SmartInternz Externships

Stream: Applied Data Science

Week: 2

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Campus: VIT-AP

In [1]:

```
import numpy as np
import pandas as pd
import seaborn as sns
```

2) Load the dataset

In [2]:

```
df = pd.read_csv("titanic.csv")
```

In [3]:

```
df.head()
```

Out[3]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	who	adult_male	deck	embark_tow
0	0	3	male	22.0	1	0	7.2500	S	Third	man	True	NaN	Southamptc
1	1	1	female	38.0	1	0	71.2833	C	First	woman	False	C	Cherbour
2	1	3	female	26.0	0	0	7.9250	S	Third	woman	False	NaN	Southamptc
3	1	1	female	35.0	1	0	53.1000	S	First	woman	False	C	Southamptc
4	0	3	male	35.0	0	0	8.0500	S	Third	man	True	NaN	Southamptc

In [4]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 15 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   survived     891 non-null    int64  
 1   pclass       891 non-null    int64  
 2   sex          891 non-null    object 
 3   age          714 non-null    float64
 4   sibsp        891 non-null    int64  
 5   parch        891 non-null    int64  
 6   fare         891 non-null    float64
 7   embarked     889 non-null    object 
 8   class        891 non-null    object 
 9   who          891 non-null    object 
 10  adult_male   891 non-null    bool   
 11  deck         203 non-null    object 
 12  embark_town  889 non-null    object 
 13  alive        891 non-null    object 
 14  alone        891 non-null    bool   
```

```
dtypes: bool(2), float64(2), int64(4), object(7)
memory usage: 92.4+ KB
```

3. Perform Below Visualizations.

● Univariate Analysis

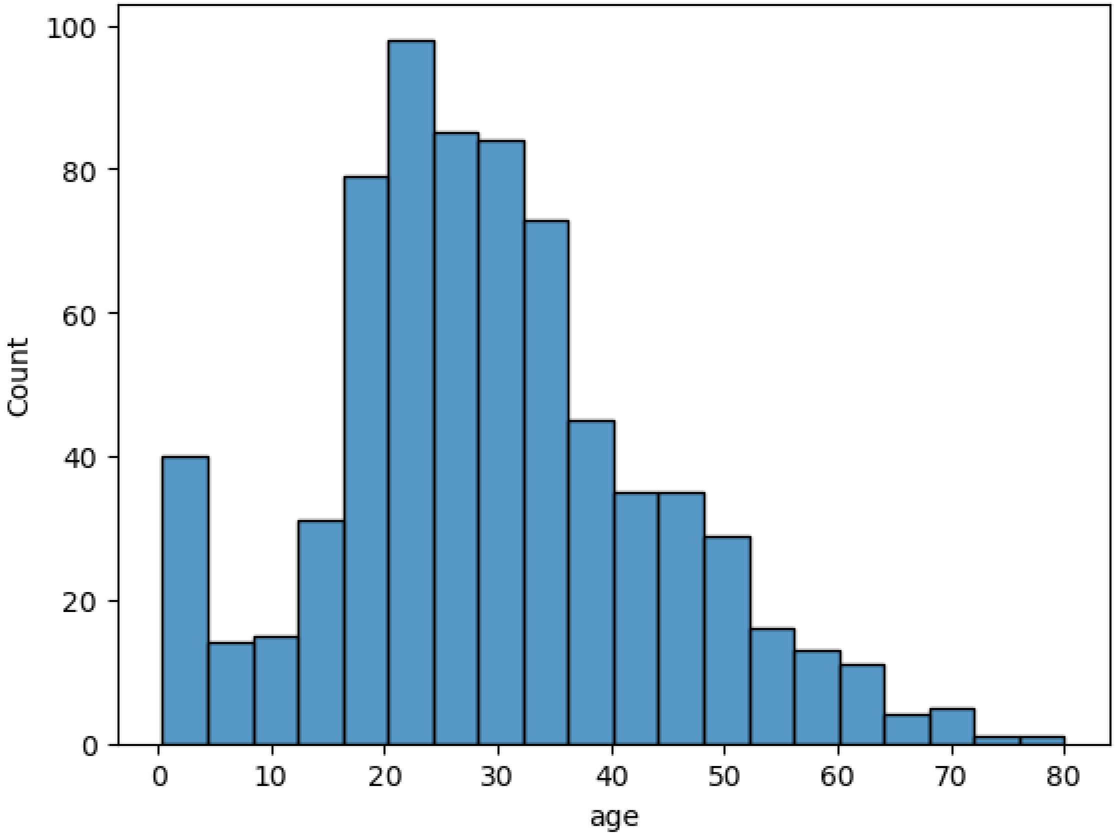
● Bi - Variate Analysis

● Multi - Variate Analysis

univariate analysis

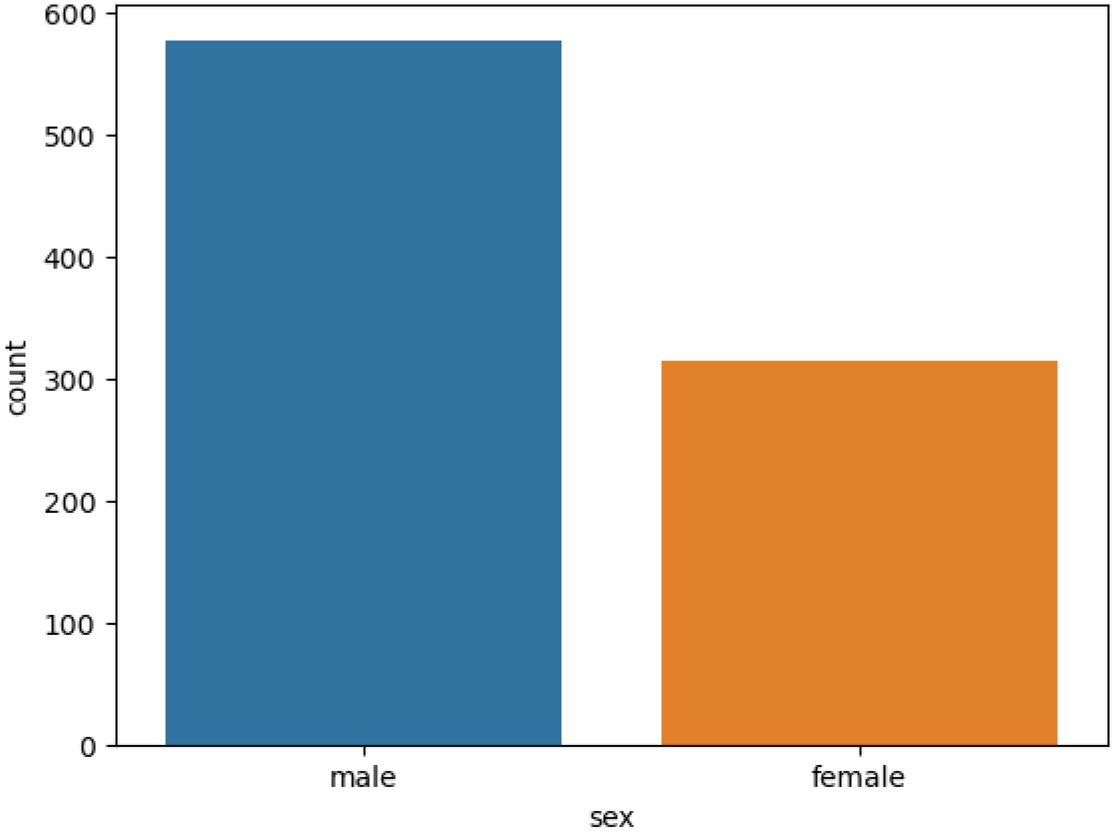
```
In [5]: sns.histplot(df['age'])
```

```
Out[5]: <Axes: xlabel='age', ylabel='Count'>
```



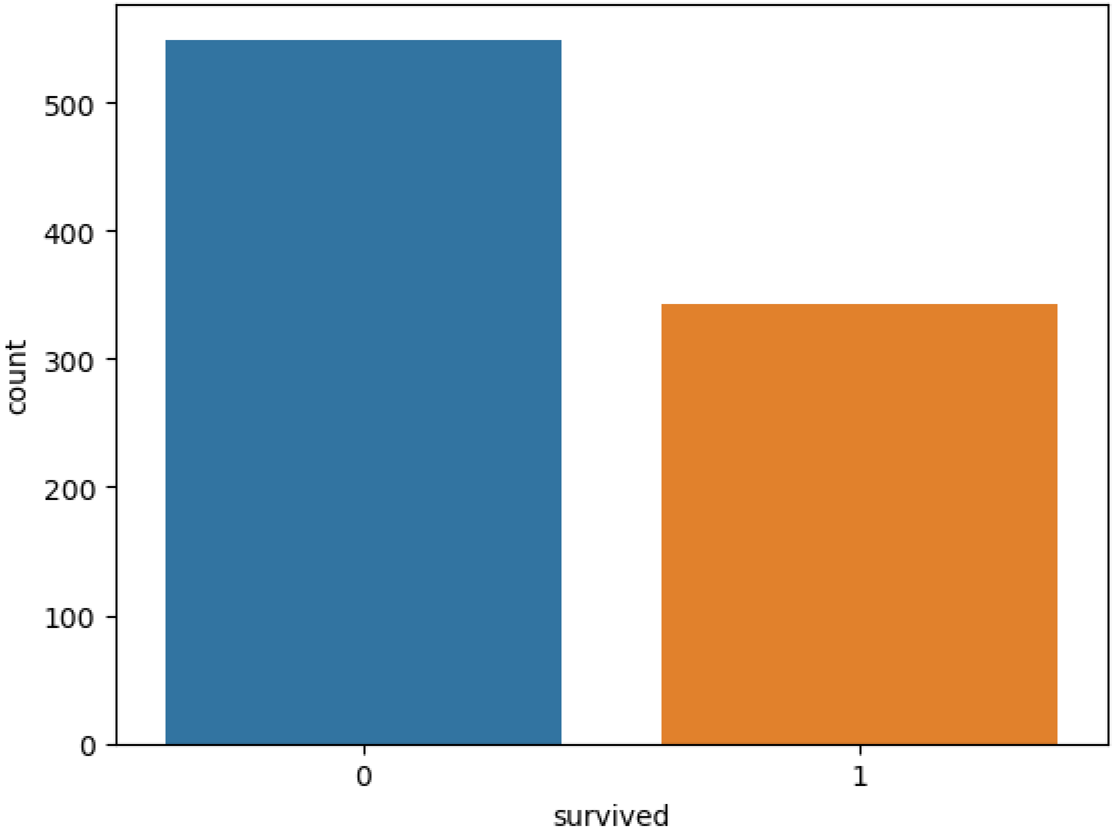
```
In [6]: sns.countplot(x = df['sex'])
```

```
Out[6]: <Axes: xlabel='sex', ylabel='count'>
```



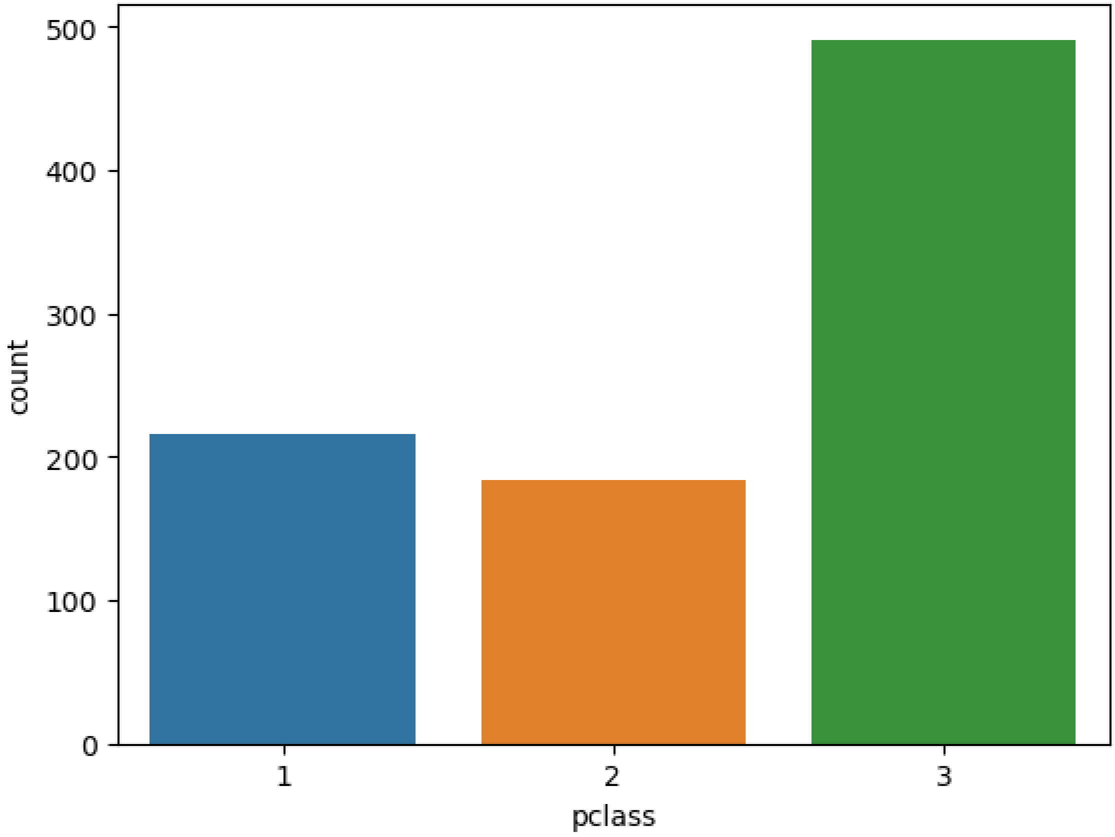
```
In [7]: sns.countplot(x = df['survived'])
```

```
Out[7]: <Axes: xlabel='survived', ylabel='count'>
```



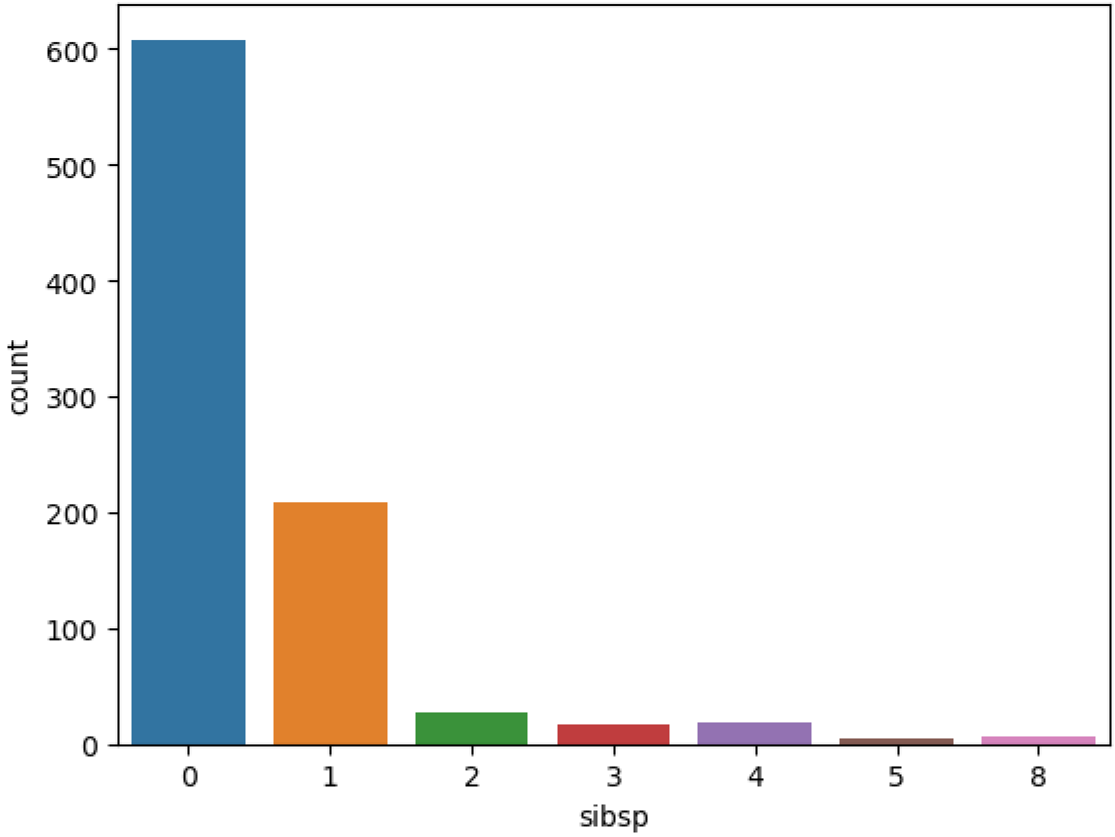
```
In [8]: sns.countplot(x = df['pclass'])
```

```
Out[8]: <Axes: xlabel='pclass', ylabel='count'>
```



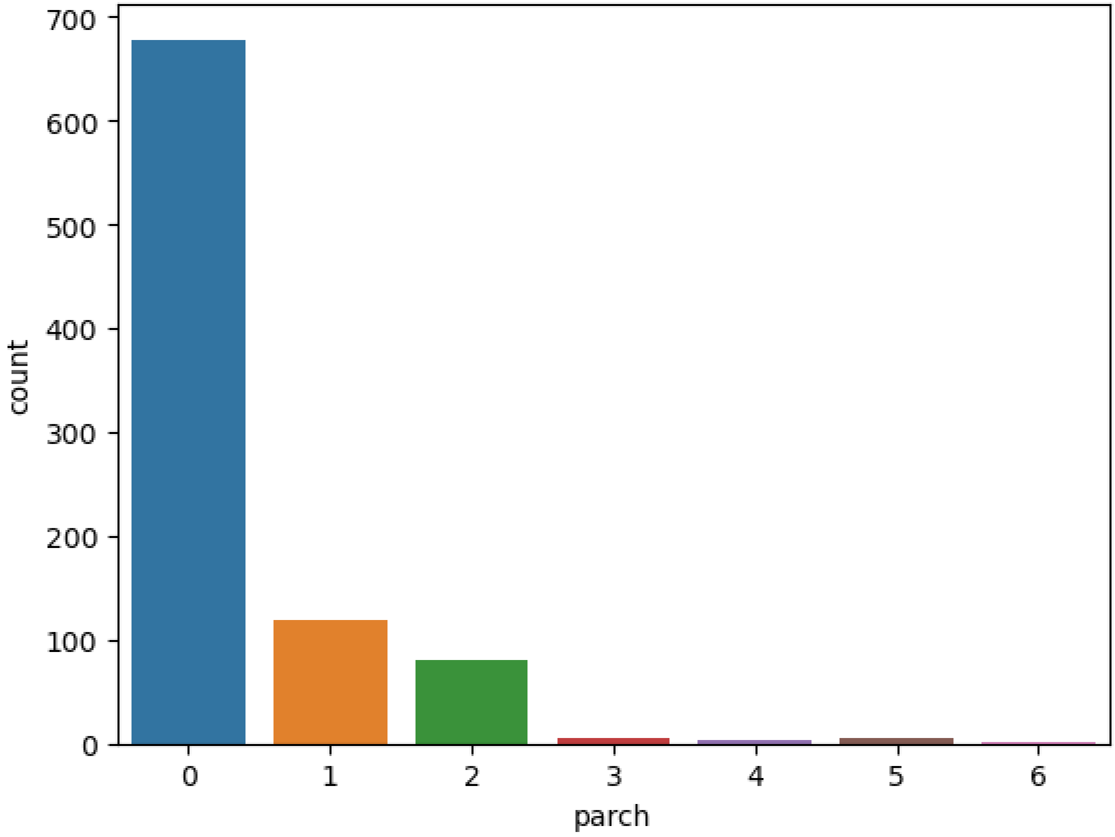
In [9]:
```
sns.countplot(x = df['sibsp'])
```

Out[9]:
```
<Axes: xlabel='sibsp', ylabel='count'>
```



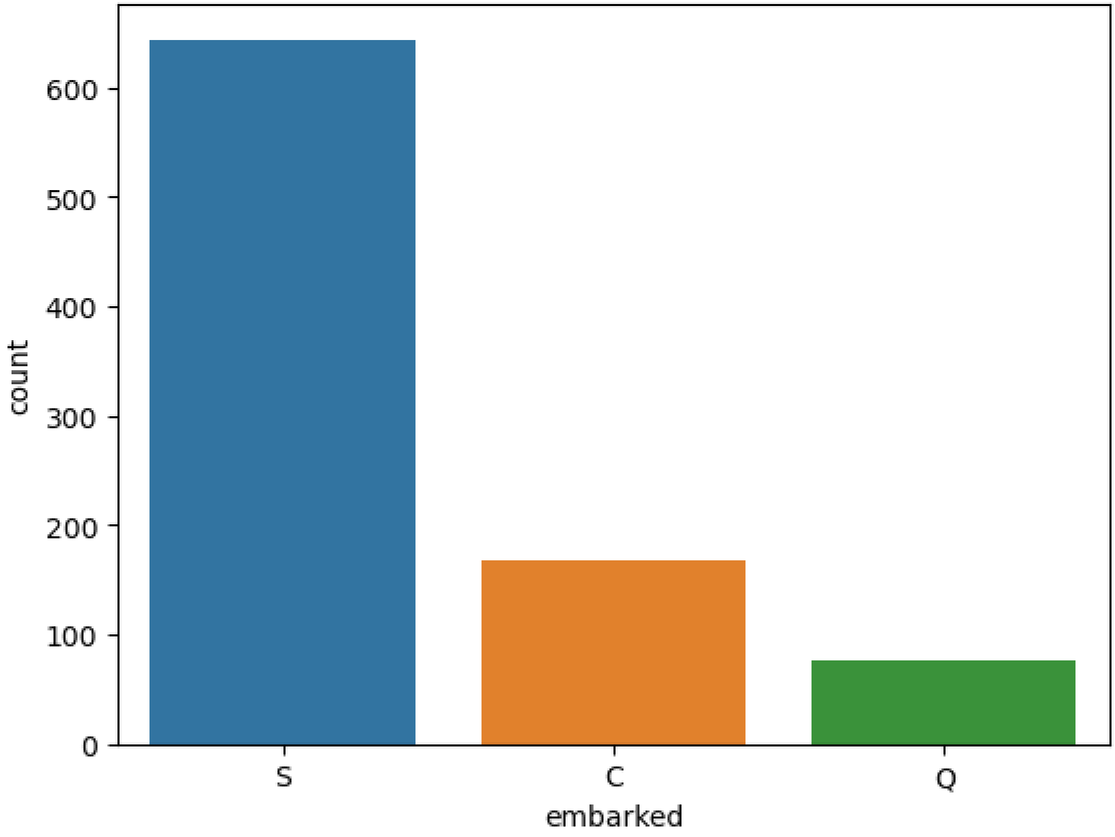
In [10]:
```
sns.countplot(x = df['parch'])
```

Out[10]:
```
<Axes: xlabel='parch', ylabel='count'>
```



```
In [11]: sns.countplot(x = df['embarked'])
```

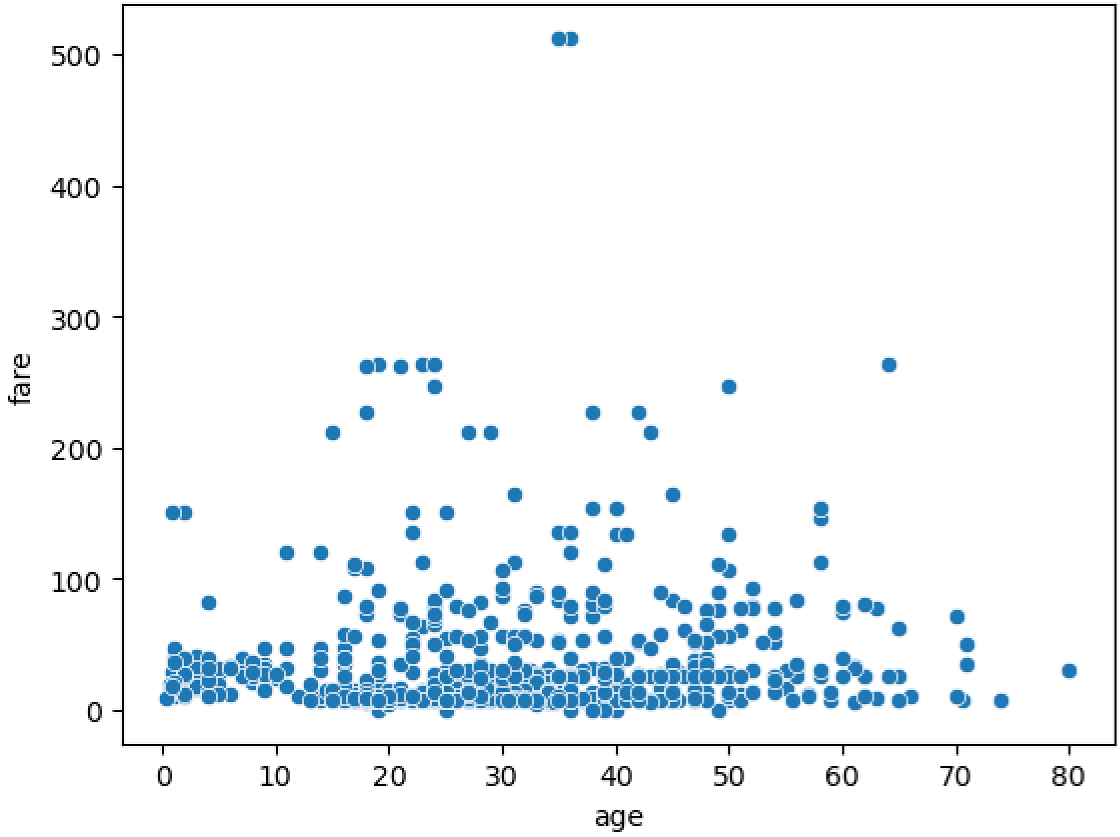
```
Out[11]: <Axes: xlabel='embarked', ylabel='count'>
```



bivariate analysis

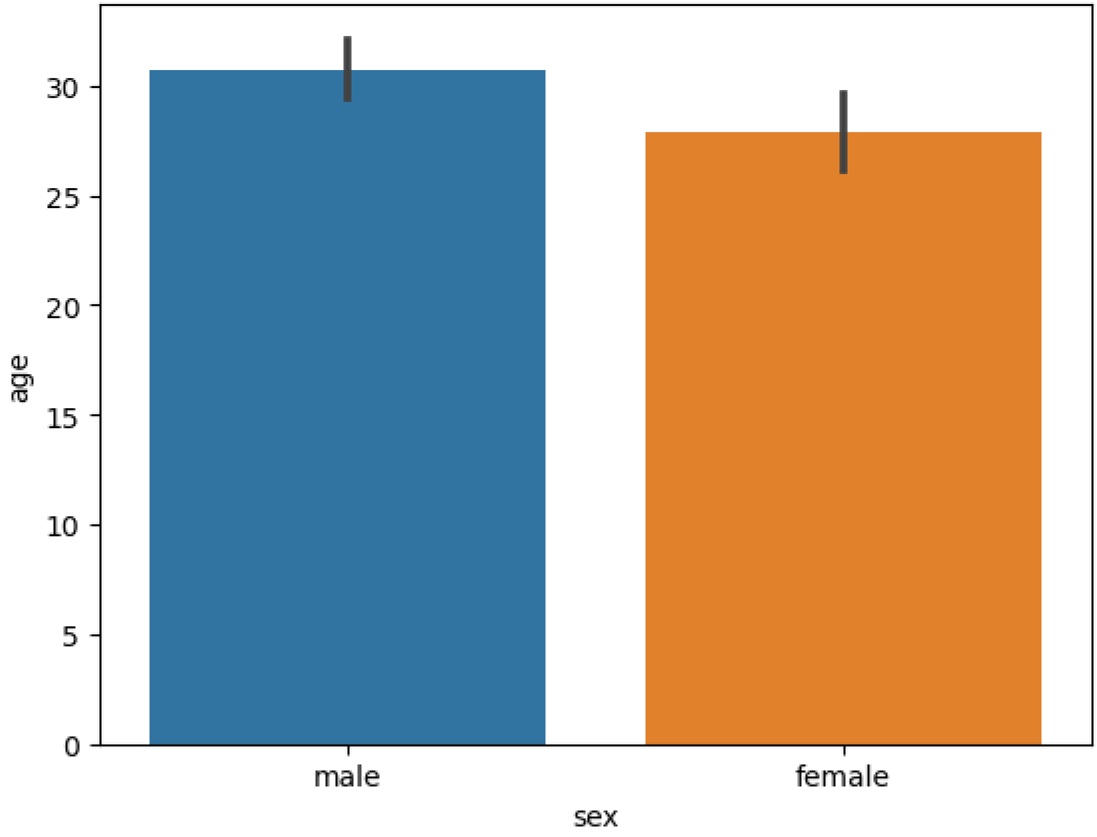
```
In [12]: sns.scatterplot(data = df, x = 'age', y = 'fare')
```

```
Out[12]: <Axes: xlabel='age', ylabel='fare'>
```



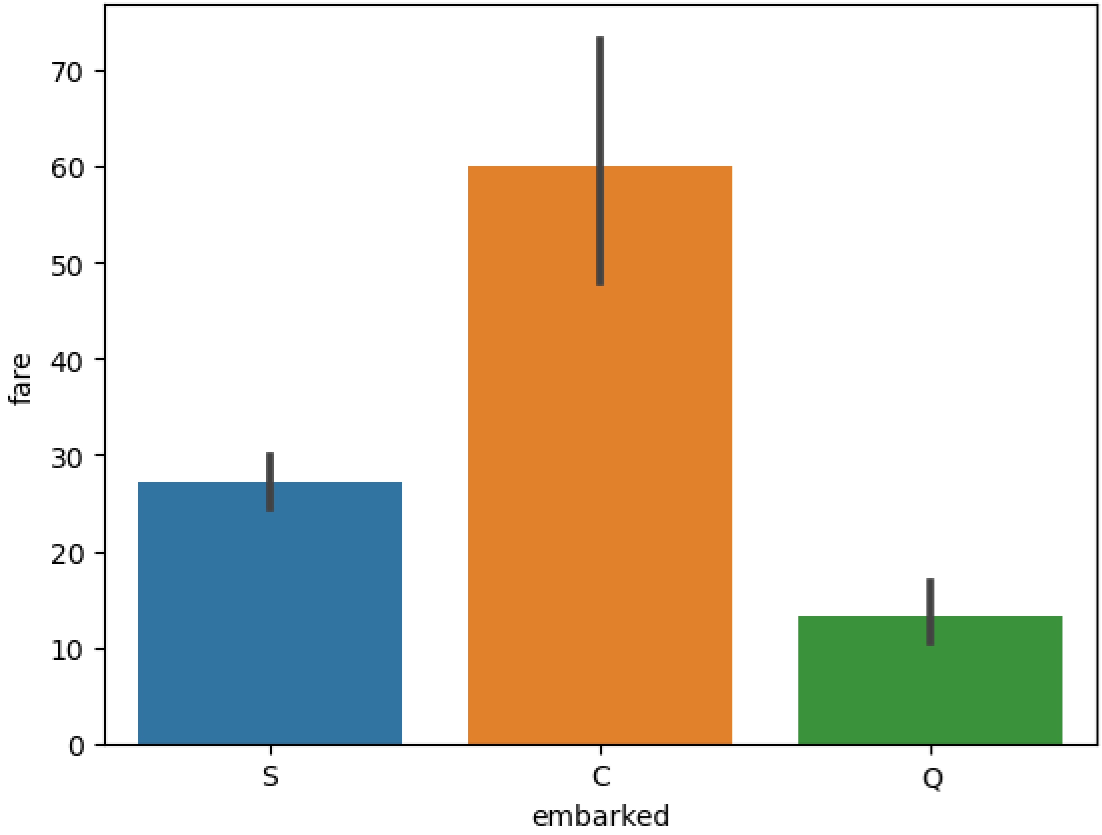
```
In [13]: sns.barplot(data = df, x = 'sex', y = 'age')
```

```
Out[13]: <Axes: xlabel='sex', ylabel='age'>
```



```
In [14]: sns.barplot(data = df, x = 'embarked', y = 'fare')
```

```
Out[14]: <Axes: xlabel='embarked', ylabel='fare'>
```

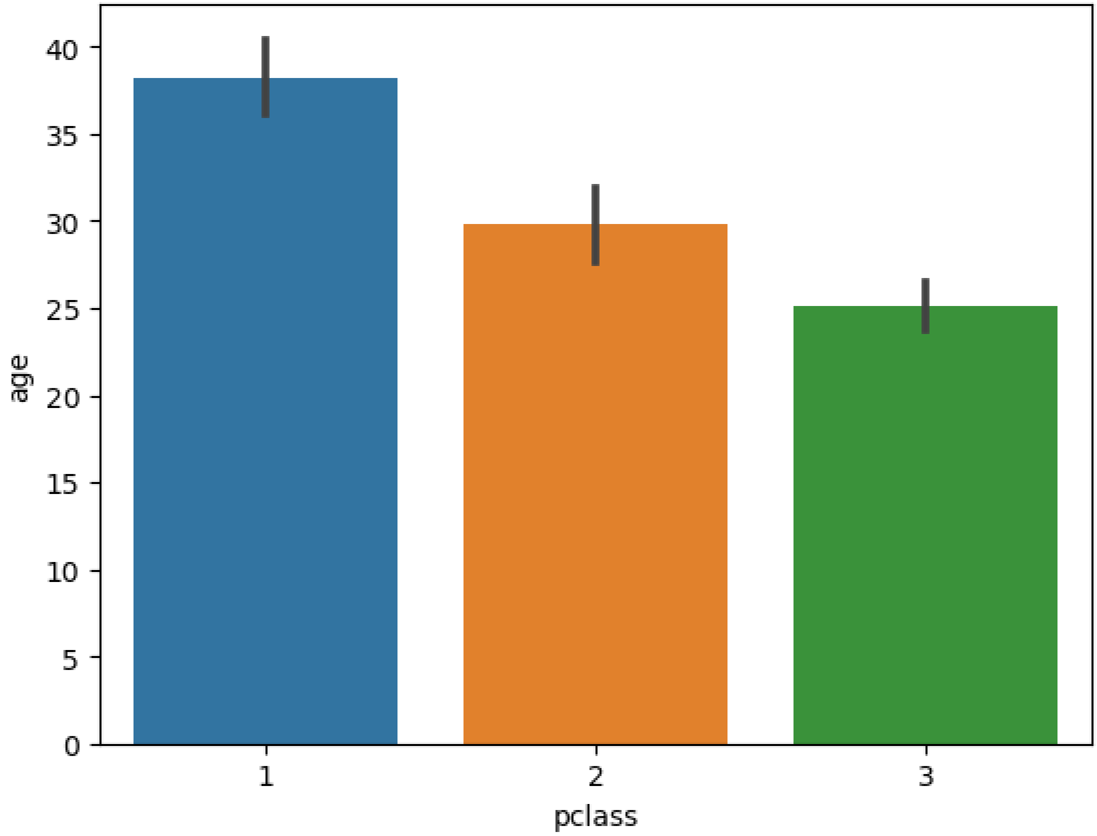


In [15]:

```
sns.barplot(data = df, x = 'pclass', y = 'age')
```

Out[15]:

```
<Axes: xlabel='pclass', ylabel='age'>
```

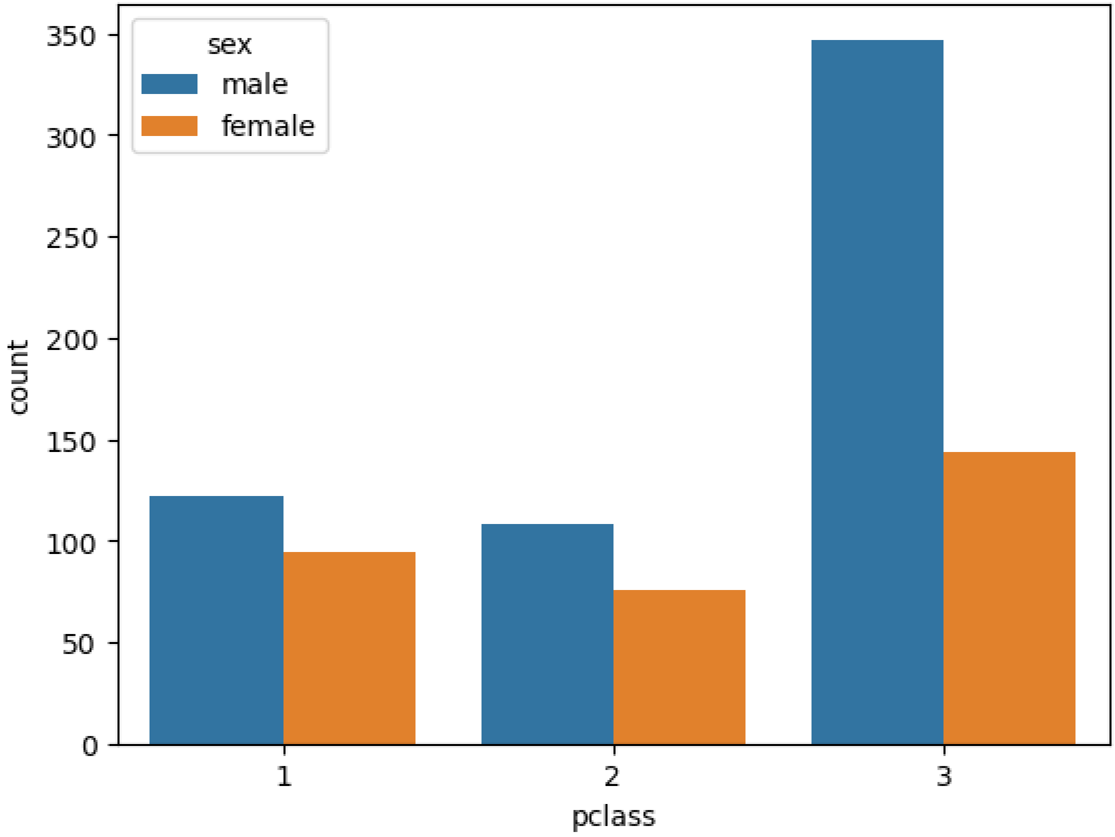


In [16]:

```
sns.countplot(x = df['pclass'], hue = df['sex'])
```

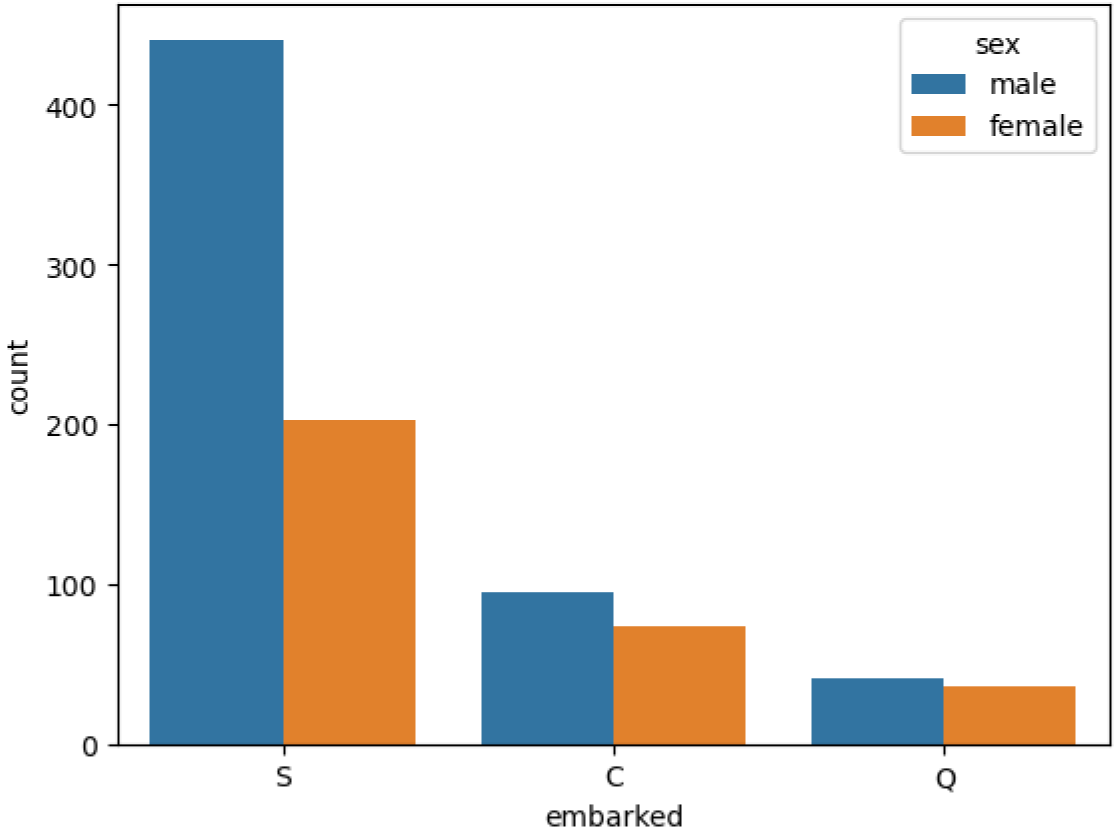
Out[16]:

```
<Axes: xlabel='pclass', ylabel='count'>
```



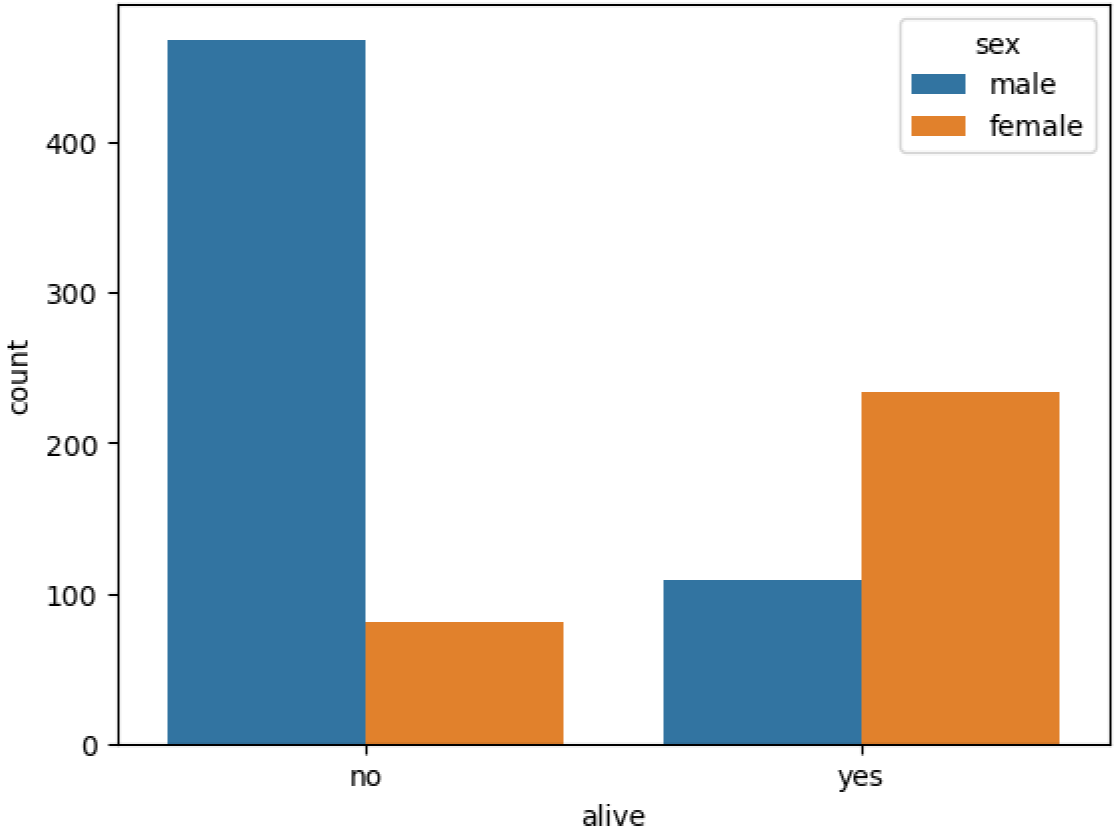
In [17]:
```
sns.countplot(x = df['embarked'], hue = df['sex'])
```

Out[17]:
```
<Axes: xlabel='embarked', ylabel='count'>
```



In [18]:
```
sns.countplot(x = df['alive'], hue = df['sex'])
```

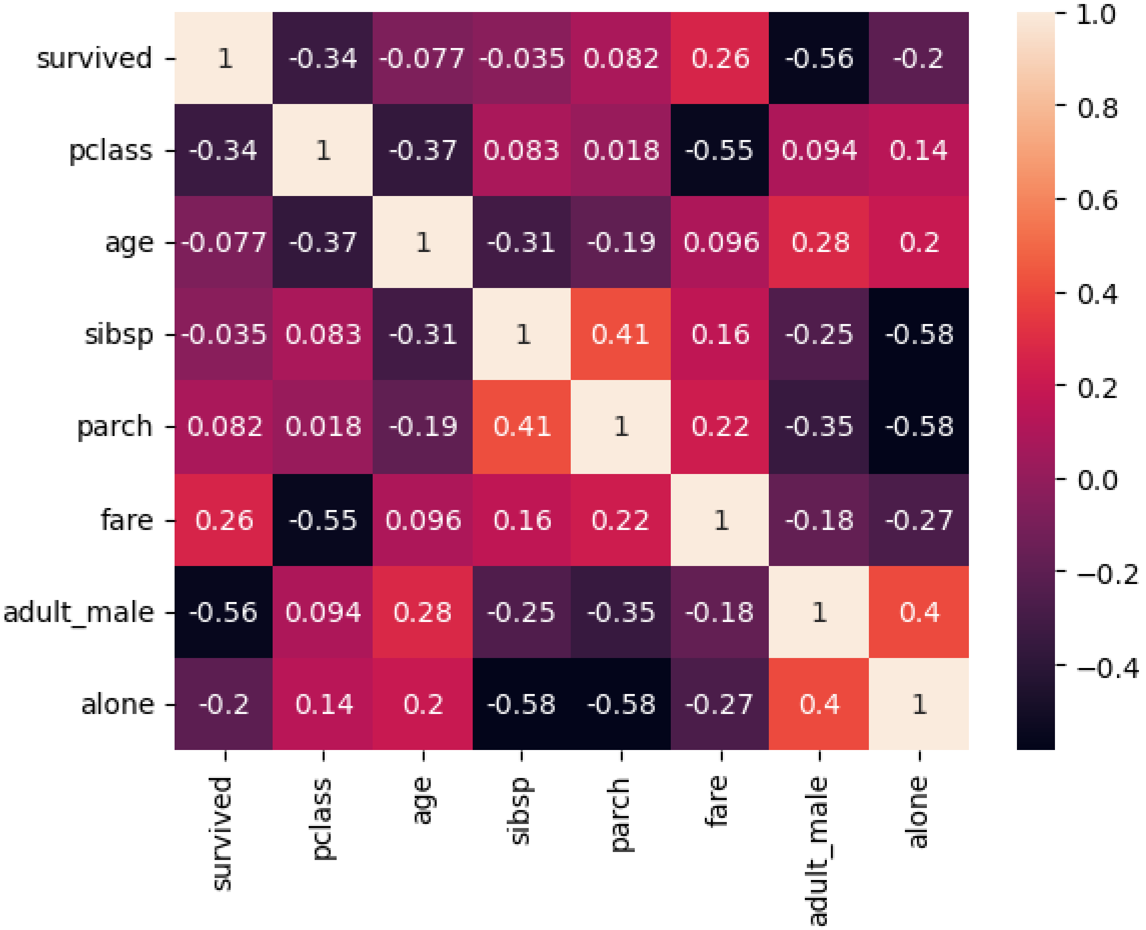
Out[18]:
```
<Axes: xlabel='alive', ylabel='count'>
```



multivariate analysis

```
In [19]: sns.heatmap(df.corr(numeric_only=True), annot = True)
```

```
Out[19]: <Axes: >
```



4. Perform descriptive statistics on the dataset.

In [20]:

```
df.describe()
```

Out[20]:

	survived	pclass	age	sibsp	parch	fare
count	891.000000	891.000000	714.000000	891.000000	891.000000	891.000000
mean	0.383838	2.308642	29.699118	0.523008	0.381594	32.204208
std	0.486592	0.836071	14.526497	1.102743	0.806057	49.693429
min	0.000000	1.000000	0.420000	0.000000	0.000000	0.000000
25%	0.000000	2.000000	20.125000	0.000000	0.000000	7.910400
50%	0.000000	3.000000	28.000000	0.000000	0.000000	14.454200
75%	1.000000	3.000000	38.000000	1.000000	0.000000	31.000000
max	1.000000	3.000000	80.000000	8.000000	6.000000	512.329200

5. Handle the Missing values.

In [21]:

```
df.isnull().sum()
```

Out[21]:

```
survived         0
pclass           0
sex              0
age            177
sibsp            0
parch            0
fare             0
embarked         2
class            0
who              0
adult_male       0
deck           688
embark_town      2
alive            0
alone            0
dtype: int64
```

In [22]:

```
df.dropna(subset=['embark_town'], how='all', inplace = True)
```

In [23]:

```
#for age column we will fill with the average
df['age'] = df['age'].fillna(df['age'].mean())
```

In [24]:

```
#only 203 records have valid values for deck column so we will drop that

df.drop(['deck'], axis = 1,inplace = True)
```

In [25]:

```
df.isnull().sum()
```

Out[25]:

```
survived       0
pclass         0
sex            0
age            0
sibsp          0
parch          0
fare           0
embarked       0
```

```
class          0
who            0
adult_male     0
embark_town    0
alive          0
alone          0
dtype: int64
```

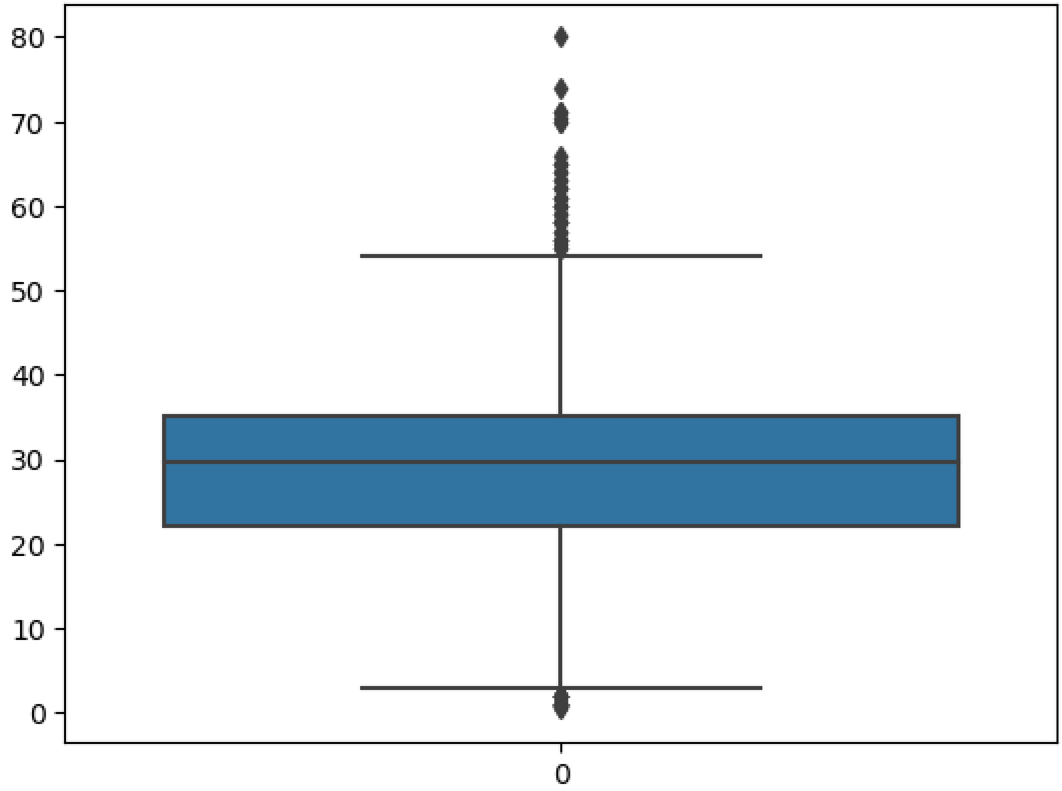
6. Find the outliers and replace the outliers

In [26]:

```
sns.boxplot(df['age'])
```

Out[26]:

```
<Axes: >
```

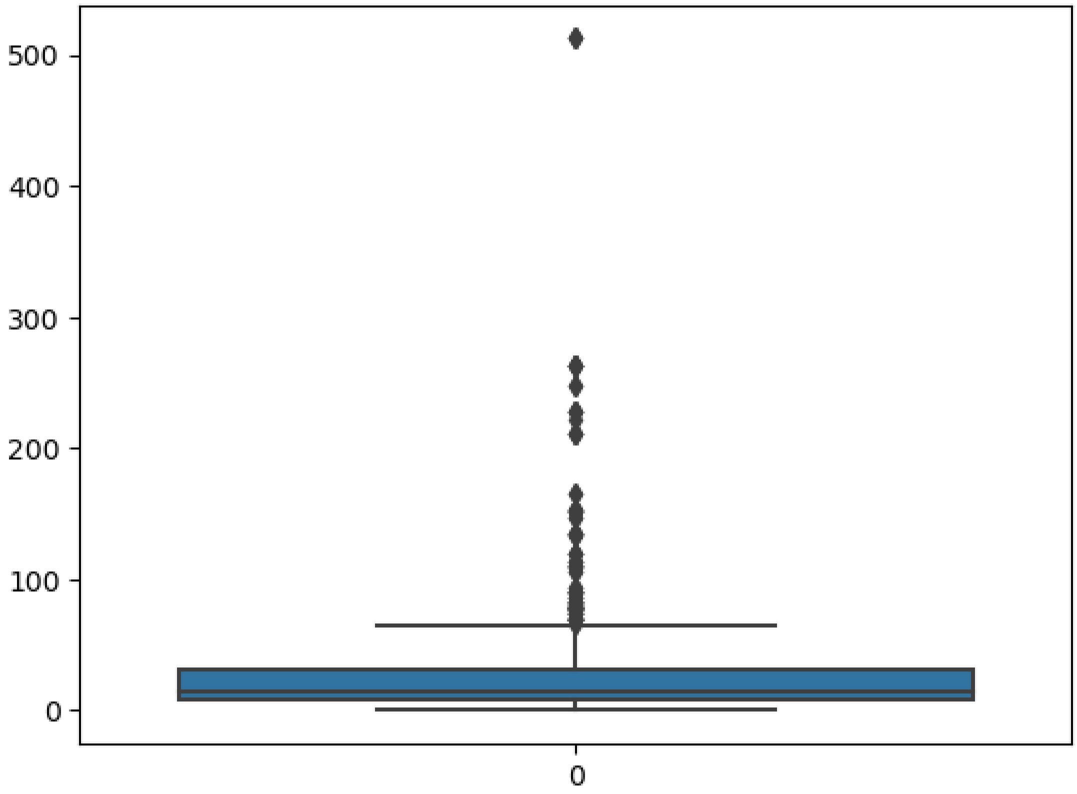


In [27]:

```
sns.boxplot(df['fare'])
```

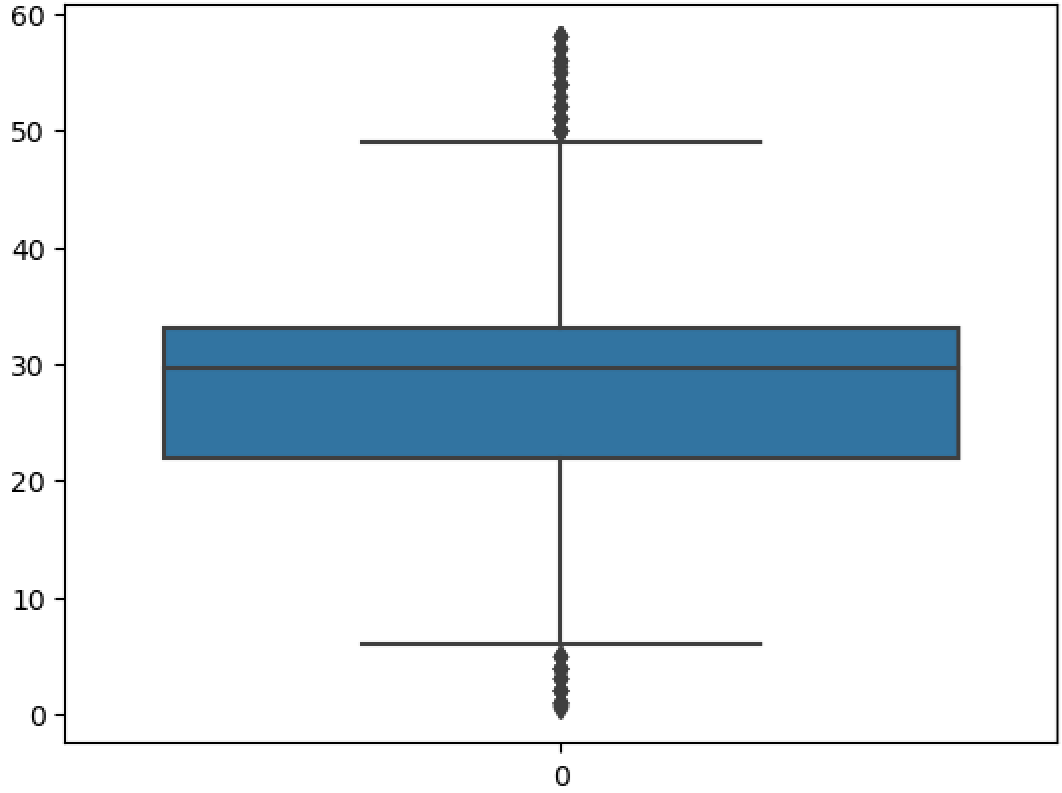
Out[27]:

```
<Axes: >
```



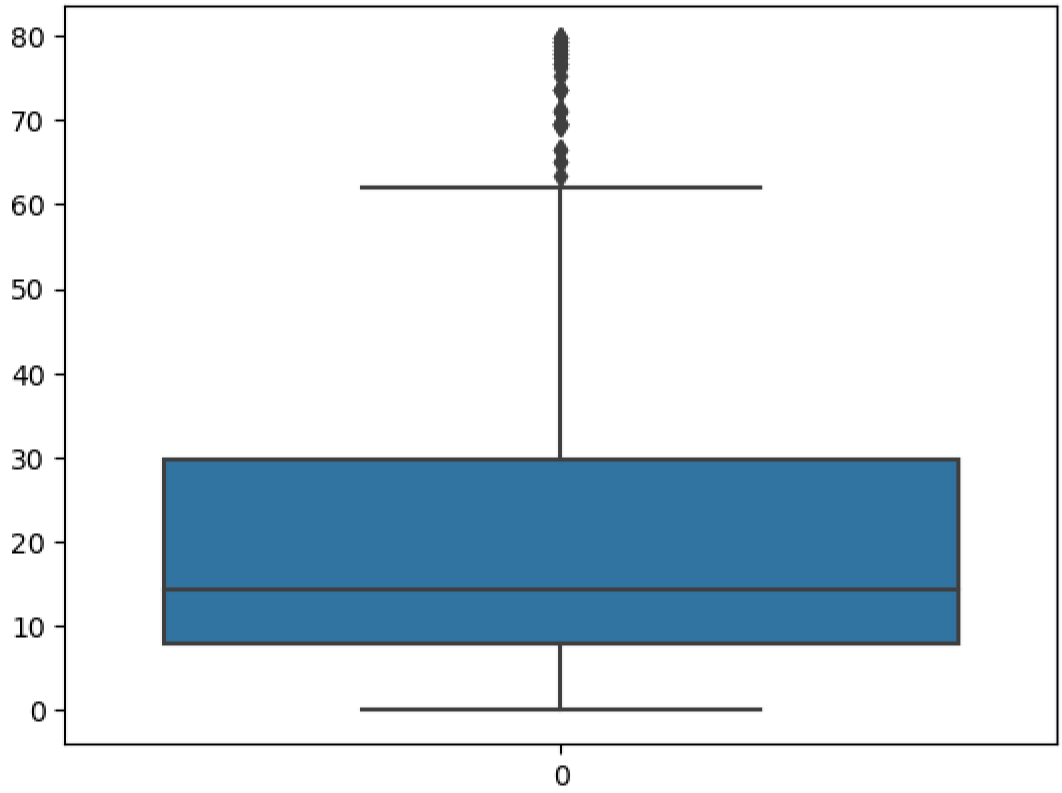
```
In [28]: median_age = df['age'].median()
         df["age"] = np.where(df["age"] > 58, median_age, df['age'])
         sns.boxplot(df['age'])
```

```
Out[28]: <Axes: >
```



```
In [29]: median_fare = df['fare'].median()
         df["fare"] = np.where(df["fare"] > 80, median_age, df['fare'])
         sns.boxplot(df['fare'])
```

```
Out[29]: <Axes: >
```



7. Check for Categorical columns and perform encoding.

In [30]:
```
from sklearn.preprocessing import OneHotEncoder
```

In [31]:
```
encoding = pd.get_dummies(df, columns = ['sex','embarked','class','who','adult_male',  'a
```

In [32]:
```
encoding.head()
```

Out[32]:

	survived	pclass	age	sibsp	parch	fare	alive	sex_female	sex_male	embarked_C	...	who_child	who_m
0	0	3	22.0	1	0	7.2500	no	0	1	0	...	0	
1	1	1	38.0	1	0	71.2833	yes	1	0	1	...	0	
2	1	3	26.0	0	0	7.9250	yes	1	0	0	...	0	
3	1	1	35.0	1	0	53.1000	yes	1	0	0	...	0	
4	0	3	35.0	0	0	8.0500	no	0	1	0	...	0	

5 rows × 25 columns

8. Split the data into dependent and independent variables

In [33]:
```
df.columns
```

Out[33]:
```
Index(['survived', 'pclass', 'sex', 'age', 'sibsp', 'parch', 'fare',
       'embarked', 'class', 'who', 'adult_male', 'embark_town', 'alive',
       'alone'],
      dtype='object')
```

In [34]:

```
# independent variables
X = encoding.drop(['survived', 'alive'], axis = 1)
X.head()
```

Out[34]:

	pclass	age	sibsp	parch	fare	sex_female	sex_male	embarked_C	embarked_Q	embarked_S	...	who_chi
0	3	22.0	1	0	7.2500	0	1	0	0	1	...	
1	1	38.0	1	0	71.2833	1	0	1	0	0	...	
2	3	26.0	0	0	7.9250	1	0	0	0	1	...	
3	1	35.0	1	0	53.1000	1	0	0	0	1	...	
4	3	35.0	0	0	8.0500	0	1	0	0	1	...	

5 rows × 23 columns

In [35]:

```
# dependent variables
y = df[['survived', 'alive']]
y.head()
```

Out[35]:

	survived	alive
0	0	no
1	1	yes
2	1	yes
3	1	yes
4	0	no

9. Scaling the independent variables

In [36]:

```
from sklearn.preprocessing import StandardScaler
scaler = StandardScaler()
x_std = scaler.fit_transform(X)
```

In [37]:

```
x_std
```

Out[37]:

```
array([[ 0.82520863, -0.57985934,  0.43135024, ..., -0.48271079,
        -0.30794088,  0.61679395],
       [-1.57221121,  0.83108889,  0.43135024, ...,  2.07163382,
        -0.30794088, -1.62128697],
       [ 0.82520863, -0.22712228, -0.47519908, ..., -0.48271079,
        -0.30794088,  0.61679395],
       ...,
       [ 0.82520863,  0.09405298,  0.43135024, ..., -0.48271079,
        -0.30794088,  0.61679395],
       [-1.57221121, -0.22712228, -0.47519908, ...,  2.07163382,
        -0.30794088, -1.62128697],
       [ 0.82520863,  0.3019833 , -0.47519908, ..., -0.48271079,
         3.24737656, -1.62128697]])
```

10. Split the data into training and testing

In [38]:

```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y['survived'], test_size=0.33, ra
```

In [ ]:

```
```