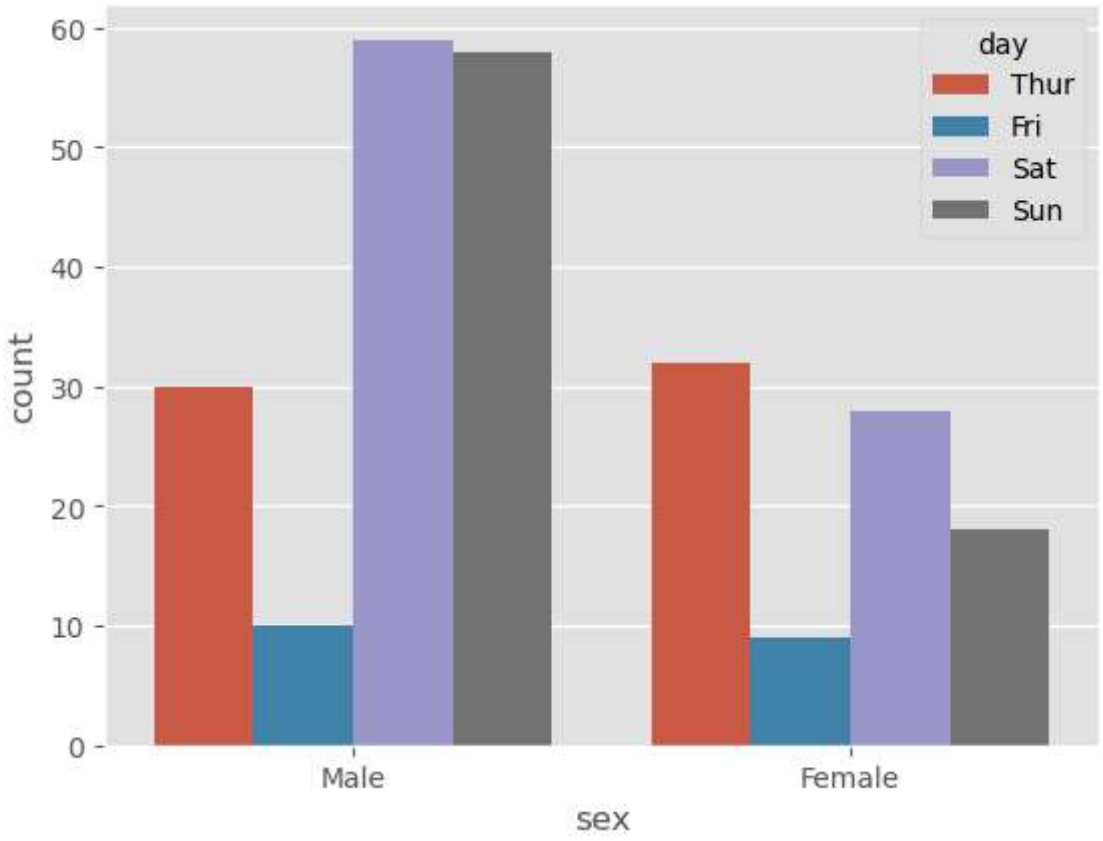
In [ ]:
```
sns.countplot(data=tips,x='sex')
```

Out[ ]:
```
<Axes: xlabel='sex', ylabel='count'>
```



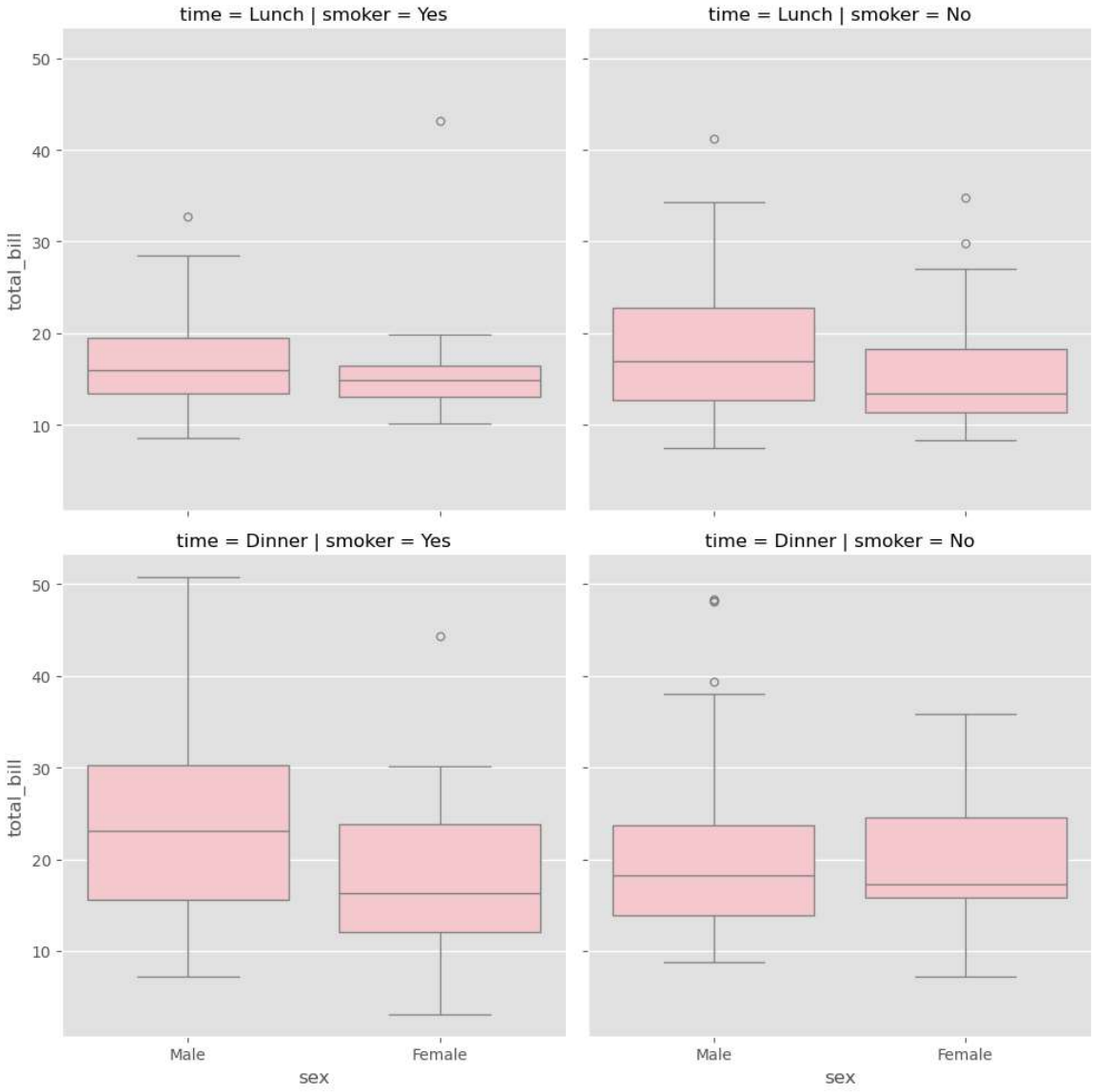
In [ ]:
```
sns.countplot(data=tips,x='sex',hue='day')
```

Out[ ]: <Axes: xlabel='sex', ylabel='count'>



In [ ]:
```
# faceting using catplot
sns.catplot(data=tips, x='sex',y='total_bill',col='smoker',kind='box',row='time'
```

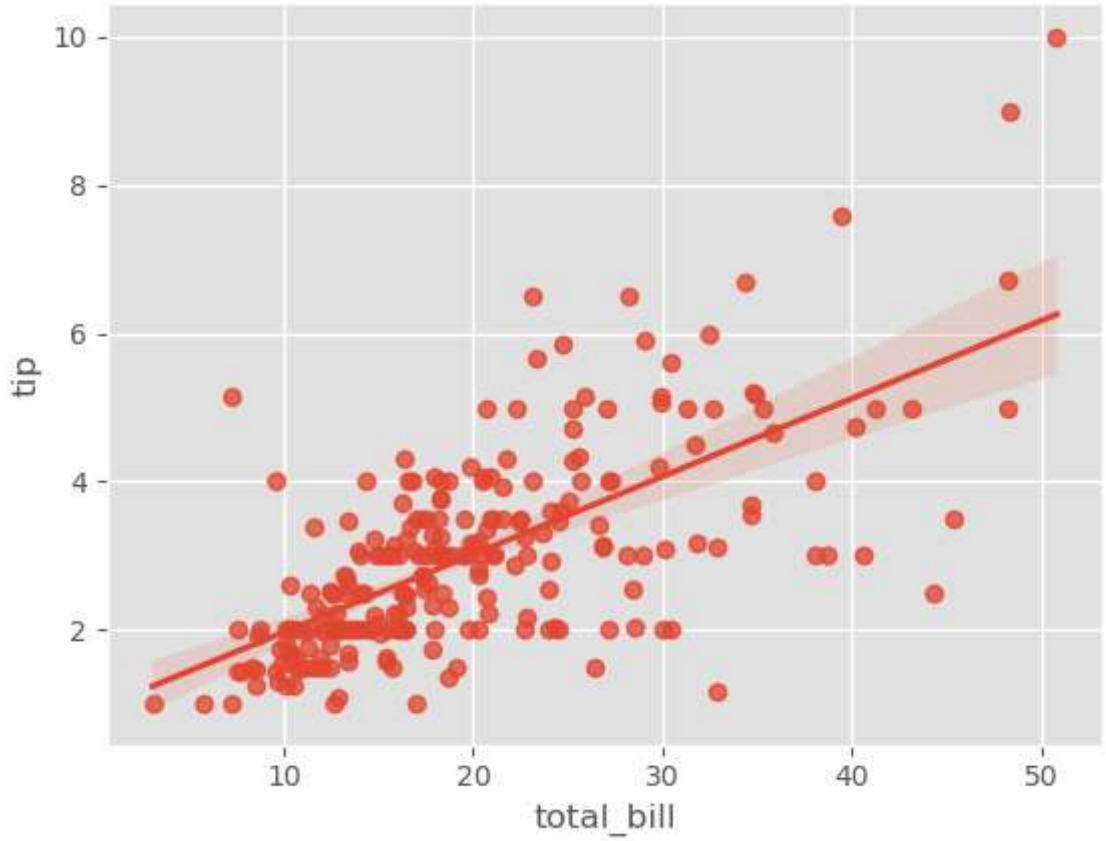
Out[ ]: <seaborn.axisgrid.FacetGrid at 0x22e70dbce50>



Regression Plots

In [ ]:
```
# axes level
 # hue parameter is not available
sns.regplot(data=tips,x='total_bill',y='tip')
```

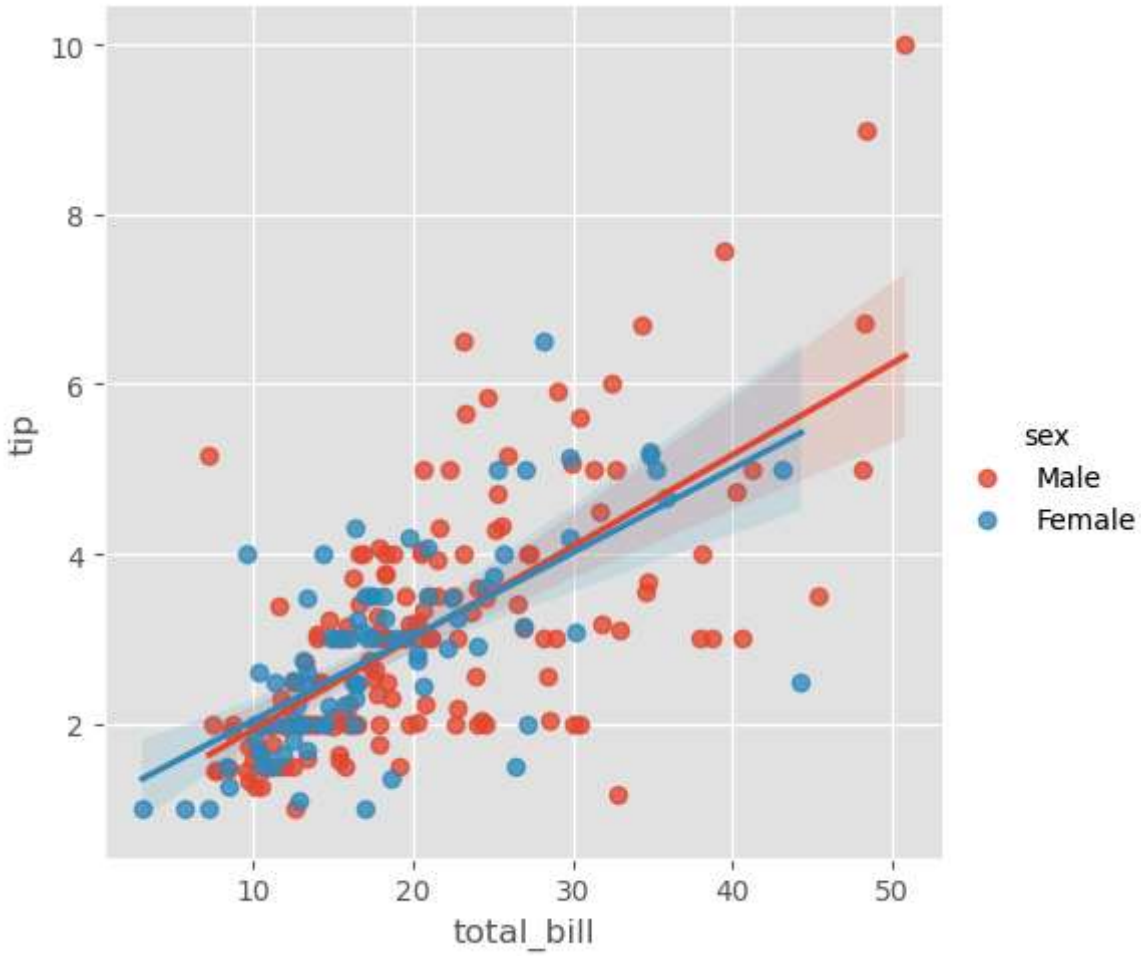
Out[ ]: <Axes: xlabel='total_bill', ylabel='tip'>



LM plot

In [ ]:
```
sns.lmplot(data=tips,x='total_bill',y='tip', hue ='sex')
```

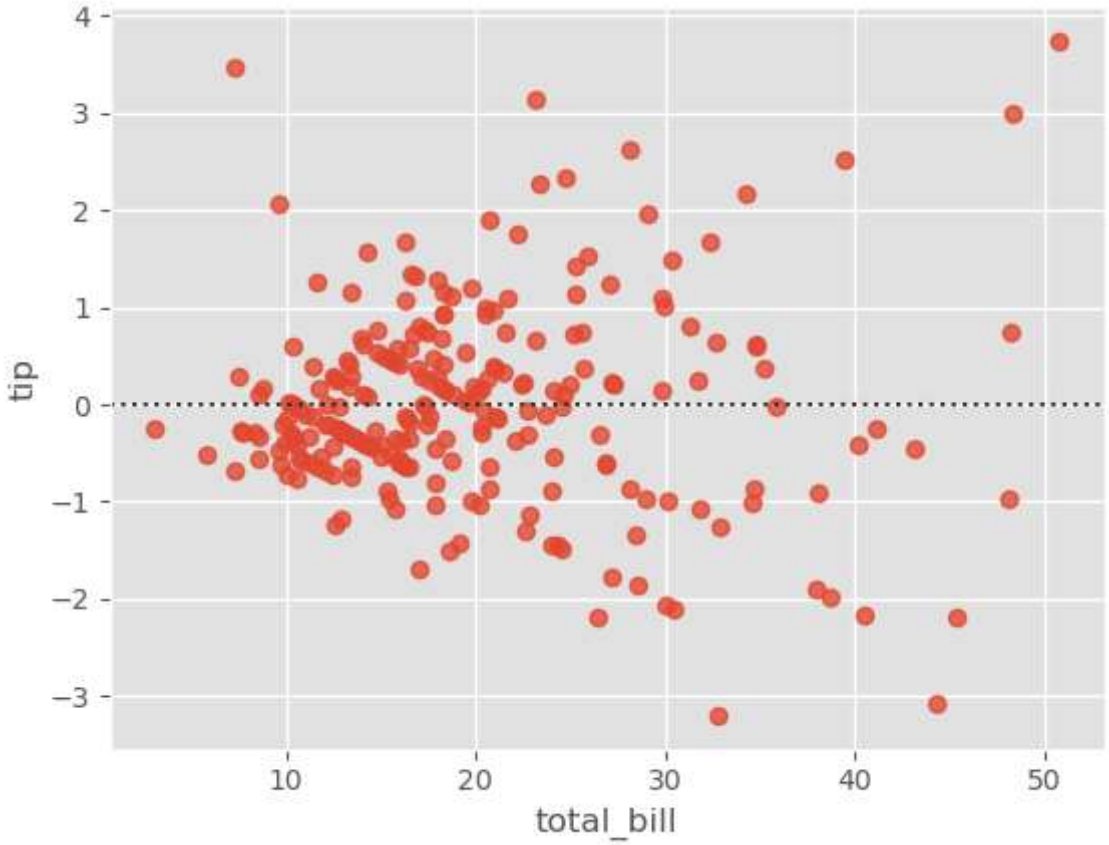
Out[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x22e724d8390>
```



residplot

In [ ]:
```
# residual plot
sns.residplot(data=tips,x='total_bill',y='tip')
```

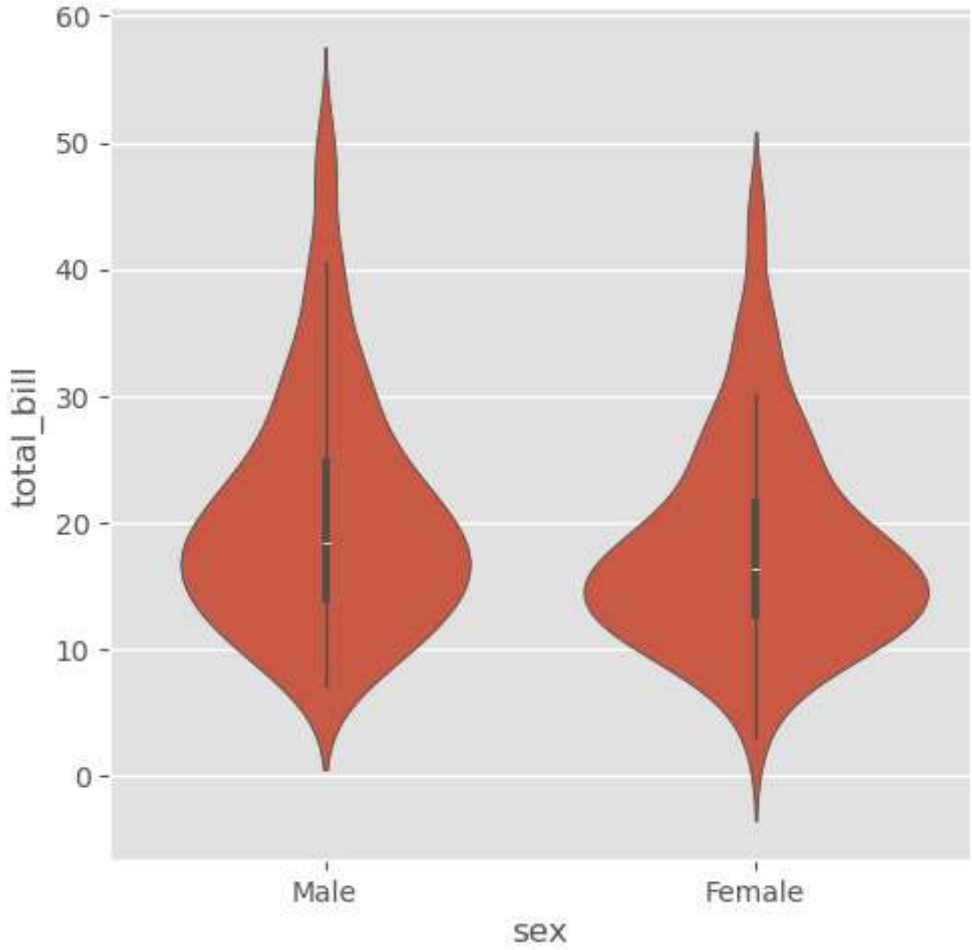
Out[ ]:
```
<Axes: xlabel='total_bill', ylabel='tip'>
```



Second way to plot Facet plots -> FacetGrid

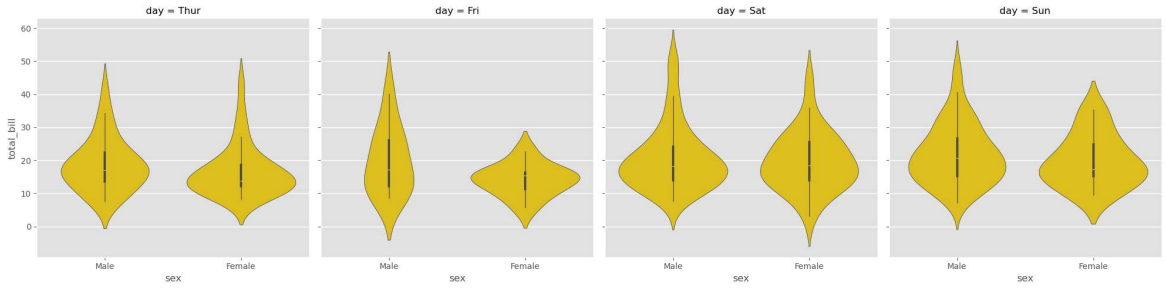
In [ ]:
```
# figure level -> relplot -> displot -> catplot -> lmplot
sns.catplot(data=tips,x='sex',y='total_bill',kind='violin')
```

Out[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x22e724d2110>
```



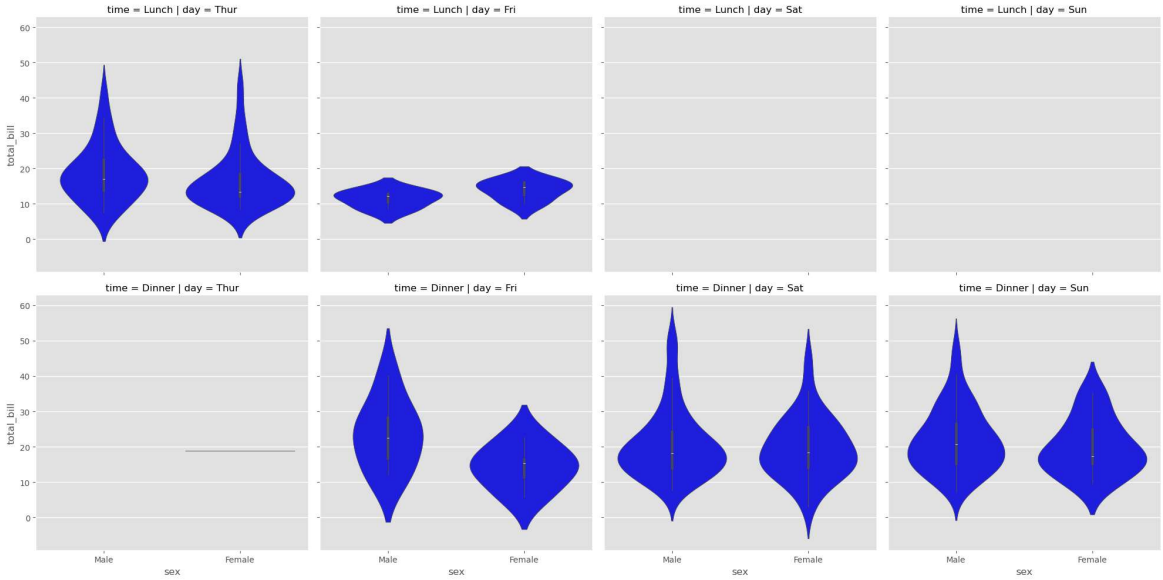
In [ ]:
```
# Facet Plot - columns
sns.catplot(data=tips,x='sex',y='total_bill', color = 'gold',kind='violin',col='
```

Out[ ]: <seaborn.axisgrid.FacetGrid at 0x22e7269eed0>



In [ ]:
```
# Facet Plot - column + rows
sns.catplot(data=tips,x='sex',y='total_bill',color ='blue' ,kind='violin',col='d
```

Out[ ]: <seaborn.axisgrid.FacetGrid at 0x22e727a1c90>



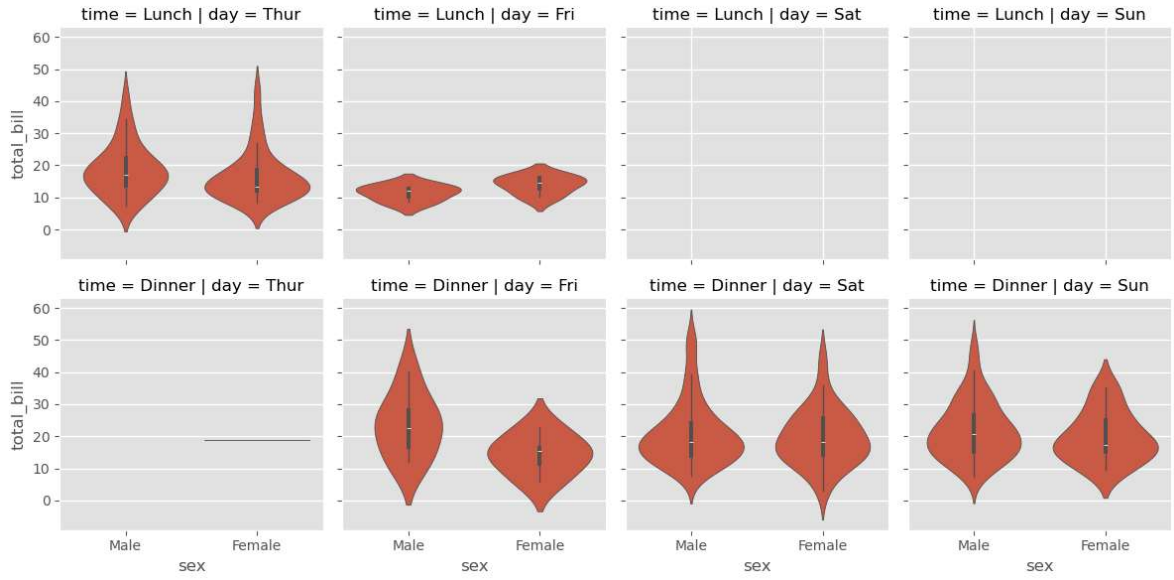
Facetgrid

In [ ]:
```
# Second Method - Facetgrid
# it is the lower level code of catplot
secondmethod = sns.FacetGrid(data =tips ,col ='day' , row ='time')

# Define a plotting function to map to the FacetGrid
def violin_plot(x, y, **kwargs):
    sns.violinplot(x=x, y=y, **kwargs)

# Map the violinplot to the grid
secondmethod.map_dataframe(violin_plot, x='sex', y='total_bill')
```

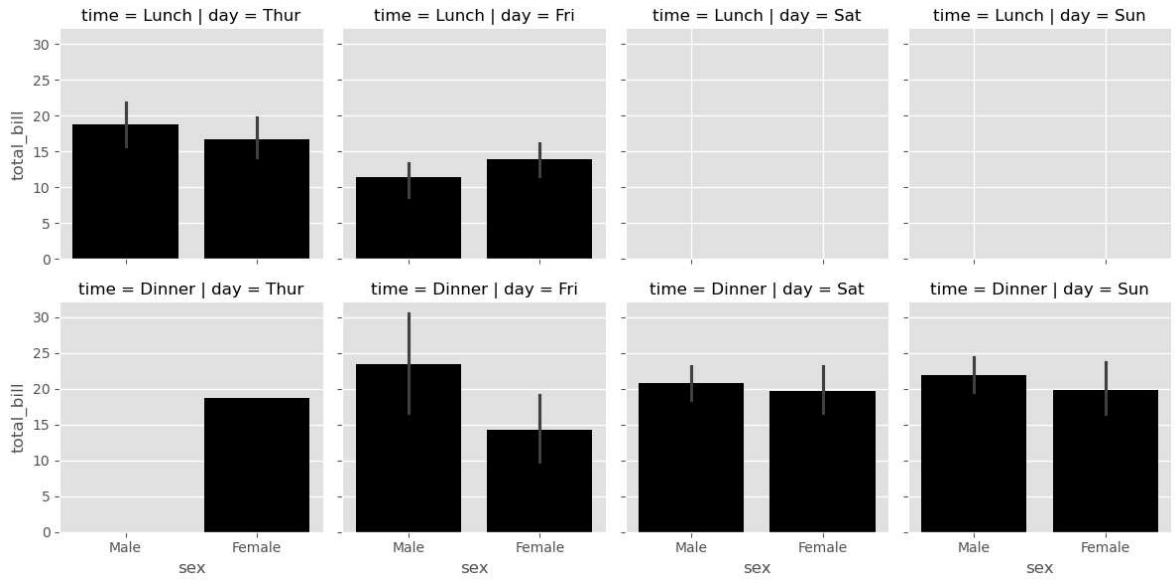
Out[ ]: <seaborn.axisgrid.FacetGrid at 0x22e73449010>



In [ ]:
```
secondmethod = sns.FacetGrid(data =tips ,col ='day' , row ='time' )
#secondmethod.map(sns.barplot,'sex','total_bill',color='black')
def bar_plot(x, y, **kwargs):
    sns.barplot(x=x, y=y, **kwargs)

# Map the barplot to the grid
secondmethod.map_dataframe(bar_plot, x='sex', y='total_bill',color='black')
```

Out[ ]: <seaborn.axisgrid.FacetGrid at 0x22e746457d0>

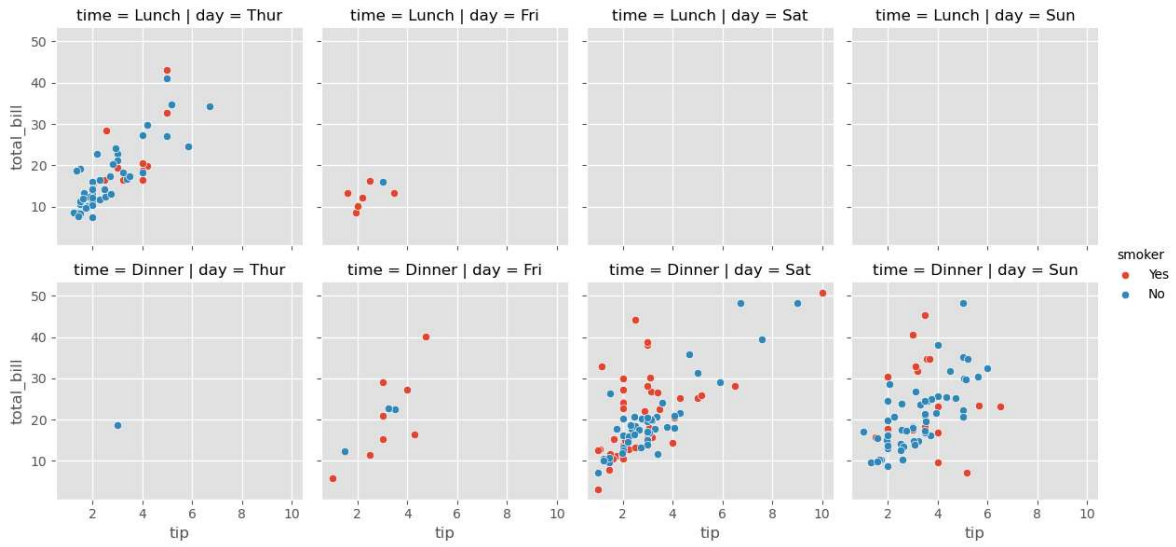


In [ ]:
```
# Adding Legend
secondmethod = sns.FacetGrid(data=tips,col='day',row='time',hue='smoker')

def scatterplot(x, y, **kwargs):
    sns.scatterplot(x=x, y=y, **kwargs)

secondmethod.map_dataframe(scatterplot, x='tip', y='total_bill')
secondmethod.add_legend()
```

Out[ ]: <seaborn.axisgrid.FacetGrid at 0x22e7486b350>



Plotting Pairwise Relationship (PairGrid Vs Pairplot)

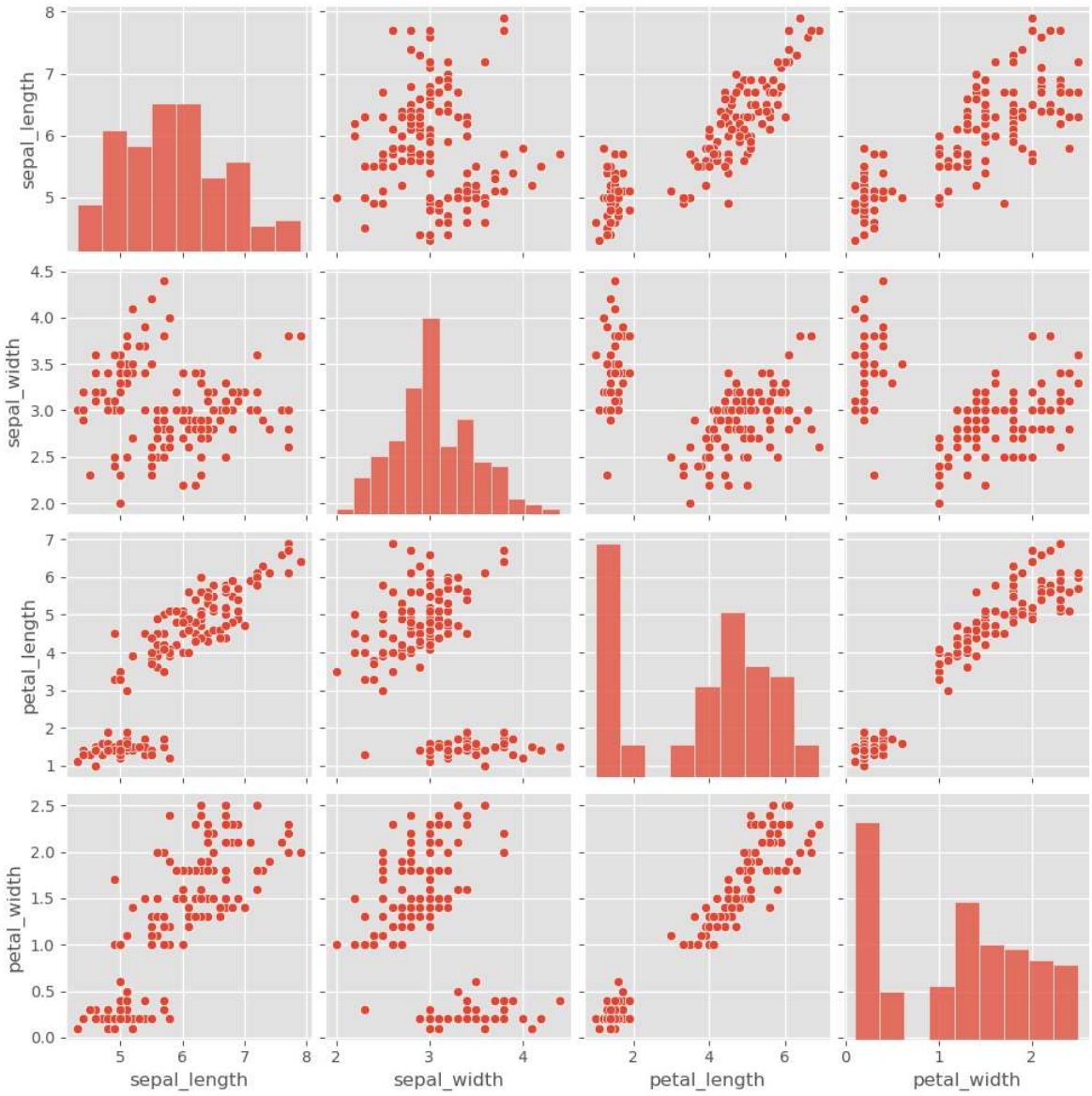
In [ ]:
```
iris.sample()
```

Out[ ]:

	sepal_length	sepal_width	petal_length	petal_width	species
104	6.5	3.0	5.8	2.2	virginica

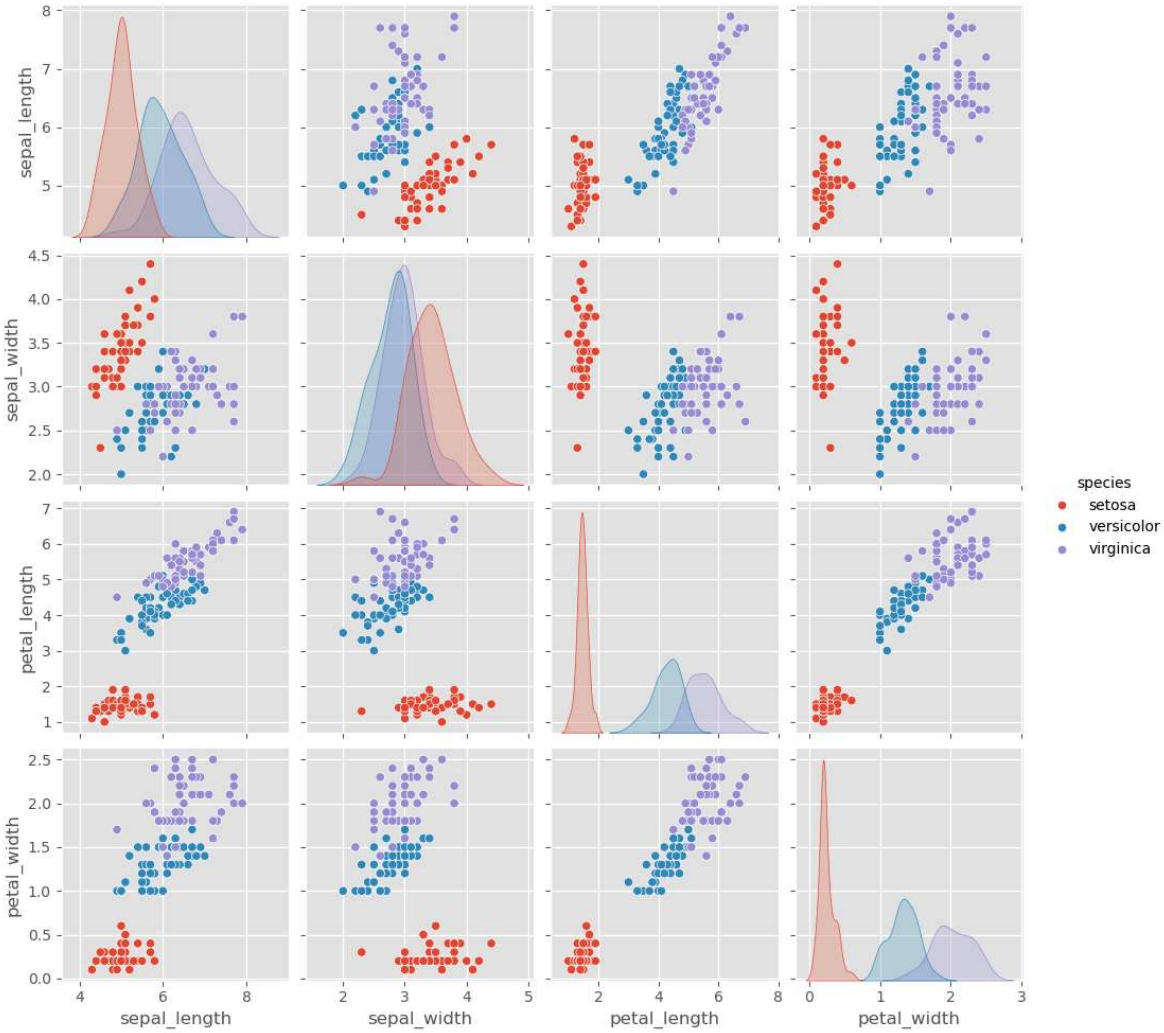
In [ ]:
```
# Pairplot
sns.pairplot(iris)
```

Out[ ]: <seaborn.axisgrid.PairGrid at 0x22e768a2ed0>



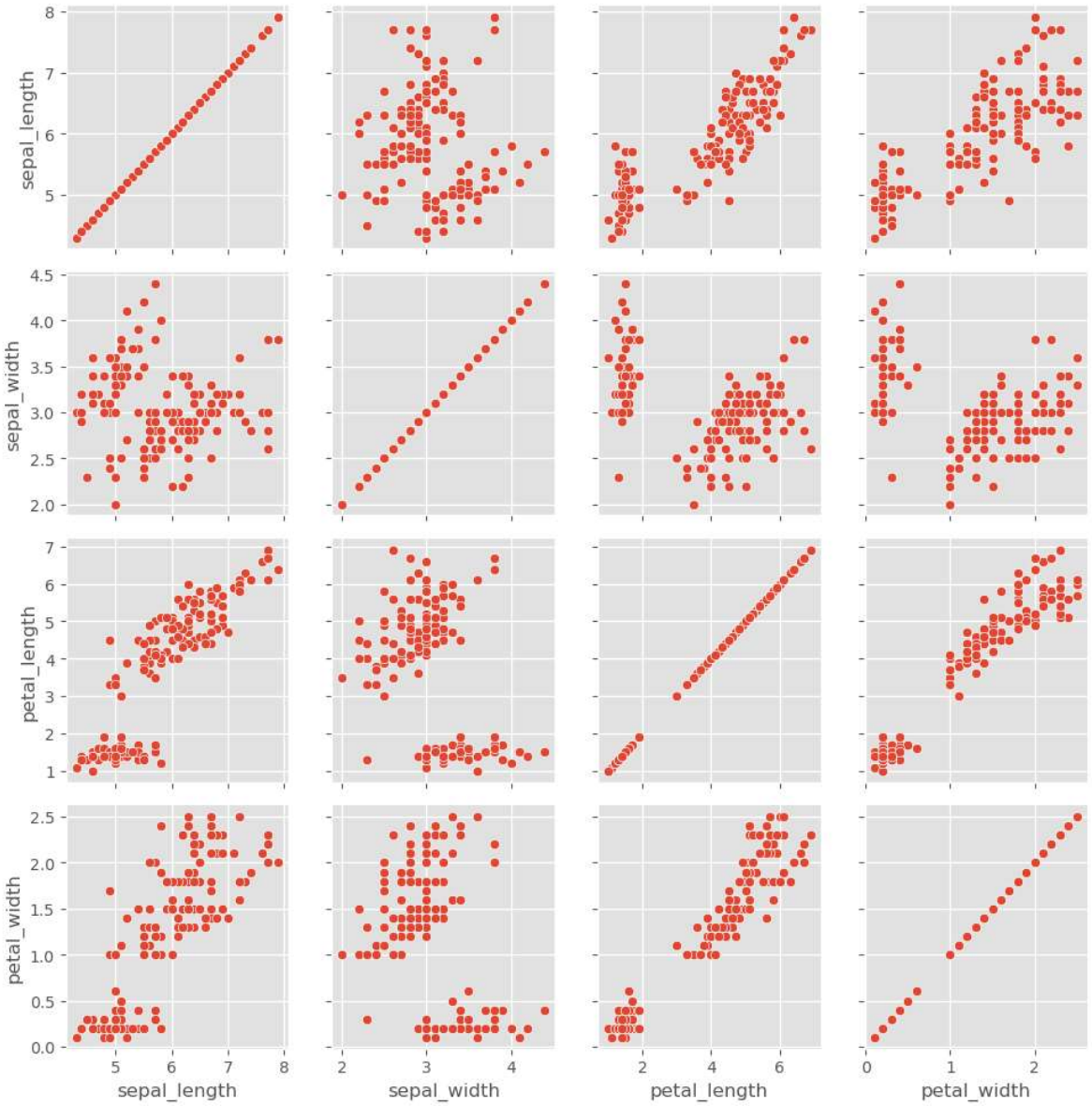
In [ ]:
```
#hue
sns.pairplot(iris,hue='species')
```

Out[ ]: <seaborn.axisgrid.PairGrid at 0x22e77d85490>

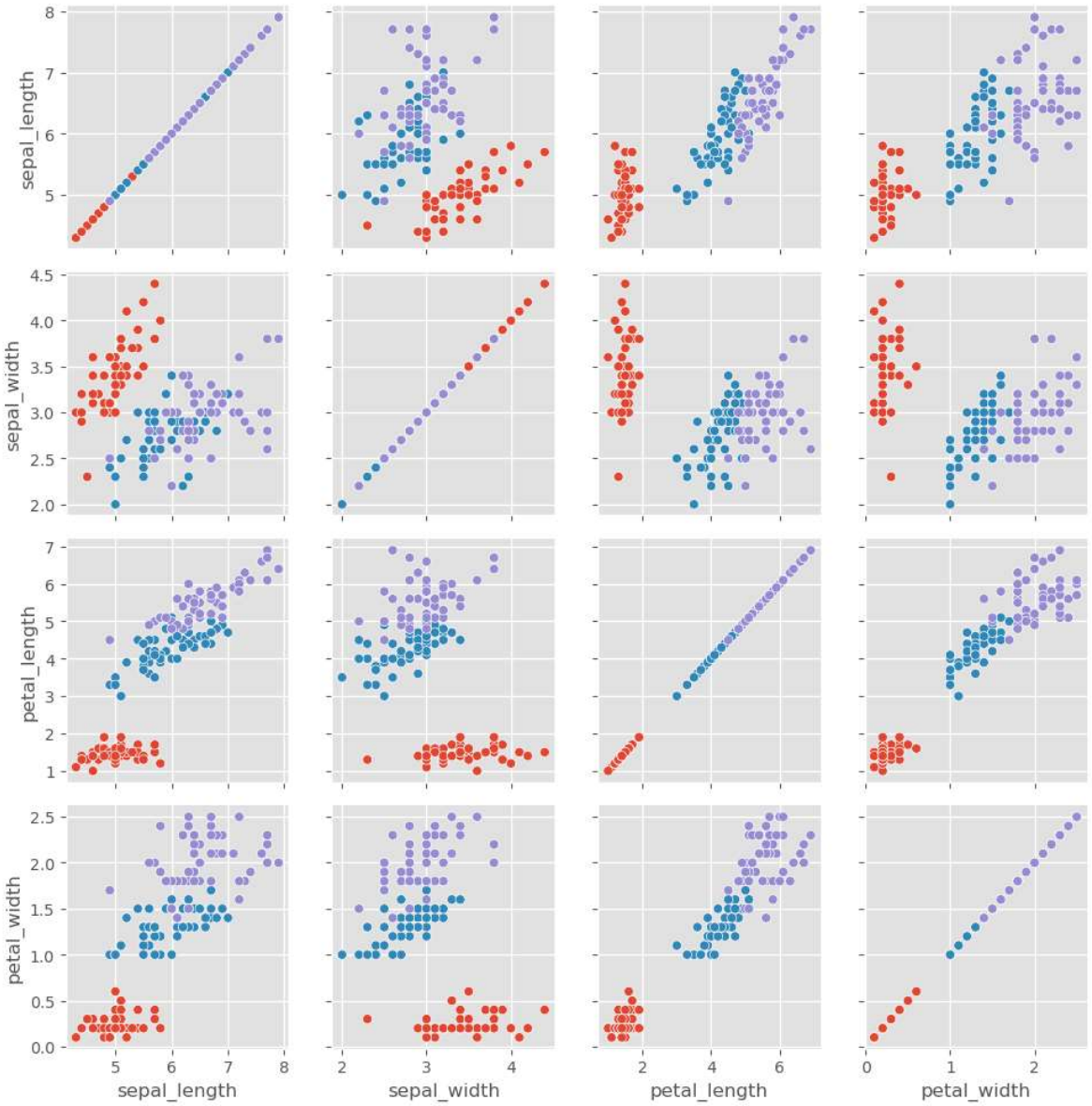


In [ ]:
```
# pair grid
g = sns.PairGrid(data=iris )
# g.map
g.map(sns.scatterplot)
```

Out[ ]: <seaborn.axisgrid.PairGrid at 0x22e755e78d0>

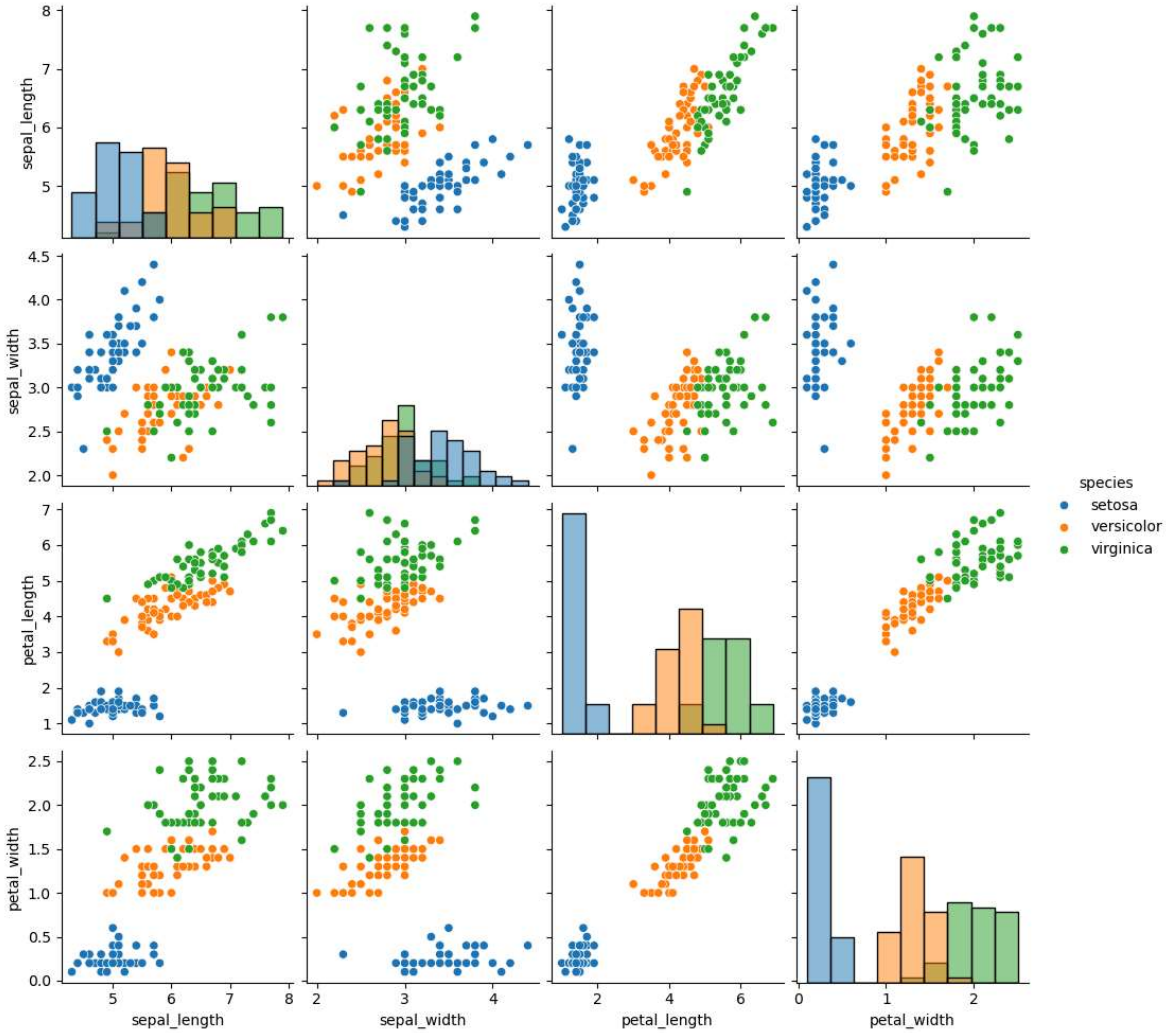


In [ ]:
```
# hue
g = sns.PairGrid(data=iris,hue='species')
# g.map
g.map(sns.scatterplot)
# style
plt.style.use('default')
```



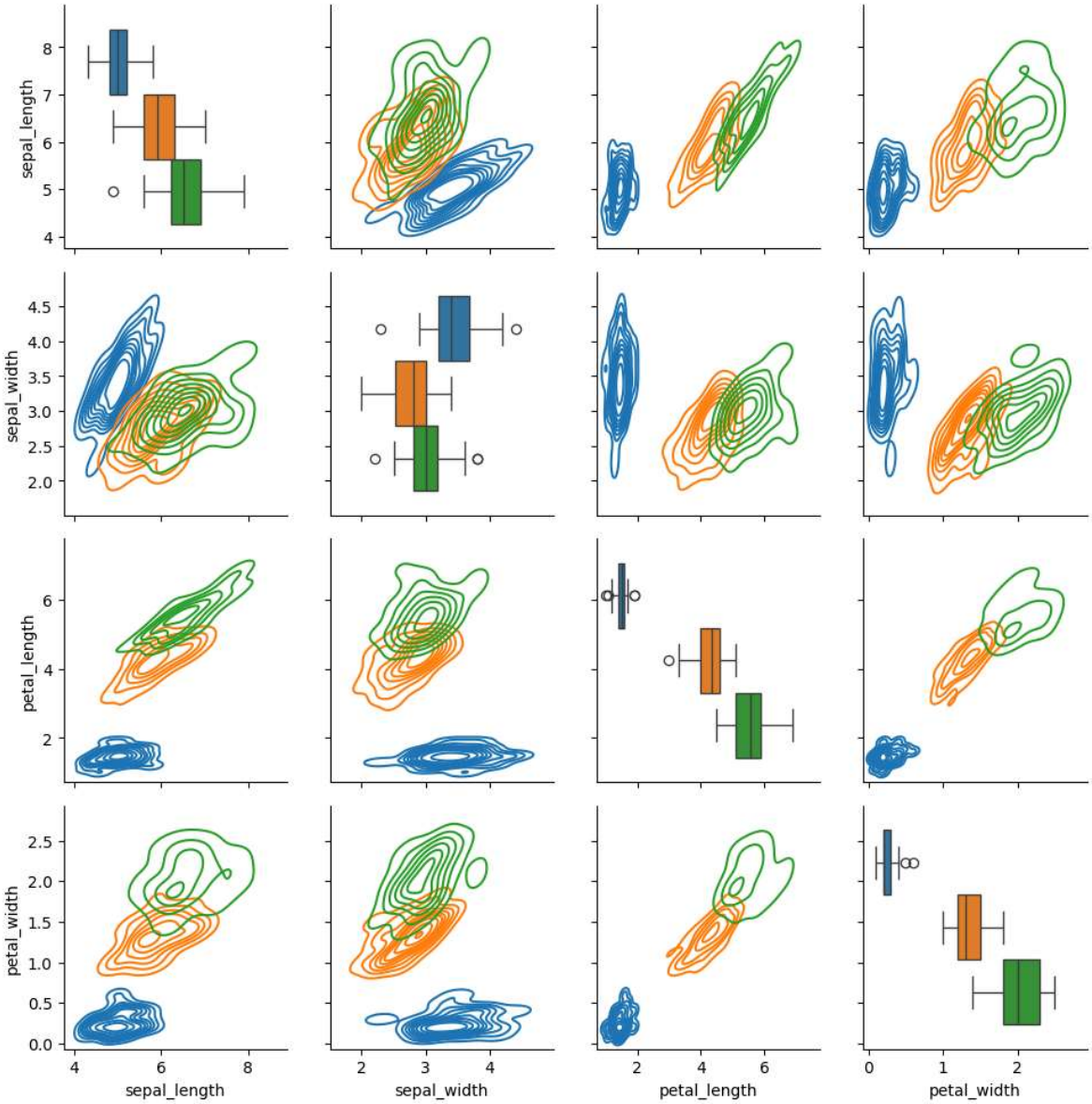
In [ ]:
```
sns.pairplot(data=iris, hue='species', diag_kind='hist')
```

Out[ ]:
```
<seaborn.axisgrid.PairGrid at 0x22e78d6f090>
```



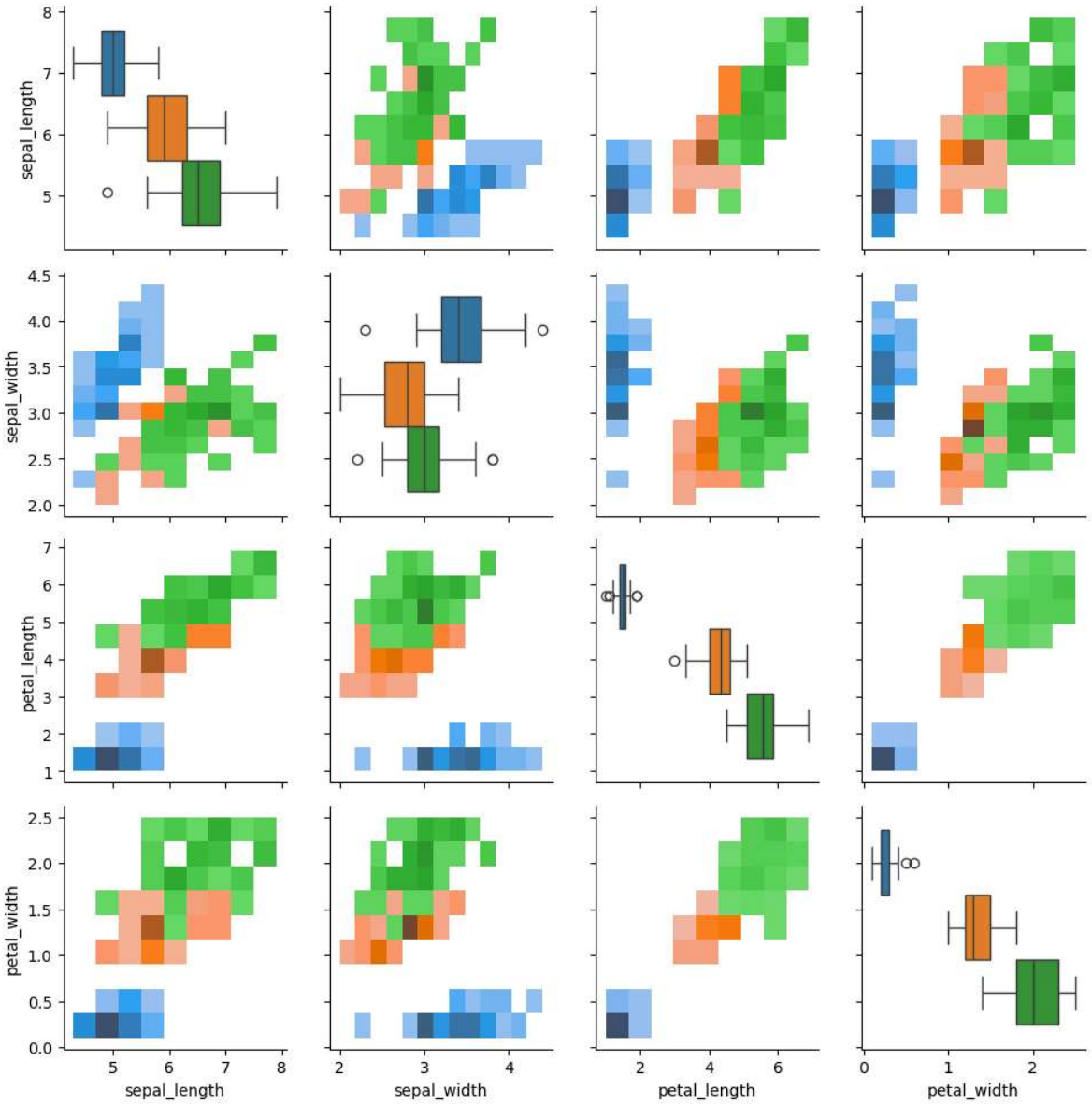
In [ ]:
```
g = sns.PairGrid(data=iris,hue='species')
g.map_diag(sns.boxplot)
g.map_offdiag(sns.kdeplot)
```

Out[ ]:
```
<seaborn.axisgrid.PairGrid at 0x22e7c8c3610>
```



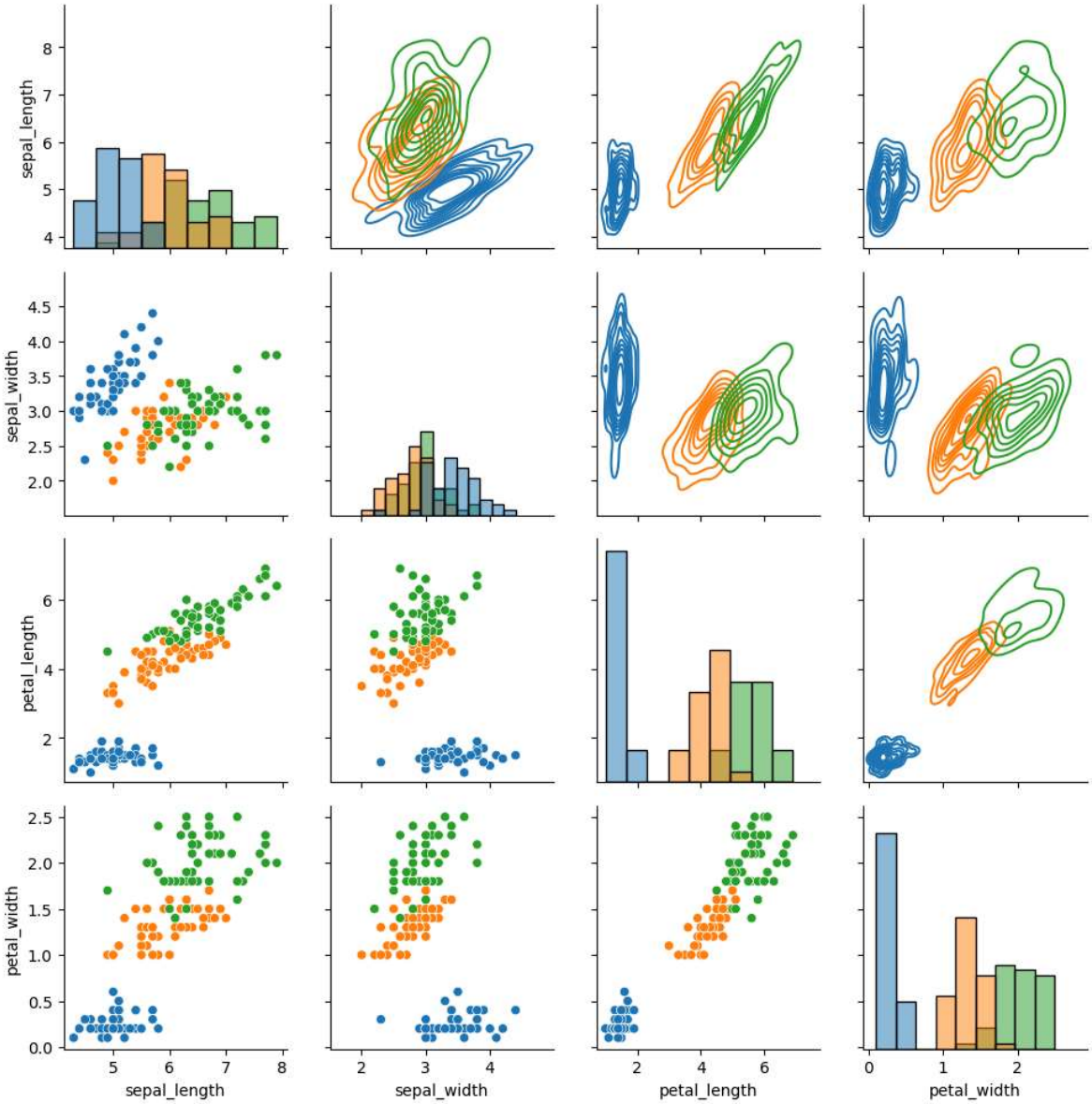
In [ ]:
```
g = sns.PairGrid(data=iris,hue='species')
g.map_diag(sns.boxplot)
g.map_offdiag(sns.histplot)
```

Out[ ]:
```
<seaborn.axisgrid.PairGrid at 0x22e7c9ba910>
```



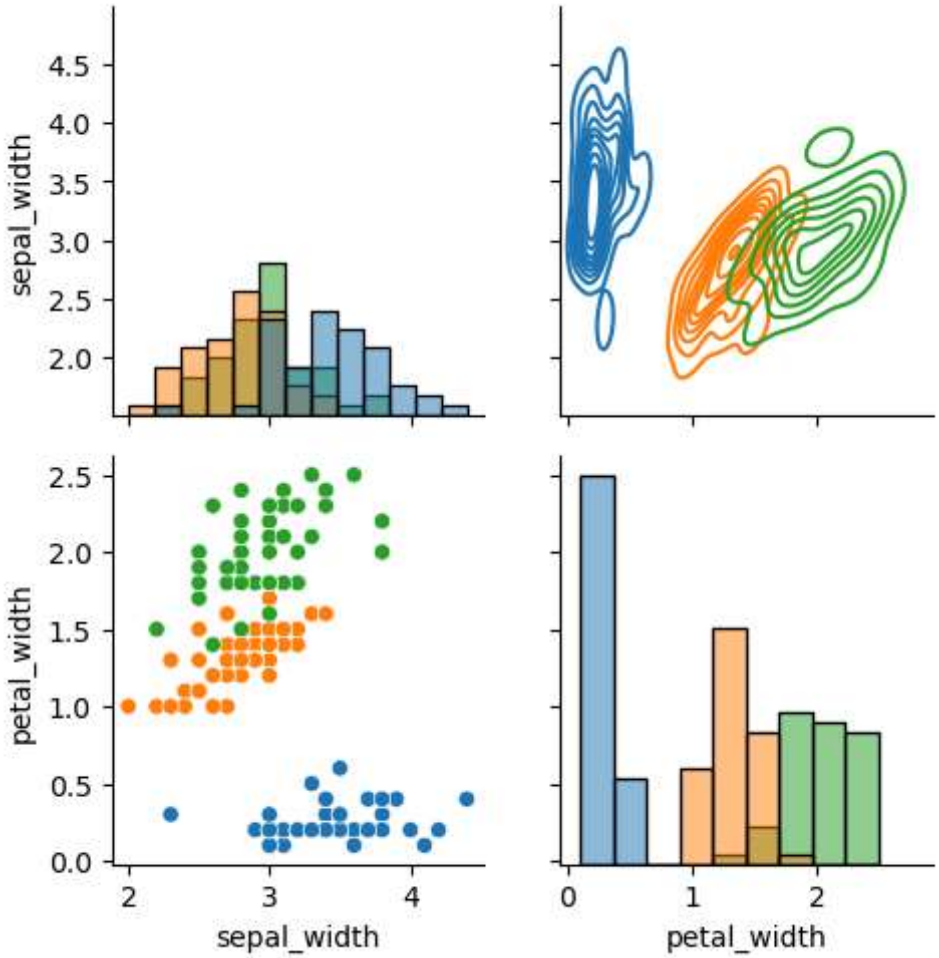
In [ ]:
```
# map_diag -> map_upper -> map_lower
g = sns.PairGrid(data=iris,hue='species')
g.map_diag(sns.histplot) # diagonal
g.map_upper(sns.kdeplot) # upper
g.map_lower(sns.scatterplot) # lower
```

Out[ ]:
```
<seaborn.axisgrid.PairGrid at 0x22e01178790>
```



In [ ]:
```
# vars - working upon the desired columns
g = sns.PairGrid(data=iris,hue='species',vars=['sepal_width','petal_width'])
g.map_diag(sns.histplot)
g.map_upper(sns.kdeplot)
g.map_lower(sns.scatterplot)
```

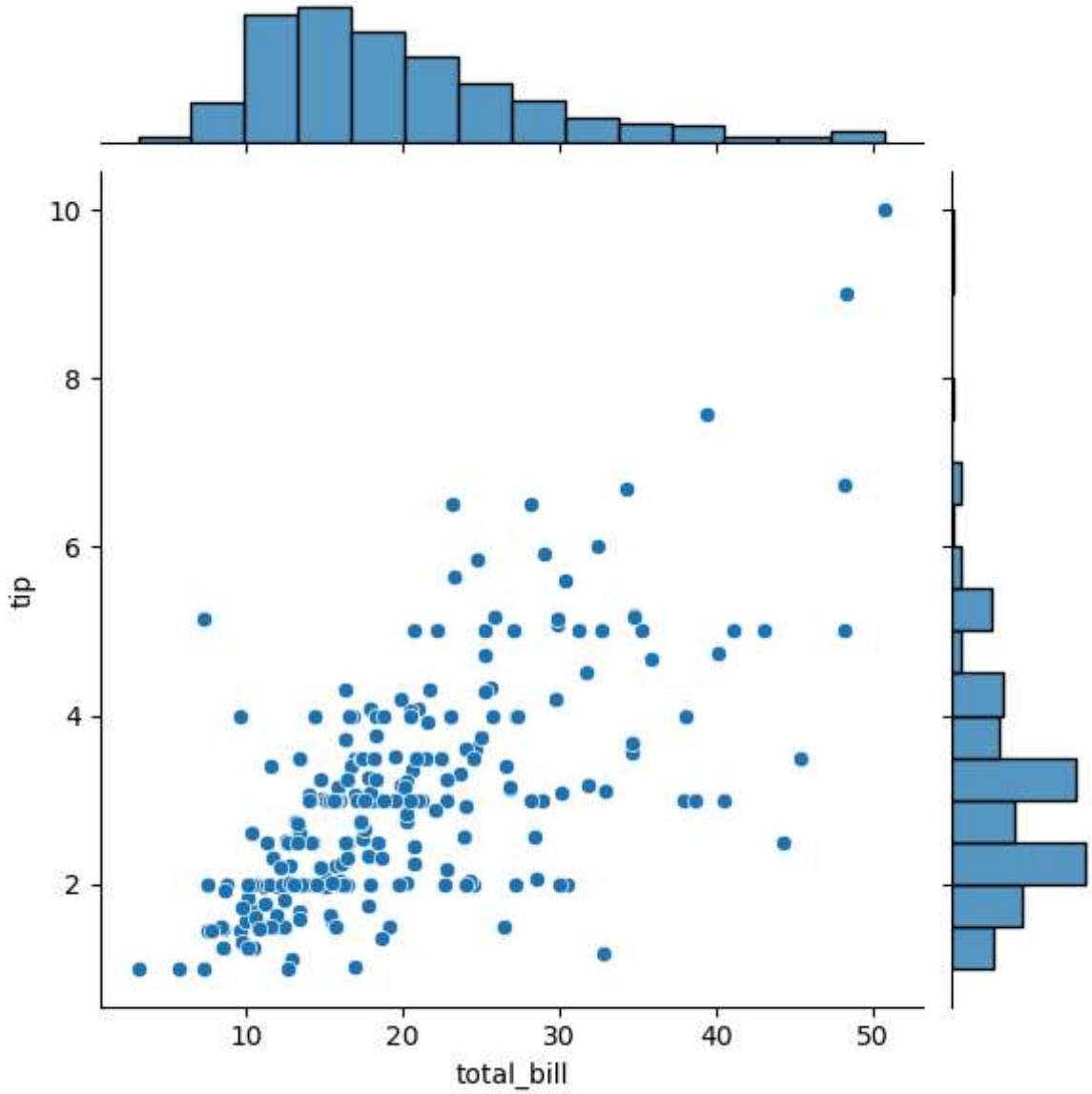
Out[ ]:
```
<seaborn.axisgrid.PairGrid at 0x22e7ca47c10>
```



JointGrid Vs Jointplot

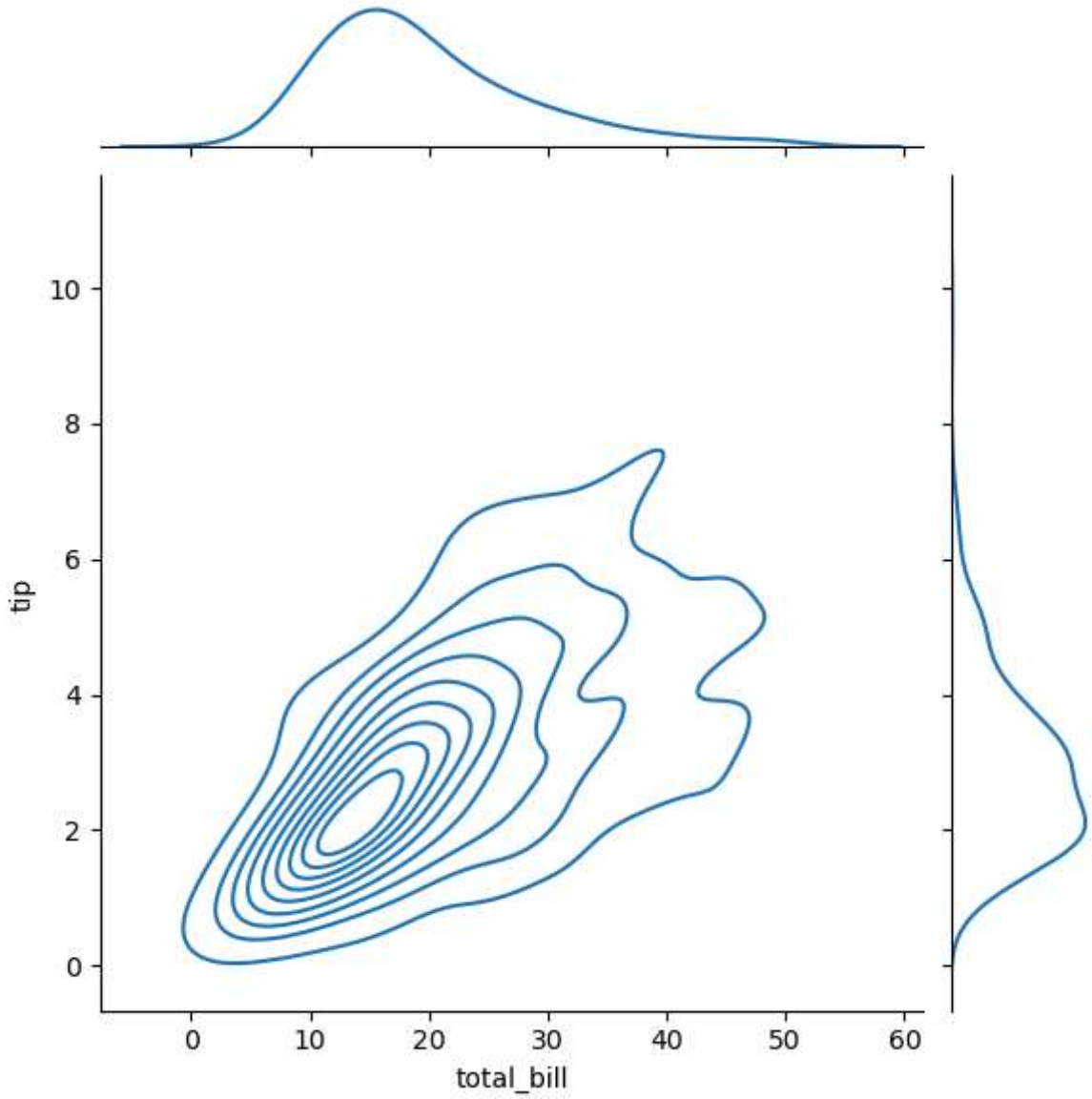
In [ ]:
```
sns.jointplot(data=tips,x='total_bill',y='tip')
```

Out[ ]:
```
<seaborn.axisgrid.JointGrid at 0x22e019f6f50>
```



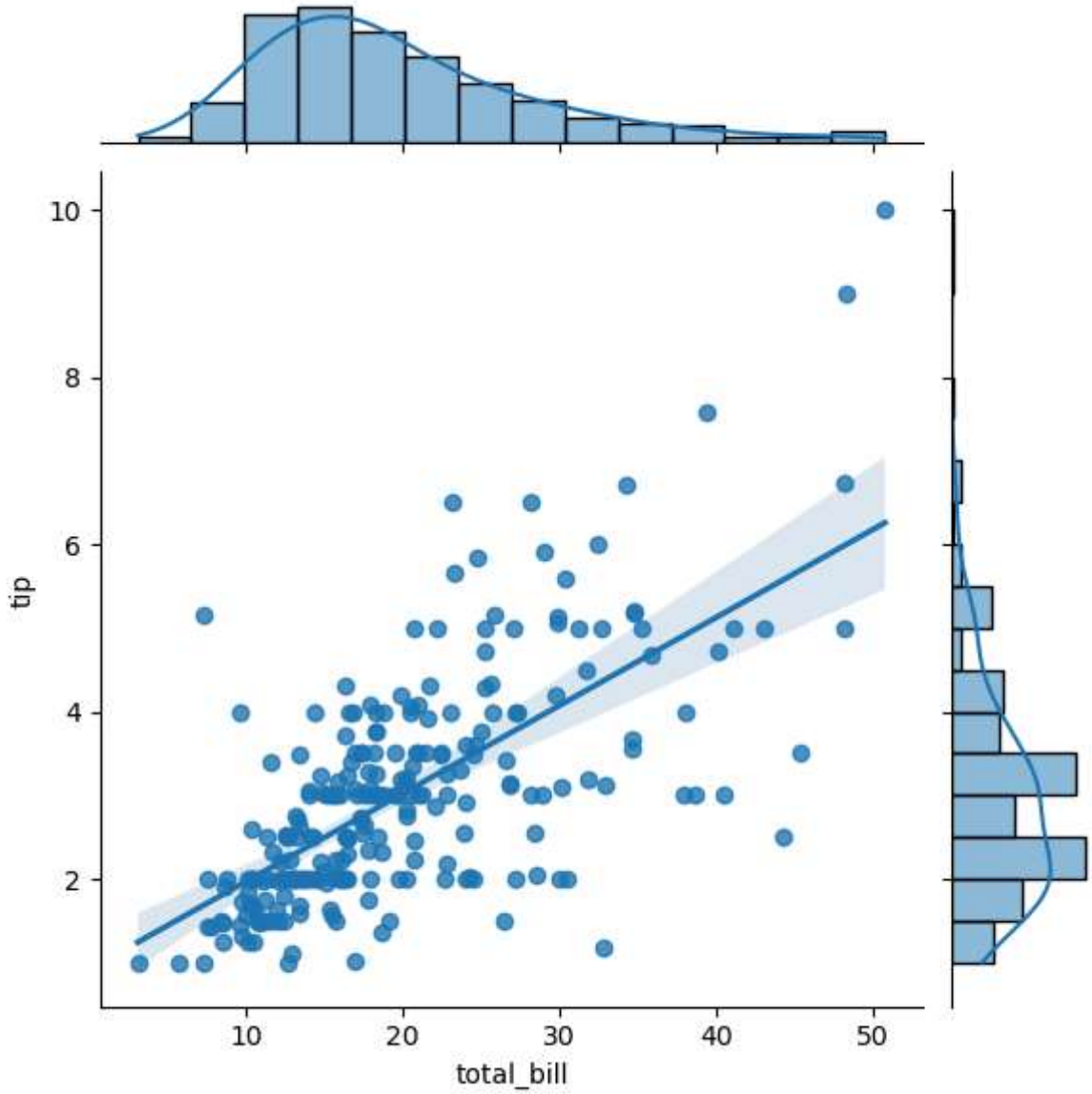
In [ ]:
```
# kind
sns.jointplot(data=tips,x='total_bill',y='tip',kind= 'kde' )
```

Out[ ]: <seaborn.axisgrid.JointGrid at 0x22e04a7ef90>



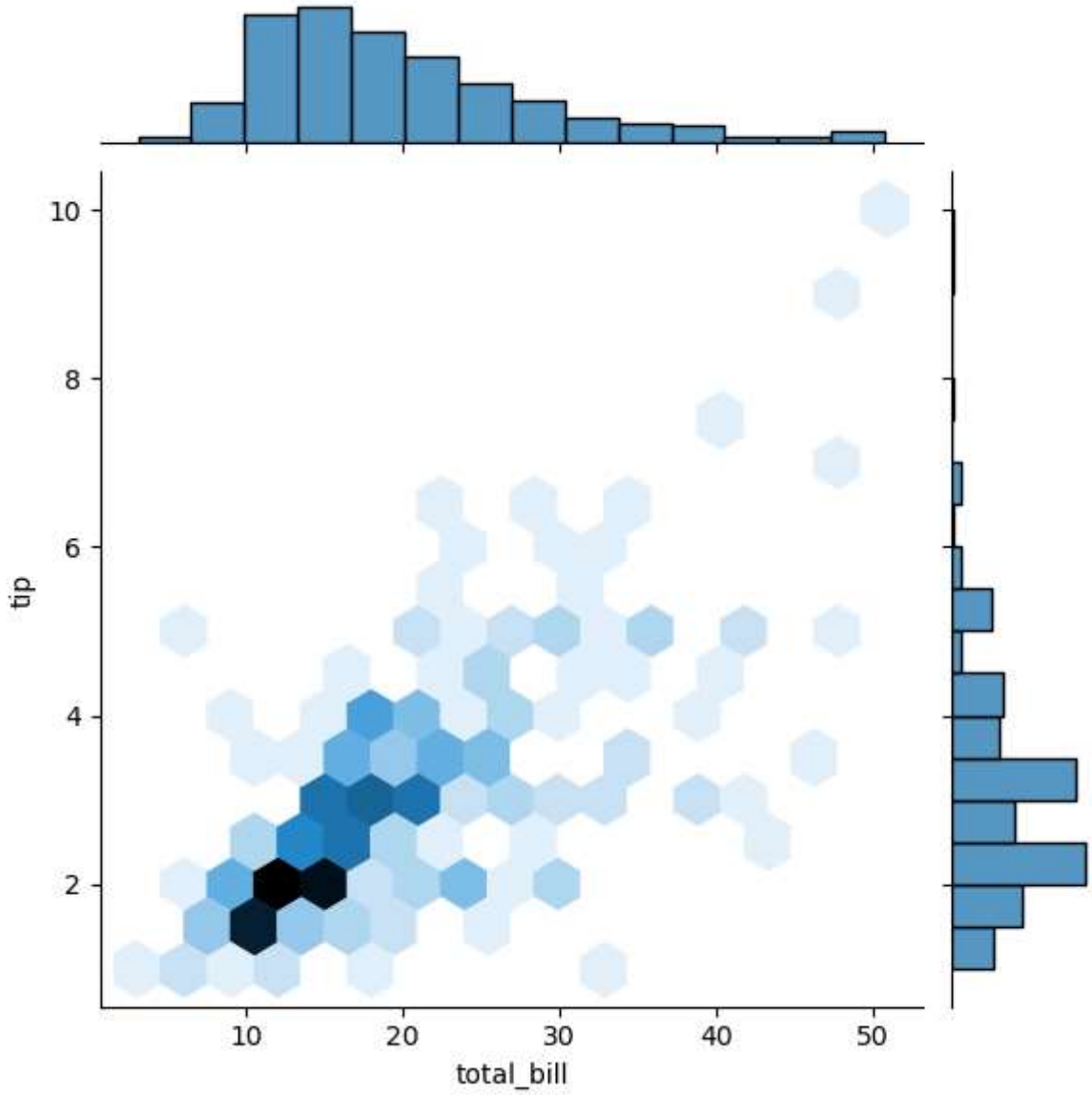
In [ ]:
```
#regression line
sns.jointplot(data=tips,x='total_bill',y='tip',kind= 'reg' )
```

Out[ ]: <seaborn.axisgrid.JointGrid at 0x22e04876f50>



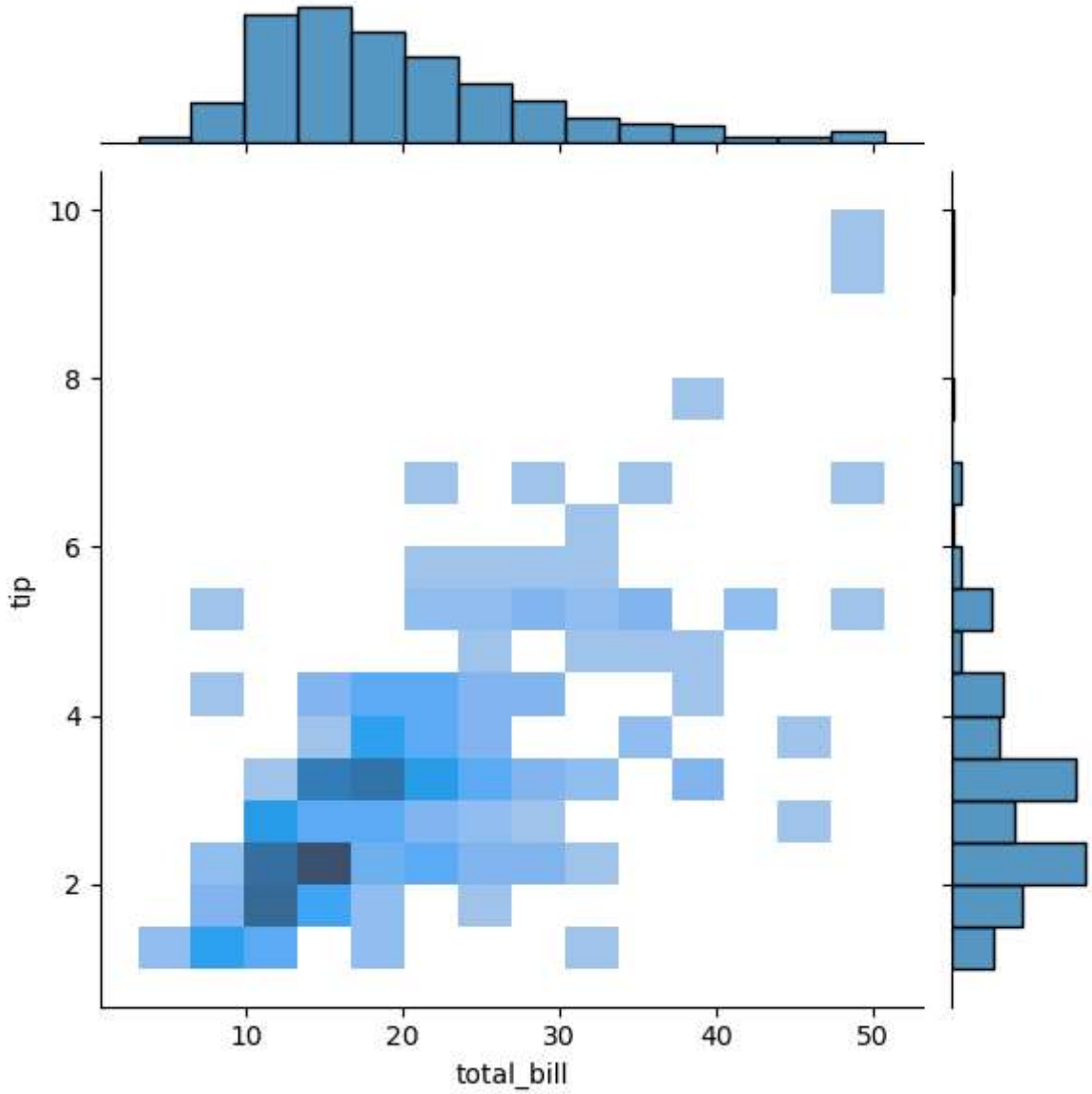
In [ ]:
```
# hex
sns.jointplot(data=tips,x='total_bill',y='tip',kind= 'hex' )
```

Out[ ]:
```
<seaborn.axisgrid.JointGrid at 0x22e052aef90>
```



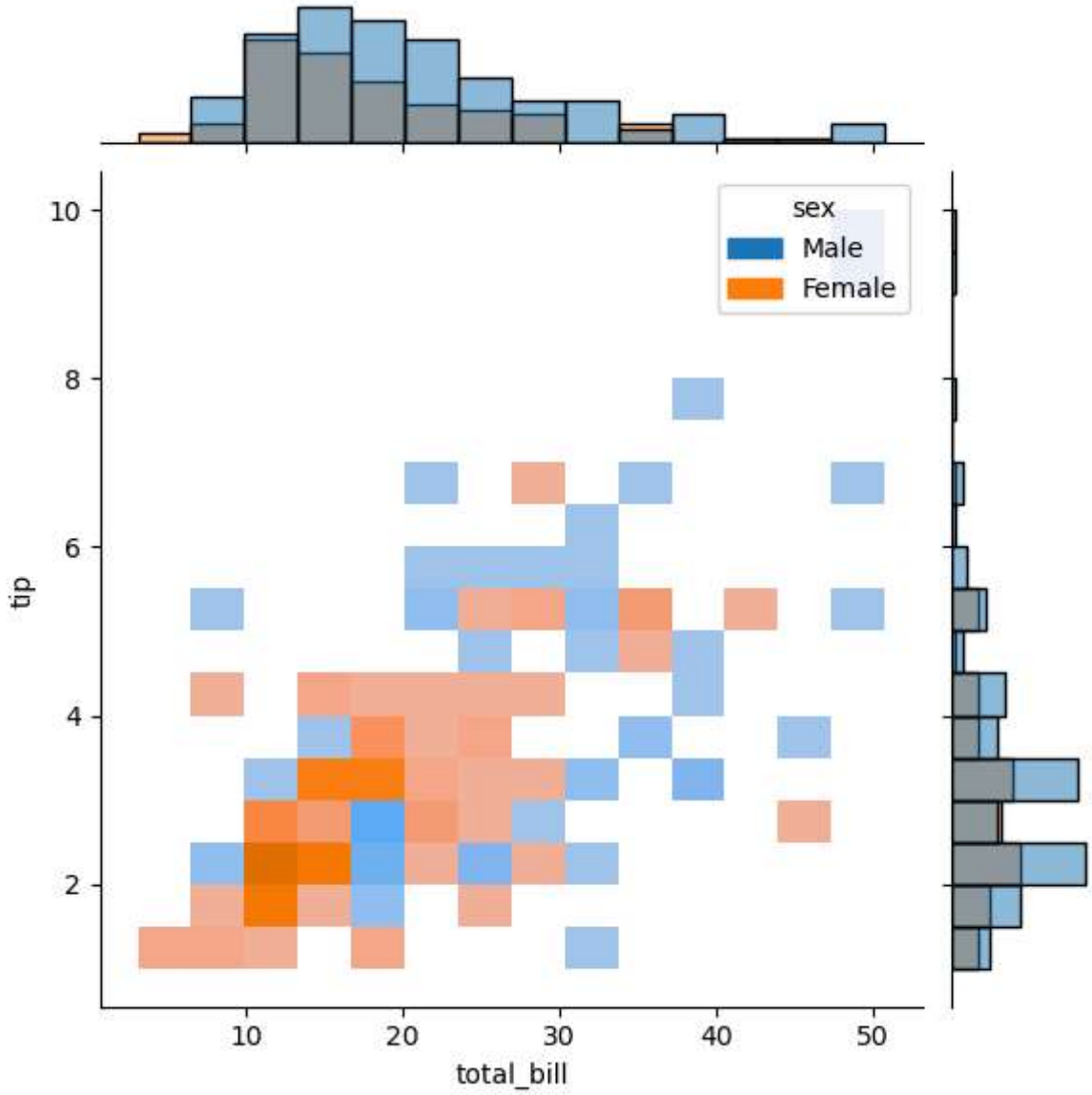
In [ ]:
```
# kind -2d histogram + 1 histogram
sns.jointplot(data=tips,x='total_bill',y='tip',kind='hist' )
```

Out[ ]: <seaborn.axisgrid.JointGrid at 0x22e0568dd10>



In [ ]:
```
# hue
sns.jointplot(data=tips,x='total_bill',y='tip',kind='hist',hue='sex')
```

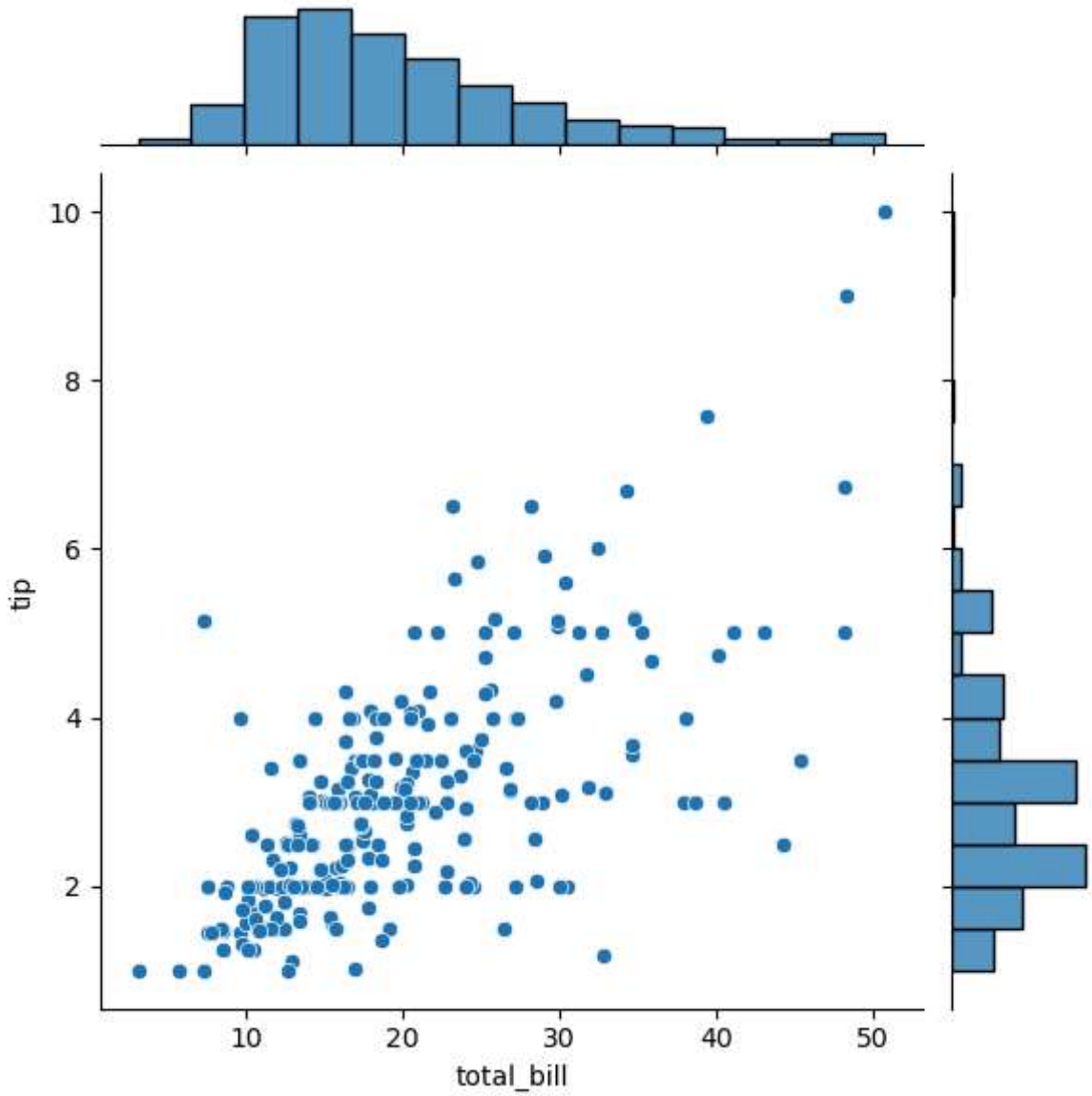
Out[ ]: <seaborn.axisgrid.JointGrid at 0x22e056e6e10>



Joint Grid

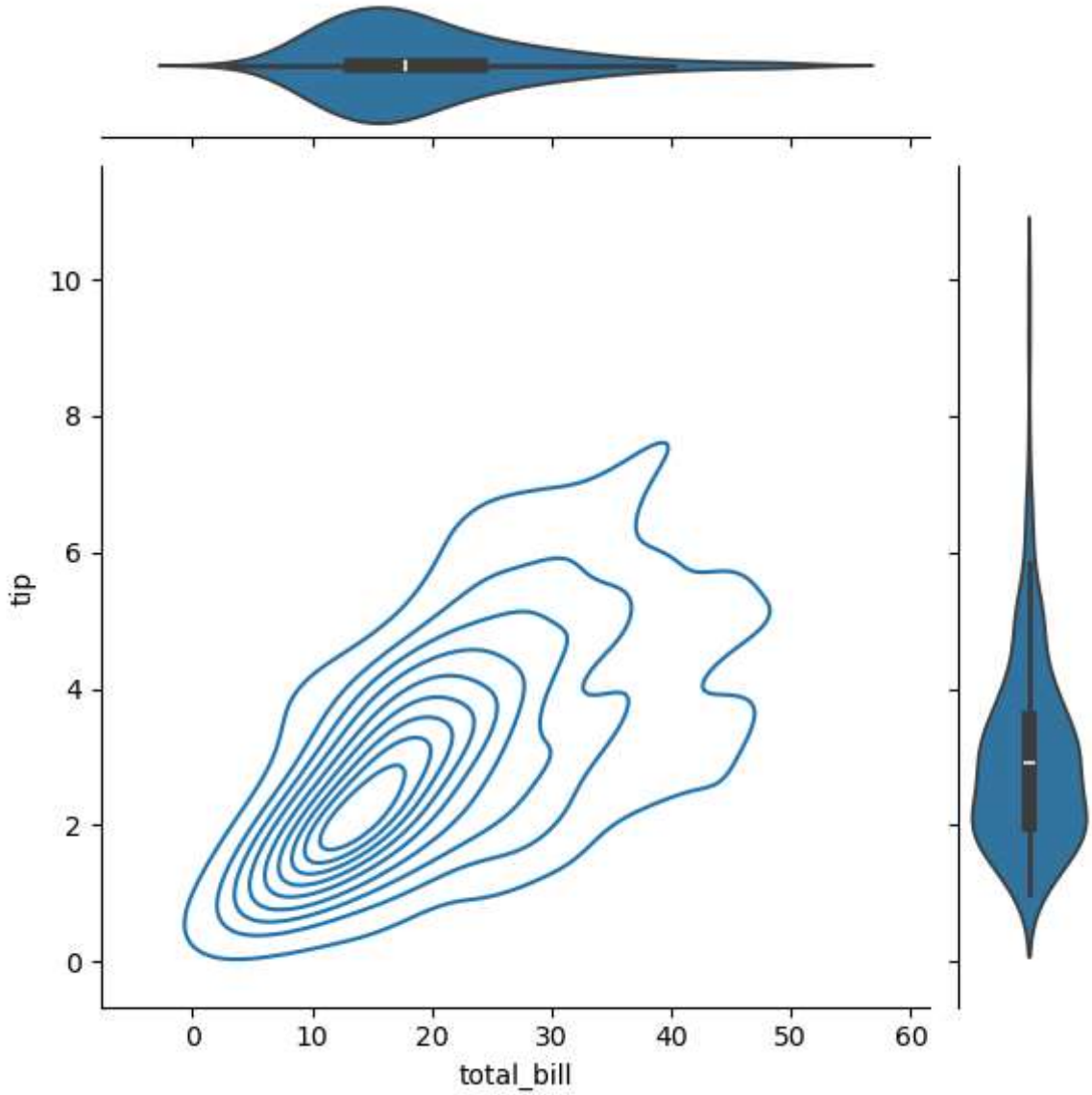
In [ ]:
```
# we can change plots as per our requirements
g = sns.JointGrid(data=tips,x='total_bill',y='tip')
g.plot(sns.scatterplot,sns.histplot)
```

Out[ ]:
```
<seaborn.axisgrid.JointGrid at 0x22e05a700d0>
```



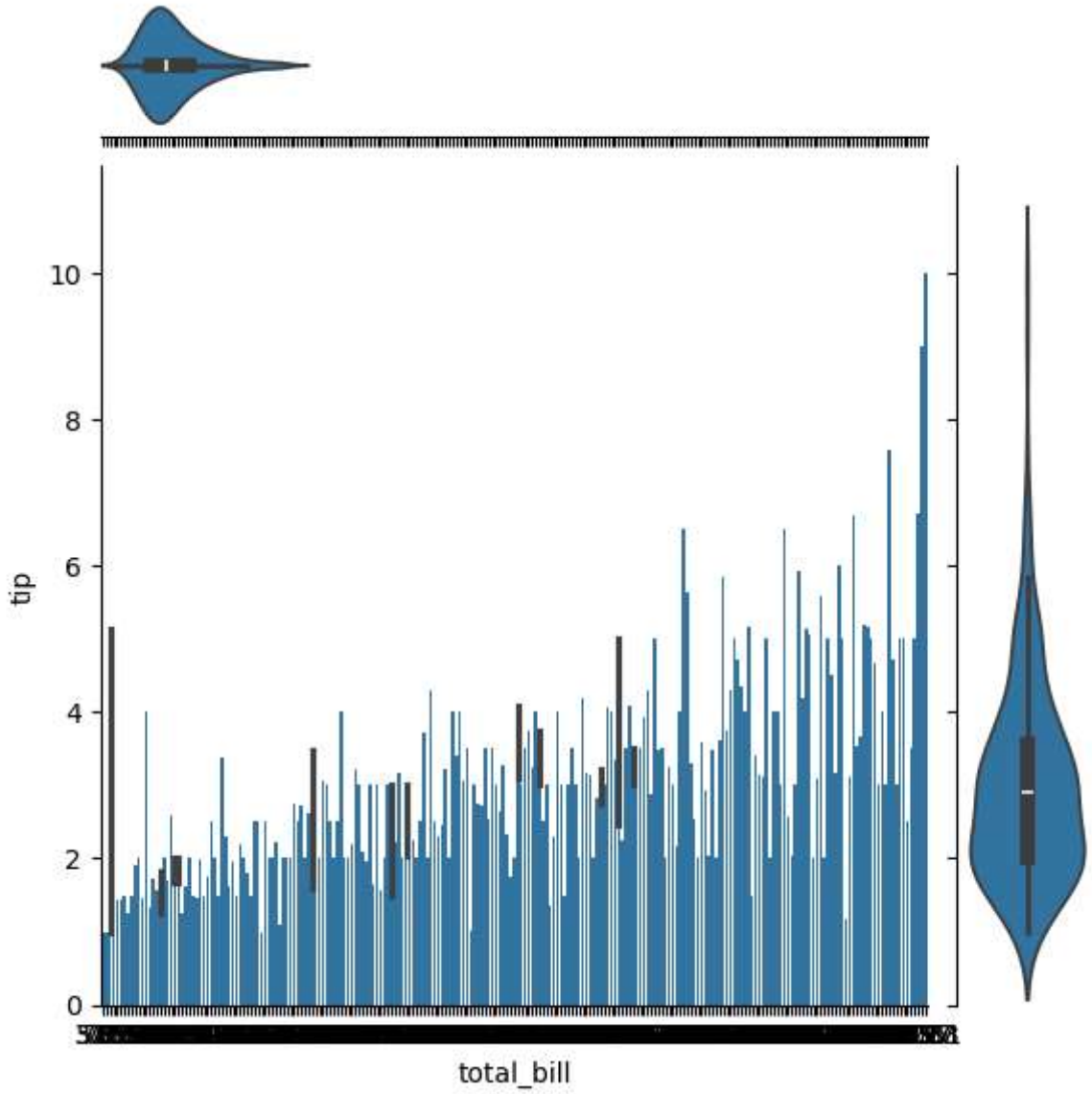
In [ ]:
```
g = sns.JointGrid(data=tips,x='total_bill',y='tip')
g.plot(sns.kdeplot,sns.violinplot)
```

Out[ ]: <seaborn.axisgrid.JointGrid at 0x22e062cd450>



In [ ]:
```
g = sns.JointGrid(data=tips,x='total_bill',y='tip')
g.plot(sns.barplot,sns.violinplot)
```

Out[ ]:
```
<seaborn.axisgrid.JointGrid at 0x22e06296cd0>
```



In [ ]: