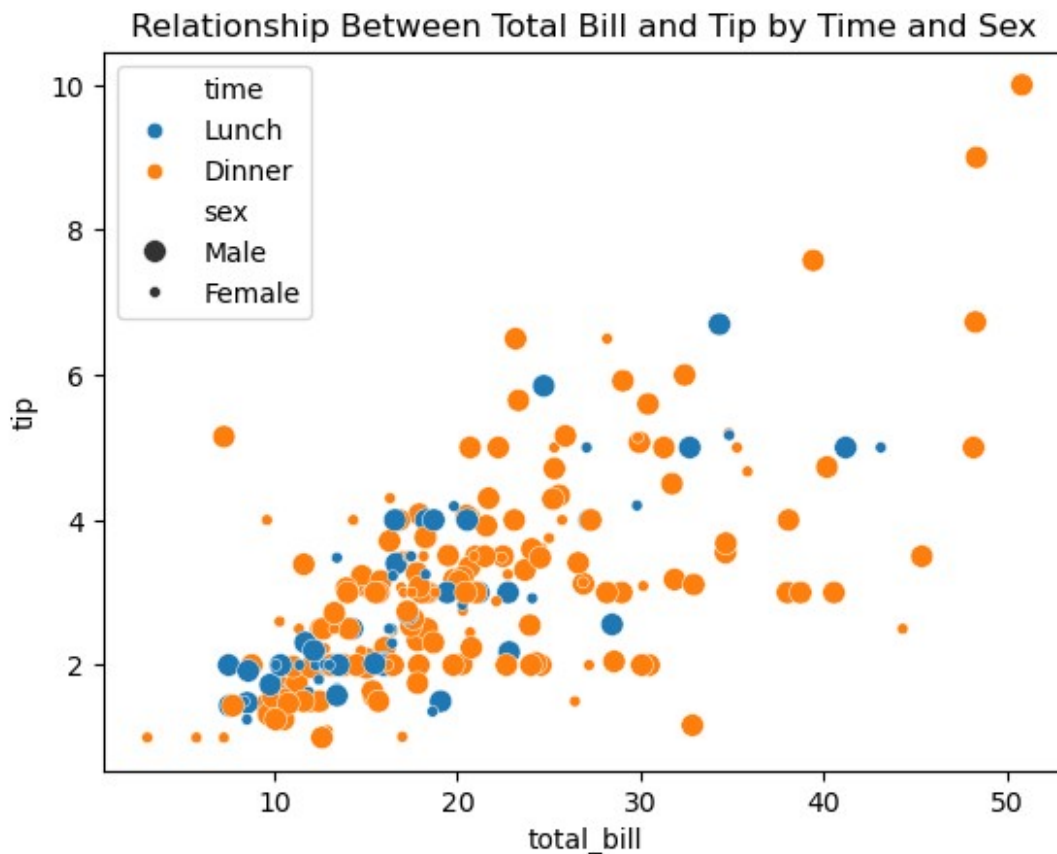


```
import seaborn as sns
import matplotlib.pyplot as plt
df = sns.load_dataset('tips')
df.head()
```

	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

Question 1: Scatter Plot

```
a =
sns.scatterplot(data=df,x='total_bill',y='tip',hue='time',size='sex')
a.set_title('Relationship Between Total Bill and Tip by Time and Sex')
Text(0.5, 1.0, 'Relationship Between Total Bill and Tip by Time and Sex')
```

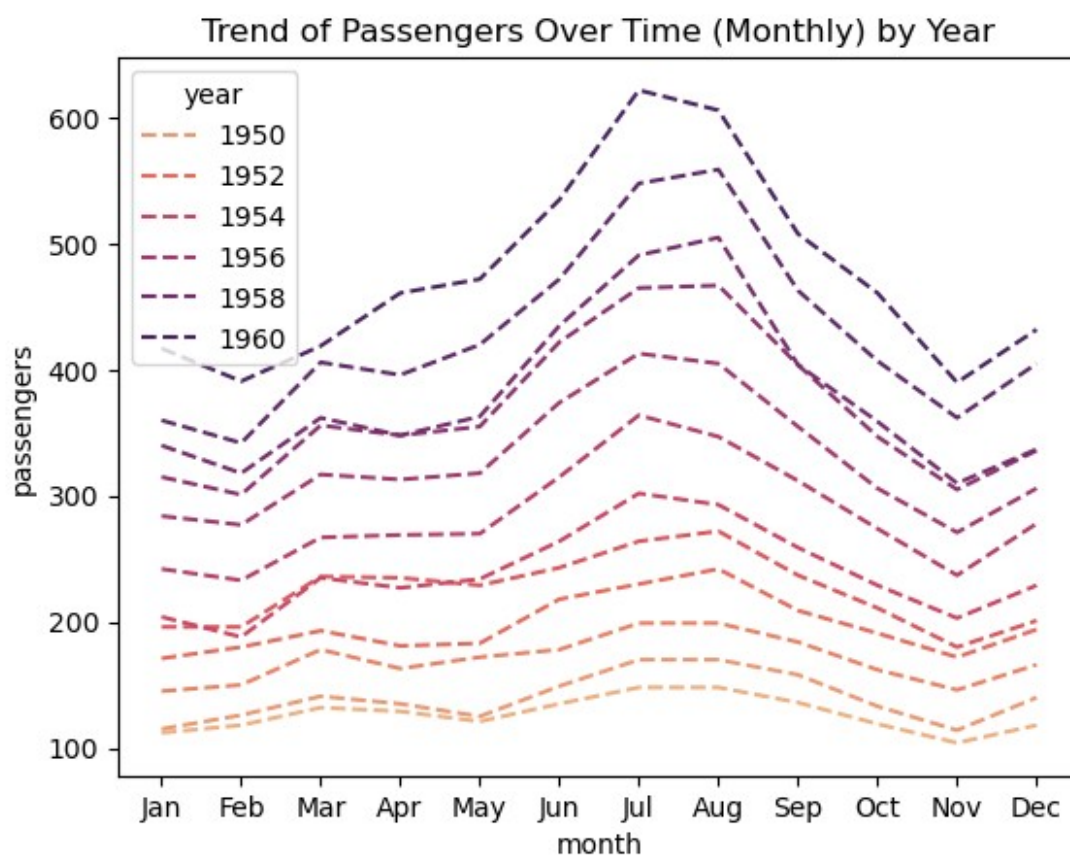


This scatter plot reveals how total bill correlates with the tip amount. It shows that as the total bill increases, the tip also tends to increase, but the relationship is not perfectly linear. The color

differentiation (Lunch/Dinner) might show that Dinner typically has higher total bills and tips. The sex-based marker style helps in observing any gender-based patterns in tipping behavior, though no clear patterns may emerge. The size of the points reflects the group size, which can indicate that larger groups tend to have both higher total bills and tips.

### Question 2: Line Plot

```
a =  
sns.lineplot(data=df2,x='month',y='passengers',hue='year',linestyle='dashed',palette='flare',errorbar='sd')  
a.set_title('Trend of Passengers Over Time (Monthly) by Year')  
Text(0.5, 1.0, 'Trend of Passengers Over Time (Monthly) by Year')
```

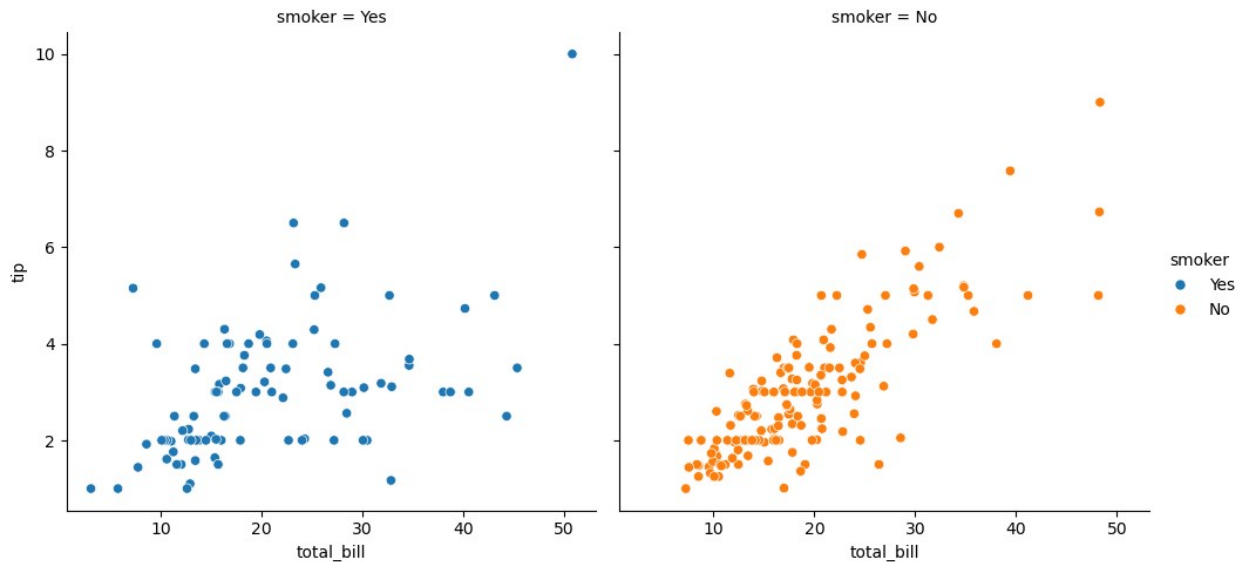


The line plot illustrates the fluctuation of passengers across different months, showing clear seasonal patterns (more passengers in summer months). By using different line styles (solid, dashed, dotted), we can easily compare the trends for different years. This visual suggests that passenger numbers increased in later years. The confidence intervals give an indication of data variability, showing that some months have higher variability in passenger counts.

### Question 3: Relational Plot with FacetGrid

```
a = sns.relplot(data=df, x="total_bill", y="tip",
col='smoker',hue='smoker',col_wrap=2)
a.set_title('Relationship Between Total Bill and Tip by Smoker
Category')
```

```
<seaborn.axisgrid.FacetGrid at 0x1c4fbcfb5c0>
```

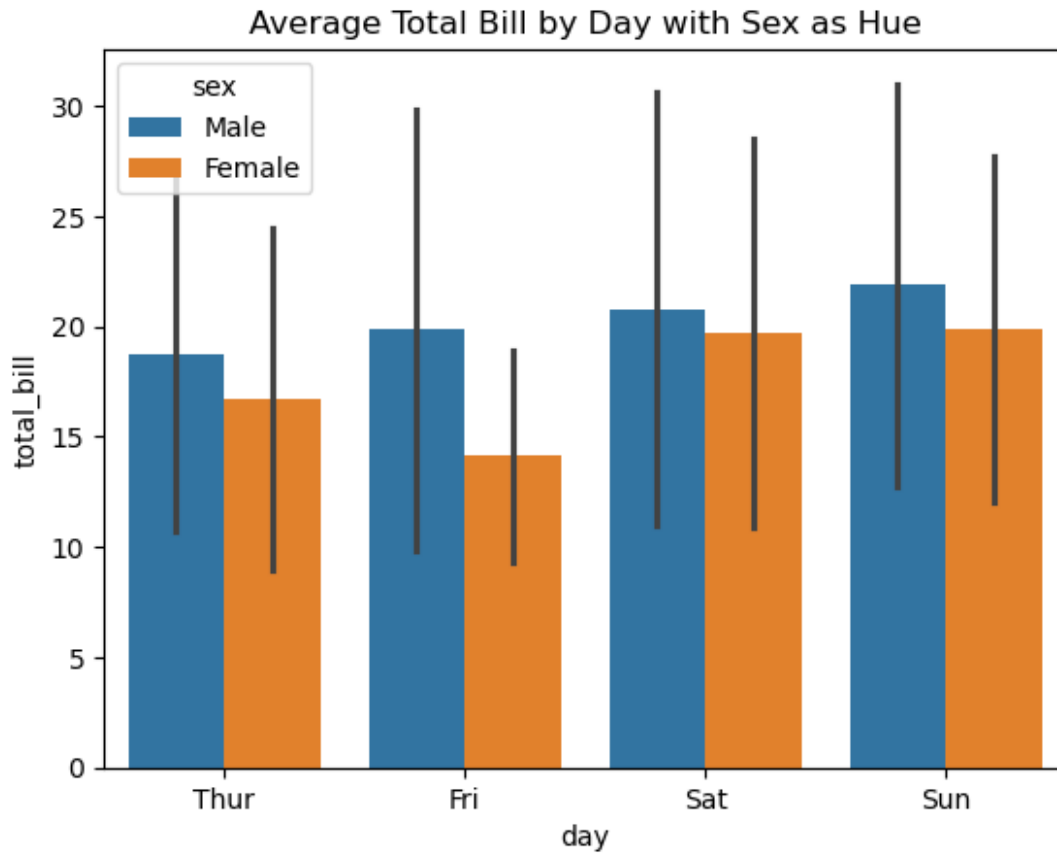


This plot shows how the relationship between total bill and tip varies depending on whether the customer is a smoker or not. We can see that non-smokers might have a slight trend of tipping more generously than smokers for similar total bills. The separation by smoker category adds a layer of analysis that shows subtle differences in tipping behavior based on smoking preferences.

#### Question 4: Bar Plot

```
a =
sns.barplot(data=df,x='day',y='total_bill',hue='sex',errorbar='sd')
a.set_title('Average Total Bill by Day with Sex as Hue')
```

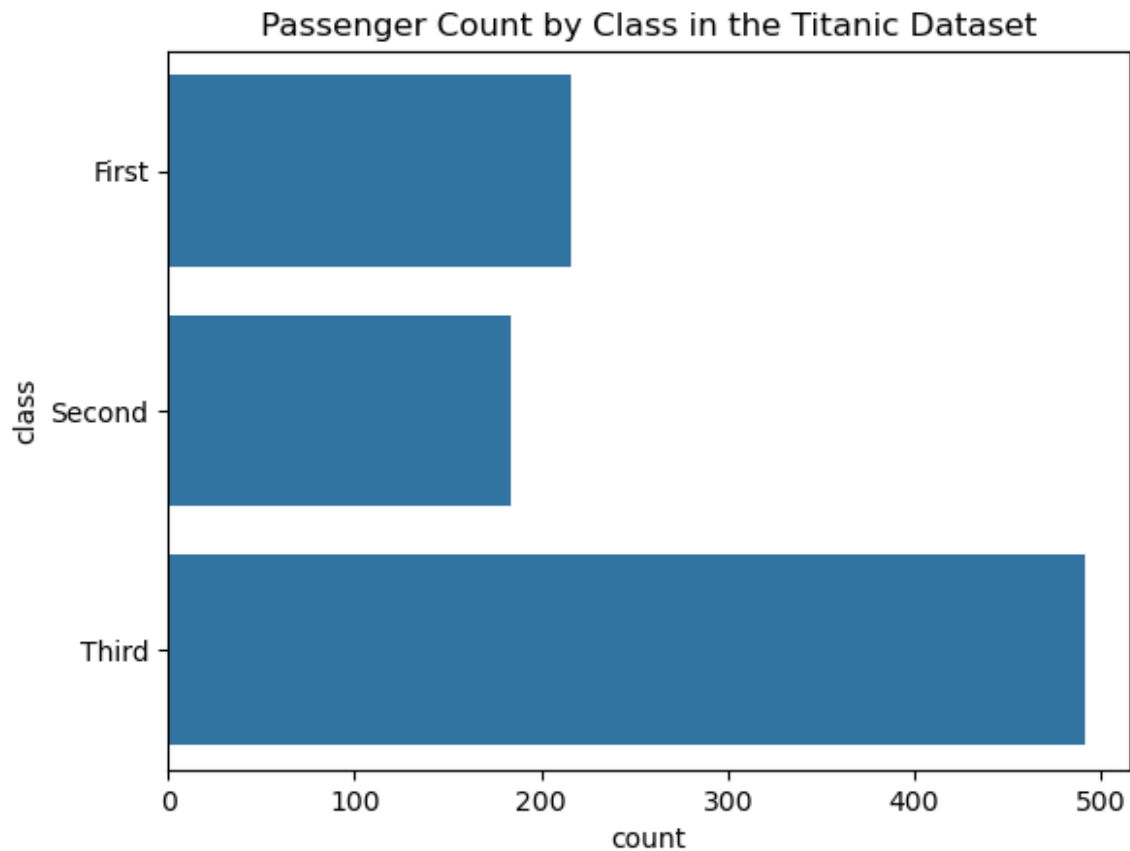
```
Text(0.5, 1.0, 'Average Total Bill by Day with Sex as Hue')
```



This bar plot reveals which days have the highest and lowest average total bills. By using sex as a hue, we can see whether men or women tend to have higher total bills on specific days. Error bars represent variability, showing that the total bill can vary significantly across individuals, particularly on days like Saturday or Sunday.

Question 5: Count Plot

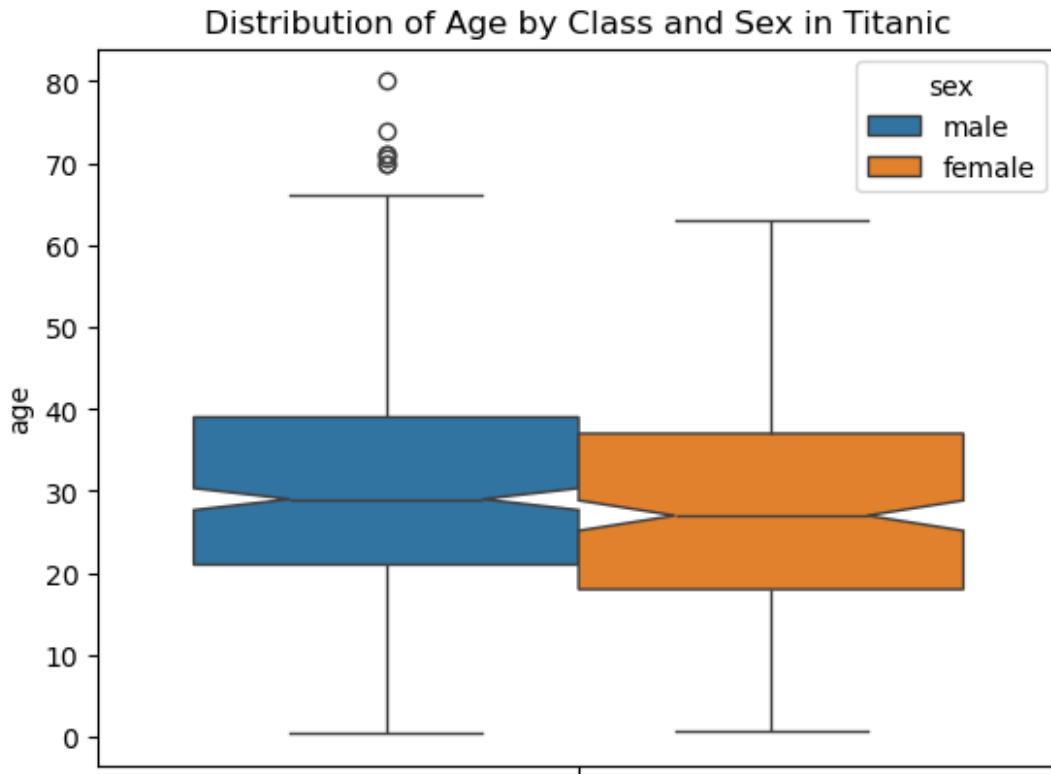
```
a = sns.countplot(data=df3,y='class',order=None,orient='y')
a.set_title('Passenger Count by Class in the Titanic Dataset')
Text(0.5, 1.0, 'Passenger Count by Class in the Titanic Dataset')
```



This count plot highlights the distribution of passengers across the three classes (First, Second, Third). First-class passengers are much fewer compared to third-class passengers, and second class lies somewhere in between. The horizontal orientation helps with better legibility of class labels and makes it easier to compare the counts visually.

Question 6: Box Plot

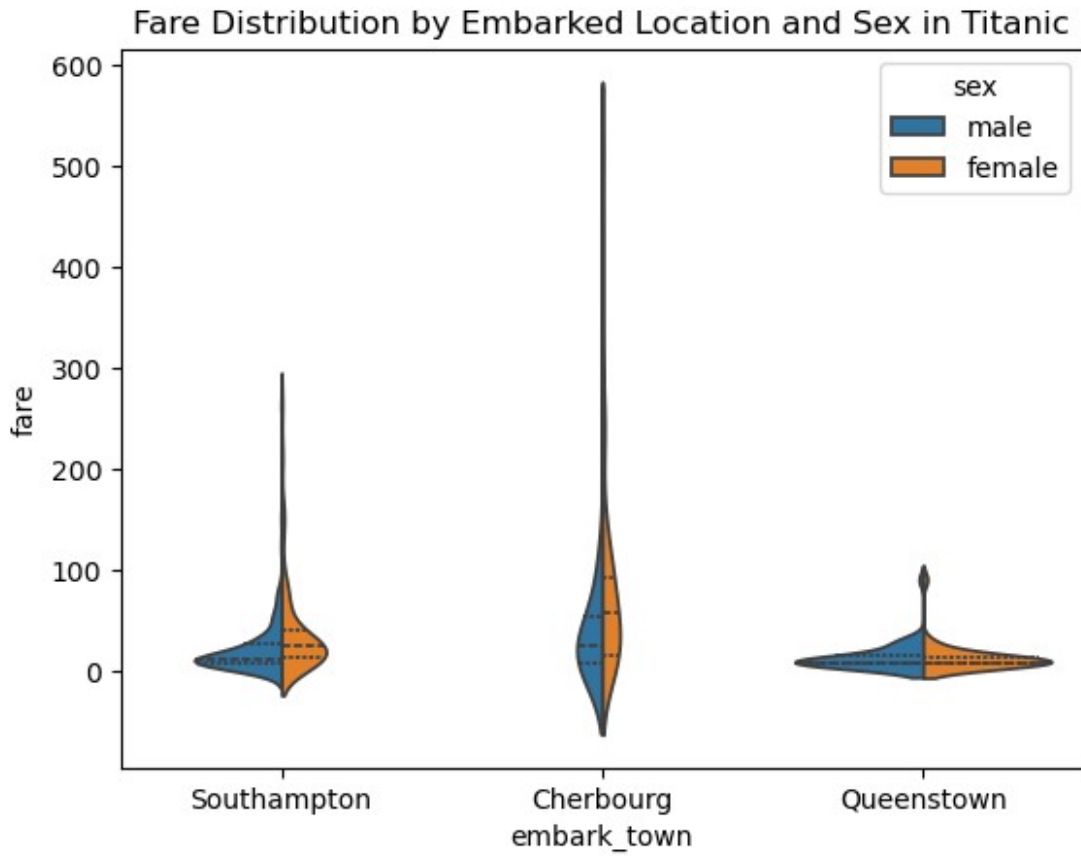
```
ab = sns.boxplot(data=df3,y='age',hue='sex',notch=True)
ab.set_title('Distribution of Age by Class and Sex in Titanic')
Text(0.5, 1.0, 'Distribution of Age by Class and Sex in Titanic')
```



The box plot reveals how the age distribution varies across different passenger classes. It is apparent that the middle-class passengers (Second class) tend to be older, while younger passengers dominate the third-class category. The notched boxes help visualize the confidence interval for the median, and differences between male and female age distributions within each class are evident.

Question 7: Violin Plot

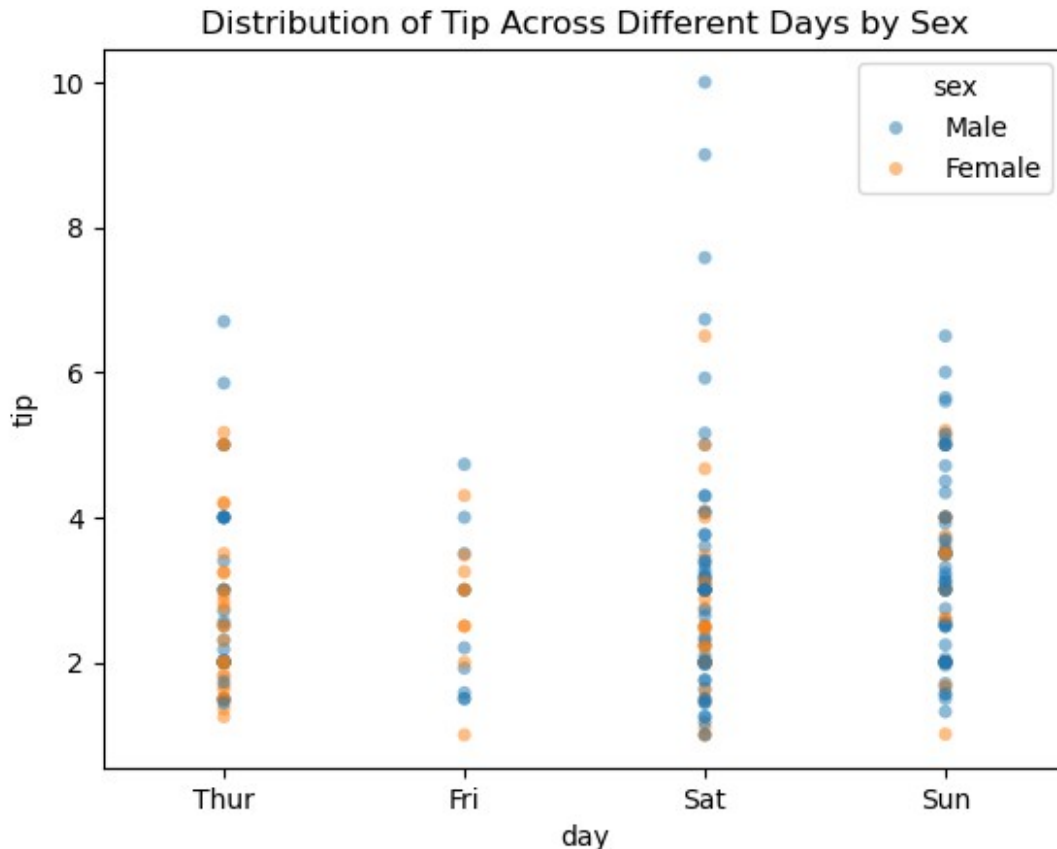
```
a =
sns.violinplot(data=df3,x='embark_town',y='fare',hue='sex',split=True,
inner="quart")
a.set_title('Fare Distribution by Embarked Location and Sex in
Titanic')
Text(0.5, 1.0, 'Fare Distribution by Embarked Location and Sex in
Titanic')
```



This violin plot shows how the fare distribution varies across different embarked locations (C, Q, S) and how sex affects the distribution. The overall fare distribution is wider for males than females, and those who embarked from "S" seem to have a broader fare range. Displaying inner quartiles and individual points enhances the granularity of understanding for each category.

Question 8: Strip Plot

```
a =
sns.stripplot(data=df,x='day',y='tip',hue='sex',jitter=False,alpha=0.5
)
a.set_title('Distribution of Tip Across Different Days by Sex')
Text(0.5, 1.0, 'Distribution of Tip Across Different Days by Sex')
```



The strip plot shows how tips are distributed for different days of the week. Female and male customers display some variation in tip amounts, with women generally providing slightly lower tips. Jitter is applied to avoid overlapping points, making the plot clearer and more readable.

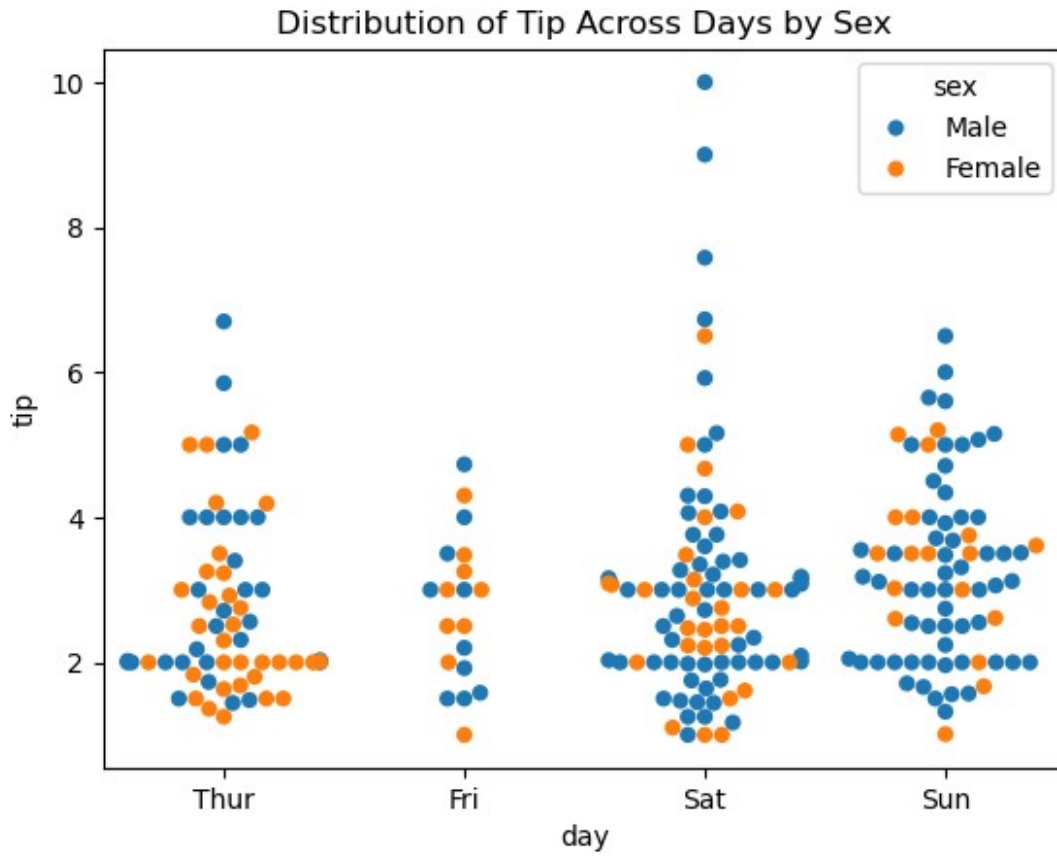
Question 9: Swarm Plot

```
a = sns.swarmplot(data=df,x='day',y='tip',hue='sex',size=6)
a.set_title('Distribution of Tip Across Days by Sex')
```

```
Text(0.5, 1.0, 'Distribution of Tip Across Days by Sex')
```

```
C:\Users\AU3FL1PC_19\anaconda3\Lib\site-packages\seaborn\
categorical.py:3399: UserWarning: 8.1% of the points cannot be placed;
you may want to decrease the size of the markers or use stripplot.
  warnings.warn(msg, UserWarning)
C:\Users\AU3FL1PC_19\anaconda3\Lib\site-packages\seaborn\
categorical.py:3399: UserWarning: 9.2% of the points cannot be placed;
you may want to decrease the size of the markers or use stripplot.
  warnings.warn(msg, UserWarning)
```

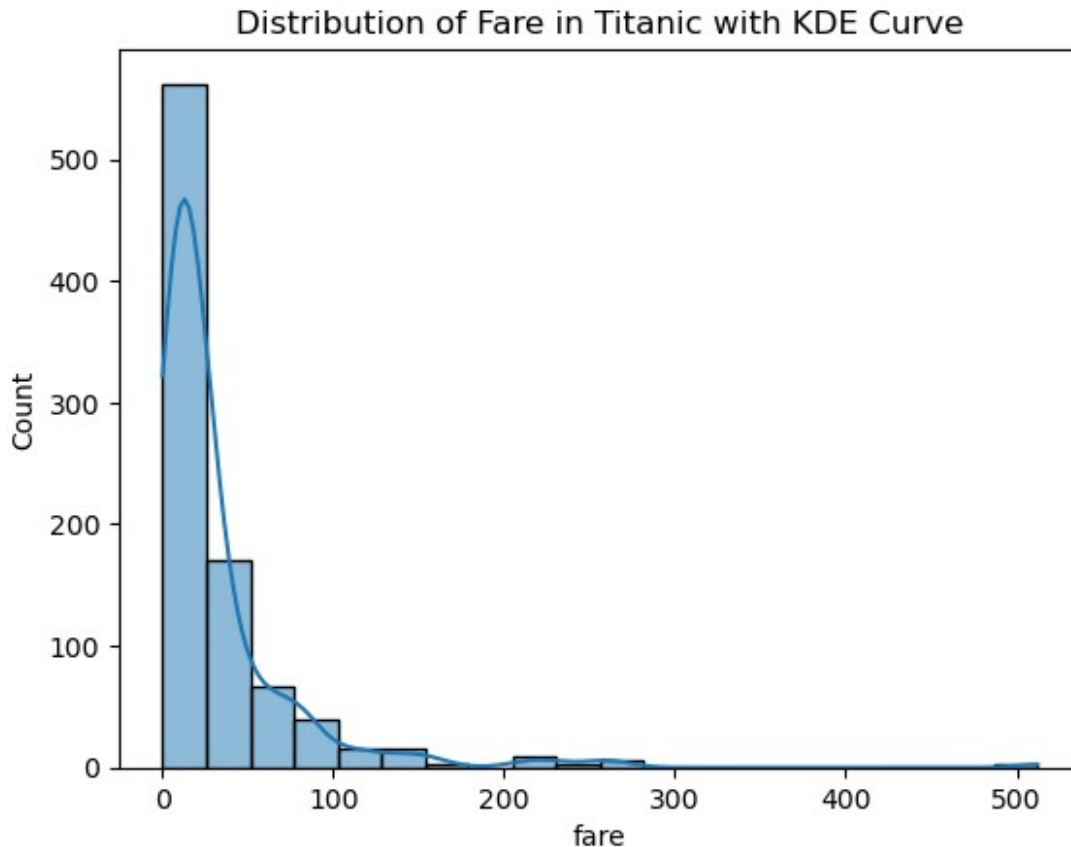




The swarm plot highlights the distribution of tips across different days of the week, with female customers slightly tipping less on average. The plot clearly shows how individual tips are spread across days, indicating that weekends (like Saturday) tend to have a broader range of tipping amounts. Point size adjustments allow for a better visual aesthetic without overlapping.

Question 10: Histogram

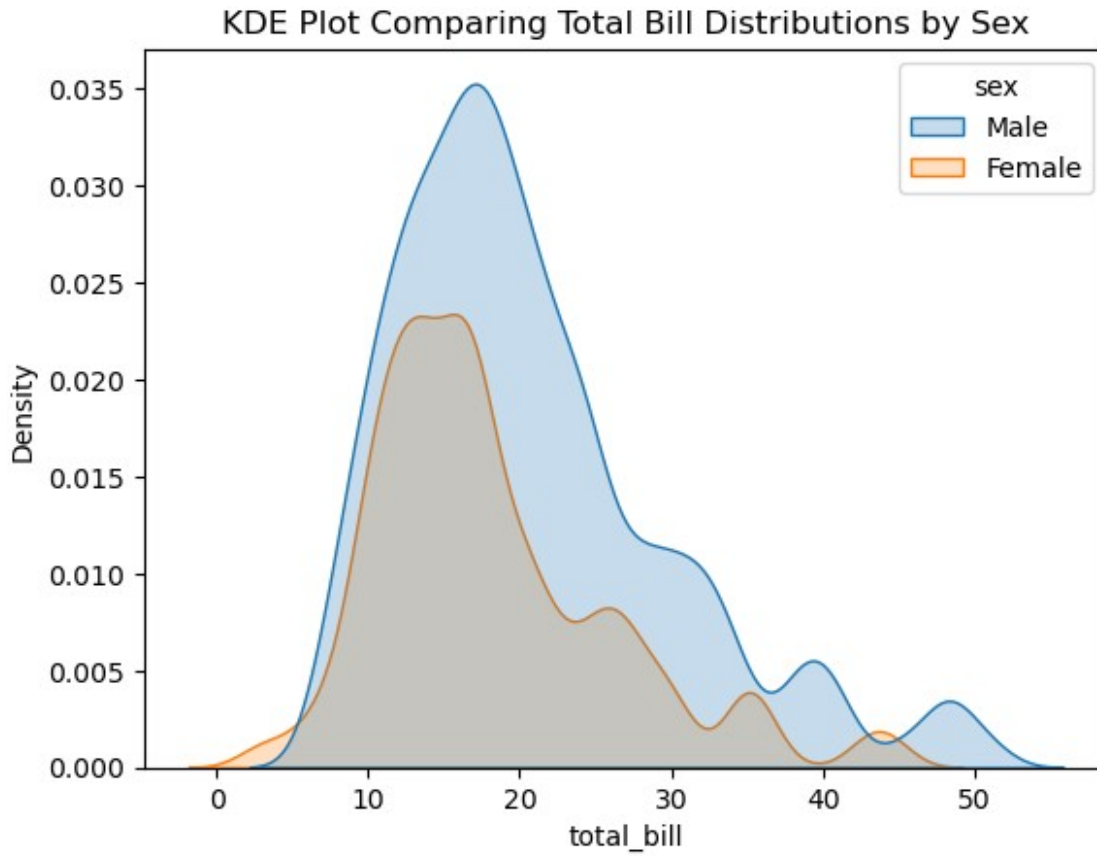
```
a =
sns.histplot(data=df3,x='fare',bins=20,kde=True,edgecolor='black',fill
='black')
a.set_title('Distribution of Fare in Titanic with KDE Curve')
Text(0.5, 1.0, 'Distribution of Fare in Titanic with KDE Curve')
```



The histogram shows the distribution of fare amounts, with a majority of passengers paying lower fares, and a few paying higher fares. The overlaid KDE curve smooths the distribution, showing a clear peak at lower fare values and a long tail for higher fares. Adjusting the number of bins allows a more granular understanding of fare distribution.

Question 11: KDE Plot

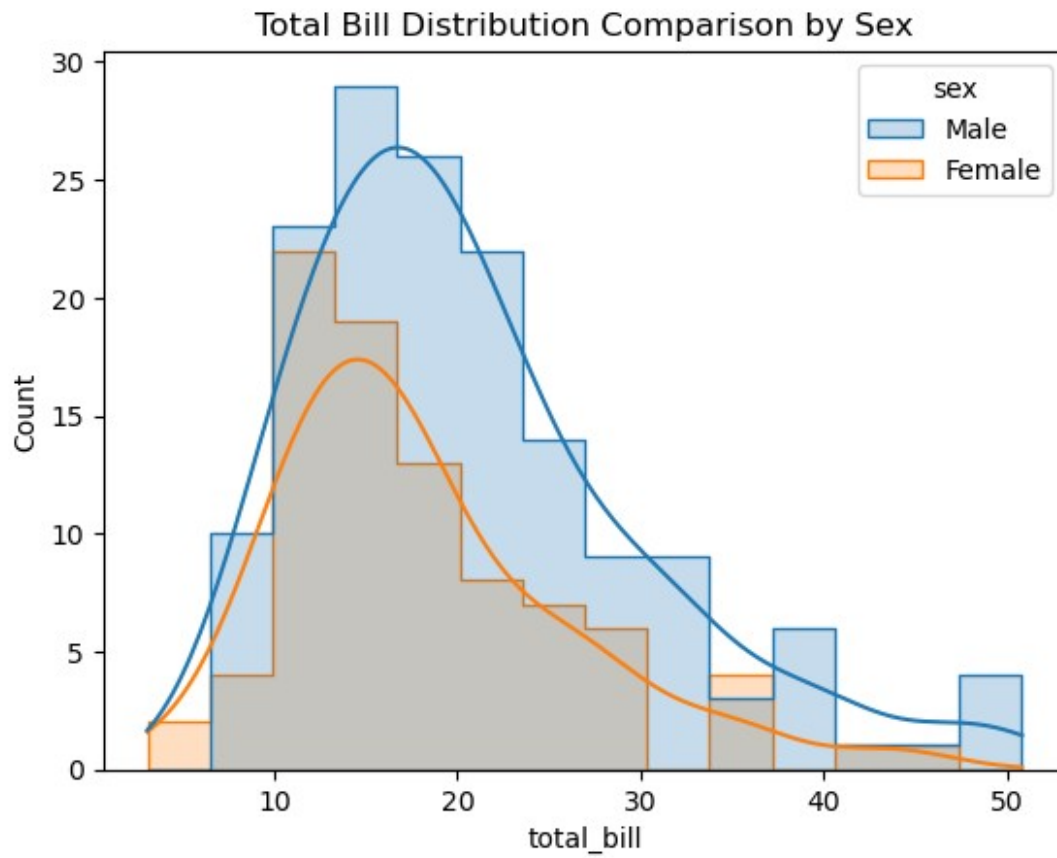
```
a =  
sns.kdeplot(data=df,x='total_bill',hue='sex',fill=True,bw_adjust=0.5)  
a.set_title('KDE Plot Comparing Total Bill Distributions by Sex')  
Text(0.5, 1.0, 'KDE Plot Comparing Total Bill Distributions by Sex')
```



This KDE plot compares how total bills are distributed for male and female customers. Females have a slightly tighter distribution around lower total bills, while males show a broader spread, with a tendency to have slightly higher bills on average. Shading the area under the curve helps visually quantify the difference between the two distributions.

Question 12: Distribution Comparison

```
a =  
sns.histplot(data=df,x='total_bill',hue='sex',kde=True,element='step')  
a.set_title('otal Bill Distribution Comparison by Sex')  
Text(0.5, 1.0, 'Total Bill Distribution Comparison by Sex')
```



The histogram shows how the total bill distribution compares between male and female customers. The KDE curve overlay indicates that males tend to have slightly higher total bills compared to females. The stacked histogram view helps in comparing the two distributions side by side and understanding the differences more clearly.