Titanic Survival Prediction

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

In [313…
```
test_data=pd.read_csv("tested.csv")
test_data
```

Out[313]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare
0	892	0	3	Kelly, Mr. James	male	34.5	0	0	330911	7.8292
1	893	1	3	Wilkes, Mrs. James (Ellen Needs)	female	47.0	1	0	363272	7.0000
2	894	0	2	Myles, Mr. Thomas Francis	male	62.0	0	0	240276	9.6875
3	895	0	3	Wirz, Mr. Albert	male	27.0	0	0	315154	8.6625
4	896	1	3	Hirvonen, Mrs. Alexander (Helga E Lindqvist)	female	22.0	1	1	3101298	12.2875
...	...	...	...	...	...	...	...	...	...	...
413	1305	0	3	Spector, Mr. Woolf	male	NaN	0	0	A.5. 3236	8.0500
414	1306	1	1	Oliva y Ocana, Dona. Fermina	female	39.0	0	0	PC 17758	108.9000
415	1307	0	3	Saether, Mr. Simon Sivertsen	male	38.5	0	0	SOTON/O.Q. 3101262	7.2500
416	1308	0	3	Ware, Mr. Frederick	male	NaN	0	0	359309	8.0500
417	1309	0	3	Peter, Master. Michael J	male	NaN	1	1	2668	22.3583

418 rows × 12 columns

In [314…
```
test_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 418 entries, 0 to 417
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   PassengerId  418 non-null    int64  
 1   Survived     418 non-null    int64  
 2   Pclass       418 non-null    int64  
 3   Name         418 non-null    object 
 4   Sex          418 non-null    object 
 5   Age          332 non-null    float64
 6   SibSp        418 non-null    int64  
 7   Parch        418 non-null    int64  
 8   Ticket       418 non-null    object 
 9   Fare         417 non-null    float64
 10  Cabin        91 non-null     object 
 11  Embarked     418 non-null    object 
dtypes: float64(2), int64(5), object(5)
memory usage: 39.3+ KB
```

In [315…]
```
test_data.describe()
```

Out[315]:

	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
count	418.000000	418.000000	418.000000	332.000000	418.000000	418.000000	417.000000
mean	1100.500000	0.363636	2.265550	30.272590	0.447368	0.392344	35.627188
std	120.810458	0.481622	0.841838	14.181209	0.896760	0.981429	55.907576
min	892.000000	0.000000	1.000000	0.170000	0.000000	0.000000	0.000000
25%	996.250000	0.000000	1.000000	21.000000	0.000000	0.000000	7.895800
50%	1100.500000	0.000000	3.000000	27.000000	0.000000	0.000000	14.454200
75%	1204.750000	1.000000	3.000000	39.000000	1.000000	0.000000	31.500000
max	1309.000000	1.000000	3.000000	76.000000	8.000000	9.000000	512.329200

In [316…]
```
#checking how many null values are in dataset
test_data.isnull().sum()
```

Out[316]:
```
PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age             86
SibSp            0
Parch            0
Ticket           0
Fare             1
Cabin          327
Embarked         0
dtype: int64
```

In [317…]
```
#dropping 'cabin' column
test_data=test_data.drop(['Cabin'],axis=1)
test_data.head()
```

Out[317]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Embark
0	892	0	3	Kelly, Mr. James	male	34.5	0	0	330911	7.8292	
1	893	1	3	Wilkes, Mrs. James (Ellen Needs)	female	47.0	1	0	363272	7.0000	
2	894	0	2	Myles, Mr. Thomas Francis	male	62.0	0	0	240276	9.6875	
3	895	0	3	Wirz, Mr. Albert	male	27.0	0	0	315154	8.6625	
4	896	1	3	Hirvonen, Mrs. Alexander (Helga E Lindqvist)	female	22.0	1	1	3101298	12.2875	

In [318…

```
test_data=test_data.rename(columns={"Sex":"Gender"})
test_data.head(9)
```

Out[318]:

	PassengerId	Survived	Pclass	Name	Gender	Age	SibSp	Parch	Ticket	Fare	Embar
0	892	0	3	Kelly, Mr. James	male	34.5	0	0	330911	7.8292	
1	893	1	3	Wilkes, Mrs. James (Ellen Needs)	female	47.0	1	0	363272	7.0000	
2	894	0	2	Myles, Mr. Thomas Francis	male	62.0	0	0	240276	9.6875	
3	895	0	3	Wirz, Mr. Albert	male	27.0	0	0	315154	8.6625	
4	896	1	3	Hirvonen, Mrs. Alexander (Helga E Lindqvist)	female	22.0	1	1	3101298	12.2875	
5	897	0	3	Svensson, Mr. Johan Cervin	male	14.0	0	0	7538	9.2250	
6	898	1	3	Connolly, Miss. Kate	female	30.0	0	0	330972	7.6292	
7	899	0	2	Caldwell, Mr. Albert Francis	male	26.0	1	1	248738	29.0000	
8	900	1	3	Abrahim, Mrs. Joseph (Sophie Halaut Easu)	female	18.0	0	0	2657	7.2292	

In [319…
```
test_data.shape
```

Out[319]:
```
(418, 11)
```

In [320…
```
test_data.isnull().sum()
```

Out[320]:
```
PassengerId     0
Survived        0
Pclass          0
Name            0
Gender          0
Age            86
SibSp           0
Parch           0
Ticket          0
Fare            1
Embarked        0
dtype: int64
```

In [321…
```
#filling null values on 'age' column by dummy values generated from mean
mean_age=int(test_data['Age'].mean())
std_age=int(test_data['Age'].std())
array=np.random.uniform(mean_age-std_age,mean_age+std_age,86)
array=np.round(array,1)
print(array)
```

```
[28.7 32.5 25.8 17.6 41.3 37.6 41.9 26.6 30.8 23.1 28.3 38.1 43.7 38.3
 30.5 29.4 32.2 34.2 36.5 39.  31.3 33.4 19.8 40.9 17.7 39.8 38.  39.6
 22.2 38.8 30.7 17.5 41.3 16.  44.  26.  38.3 42.5 41.3 33.  16.9 27.5
 32.6 28.5 25.7 24.1 37.  42.  24.4 24.5 33.  26.1 24.  22.3 23.1 25.
 37.3 42.8 32.9 17.4 31.5 18.6 24.5 21.4 17.5 34.8 30.3 33.6 25.  25.5
 39.4 34.5 25.2 40.9 35.  29.3 23.8 29.  23.8 16.2 32.7 19.6 38.7 37.7
 27.6 18.3]
```

In [322…
```
#insert array into null values
test_data['Age'][test_data['Age'].isnull()]=array
```

```
C:\Users\mairah nisar\AppData\Local\Temp\ipykernel_27804\203652770.py:2: SettingWi
thCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stabl
e/user_guide/indexing.html#returning-a-view-versus-a-copy
  test_data['Age'][test_data['Age'].isnull()]=array
```

In [323…
```
test_data.isnull().sum()
```

Out[323]:
```
PassengerId    0
Survived       0
Pclass         0
Name           0
Gender         0
Age            0
SibSp          0
Parch          0
Ticket         0
Fare           1
Embarked       0
dtype: int64
```

In [324…
```
mean=test_data['Fare'].mean()
test_data['Fare'].fillna(mean,inplace=True)
test_data.isnull().sum()
```

Out[324]:
```
PassengerId    0
Survived       0
Pclass         0
Name           0
Gender         0
Age            0
SibSp          0
Parch          0
Ticket         0
Fare           0
Embarked       0
dtype: int64
```

In [325…
```
test_data['Gender']=test_data['Gender'].replace({'male':0,'female':1})

test_data['Embarked']=test_data['Embarked'].replace({'Q':0,'S':1,'C':3})
test_data.head(8)
```

Out[325]:

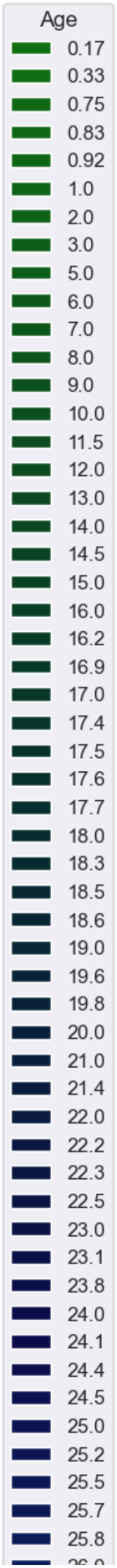
	PassengerId	Survived	Pclass	Name	Gender	Age	SibSp	Parch	Ticket	Fare	Embar
0	892	0	3	Kelly, Mr. James	0	34.5	0	0	330911	7.8292	
1	893	1	3	Wilkes, Mrs. James (Ellen Needs)	1	47.0	1	0	363272	7.0000	
2	894	0	2	Myles, Mr. Thomas Francis	0	62.0	0	0	240276	9.6875	
3	895	0	3	Wirz, Mr. Albert	0	27.0	0	0	315154	8.6625	
4	896	1	3	Hirvonen, Mrs. Alexander (Helga E Lindqvist)	1	22.0	1	1	3101298	12.2875	
5	897	0	3	Svensson, Mr. Johan Cervin	0	14.0	0	0	7538	9.2250	
6	898	1	3	Connolly, Miss. Kate	1	30.0	0	0	330972	7.6292	
7	899	0	2	Caldwell, Mr. Albert Francis	0	26.0	1	1	248738	29.0000	

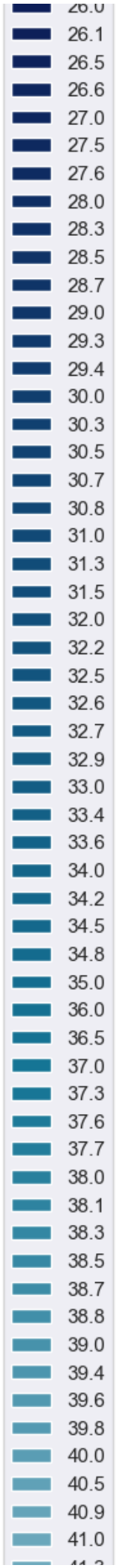
In [326…

```
sur_pclass = sns.countplot(x='Survived',hue='Age',data=test_data,palette='ocean')
sur_pclass.set_xticklabels(sur_pclass.get_xticklabels())
```

Out[326]:

```
[Text(0, 0, '0'), Text(1, 0, '1')]
```


Age
0.17
0.33
0.75
0.83
0.92
1.0
2.0
3.0
5.0
6.0
7.0
8.0
9.0
10.0
11.5
12.0
13.0
14.0
14.5
15.0
16.0
16.2
16.9
17.0
17.4
17.5
17.6
17.7
18.0
18.3
18.5
18.6
19.0
19.6
19.8
20.0
21.0
21.4
22.0
22.2
22.3
22.5
23.0
23.1
23.8
24.0
24.1
24.4
24.5
25.0
25.2
25.5
25.7
25.8


26.0
26.1
26.5
26.6
27.0
27.5
27.6
28.0
28.3
28.5
28.7
29.0
29.3
29.4
30.0
30.3
30.5
30.7
30.8
31.0
31.3
31.5
32.0
32.2
32.5
32.6
32.7
32.9
33.0
33.4
33.6
34.0
34.2
34.5
34.8
35.0
36.0
36.5
37.0
37.3
37.6
37.7
38.0
38.1
38.3
38.5
38.7
38.8
39.0
39.4
39.6
39.8
40.0
40.5
40.9
41.0

In [327…

```
data=[test_data]
for dataset in data:
    dataset['Age']= dataset['Age'].astype(int)
    dataset.loc[dataset['Age']<=5,'Age']=0
    dataset.loc[(dataset['Age'] > 5) & (dataset['Age'] <= 10), 'Age'] = 1
    dataset.loc[(dataset['Age']>10)&(dataset['Age']<=18),'Age']= 2
    dataset.loc[(dataset['Age']>18) & (dataset['Age']<=22),'Age']=3
    dataset.loc[(dataset['Age'] > 22) & (dataset['Age'] <= 25), 'Age'] = 4
    dataset.loc[(dataset['Age'] > 25) & (dataset['Age'] <= 30),'Age'] =5
    dataset.loc[(dataset['Age'] > 30) & (dataset['Age'] <= 46), 'Age'] = 6
    dataset.loc[(dataset['Age'] > 46) & (dataset['Age'] <= 52), 'Age'] = 7
    dataset.loc[(dataset['Age'] > 52) & (dataset['Age'] <= 60), 'Age'] = 8
    dataset.loc[(dataset['Age'] > 60) & (dataset['Age'] <= 66), 'Age'] = 9
    dataset.loc[(dataset['Age'] > 66) & (dataset['Age'] <= 72), 'Age'] = 10
    dataset.loc[(dataset['Age'] > 72) & (dataset['Age'] <= 80), 'Age'] = 11
    dataset.loc[(dataset['Age'] > 80), 'Age'] = 12

test_data['Age'].value_counts()
```

Out[327]:

```
8     124
6      73
4      54
3      51
2      45
8      20
7      19
0      12
1      10
9       8
10      1
11      1
Name: Age, dtype: int64
```

In [328…

```
test_data
```

Out[328]:

	PassengerId	Survived	Pclass	Name	Gender	Age	SibSp	Parch	Ticket	Fare
0	892	0	3	Kelly, Mr. James	0	6	0	0	330911	7.8292
1	893	1	3	Wilkes, Mrs. James (Ellen Needs)	1	7	1	0	363272	7.0000
2	894	0	2	Myles, Mr. Thomas Francis	0	9	0	0	240276	9.6875
3	895	0	3	Wirz, Mr. Albert	0	5	0	0	315154	8.6625
4	896	1	3	Hirvonen, Mrs. Alexander (Helga E Lindqvist)	1	3	1	1	3101298	12.2875
...	...	...	...	...	...	...	...	...	...	...
413	1305	0	3	Spector, Mr. Woolf	0	6	0	0	A.5. 3236	8.0500
414	1306	1	1	Oliva y Ocana, Dona. Fermina	1	6	0	0	PC 17758	108.9000
415	1307	0	3	Saether, Mr. Simon Sivertsen	0	6	0	0	SOTON/O.Q. 3101262	7.2500
416	1308	0	3	Ware, Mr. Frederick	0	5	0	0	359309	8.0500
417	1309	0	3	Peter, Master. Michael J	0	2	1	1	2668	22.3583

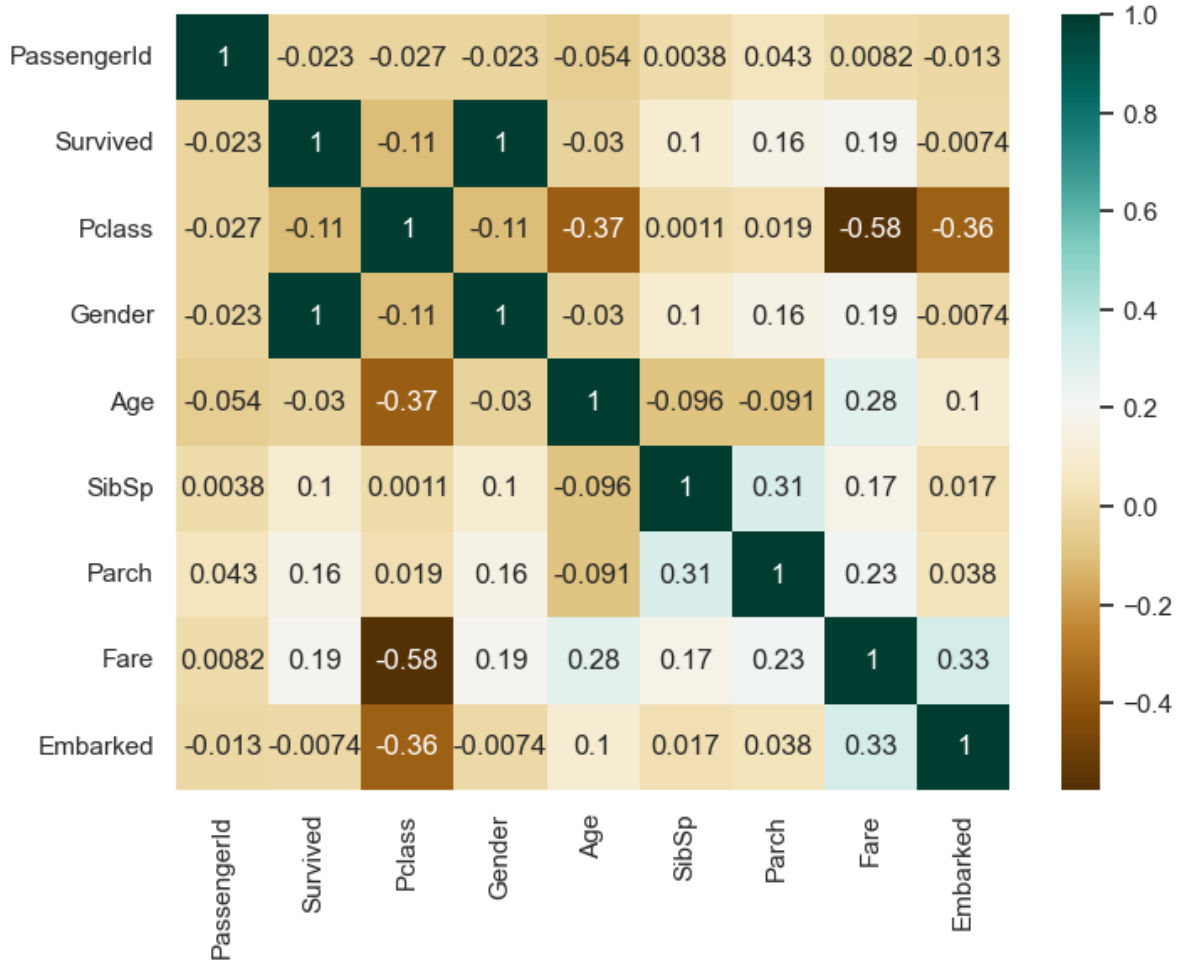
418 rows × 11 columns

FEATURE SELECTION

In [329…

```
sns.heatmap(test_data.corr(),annot=True,cmap="BrBG")
plt.show()
```

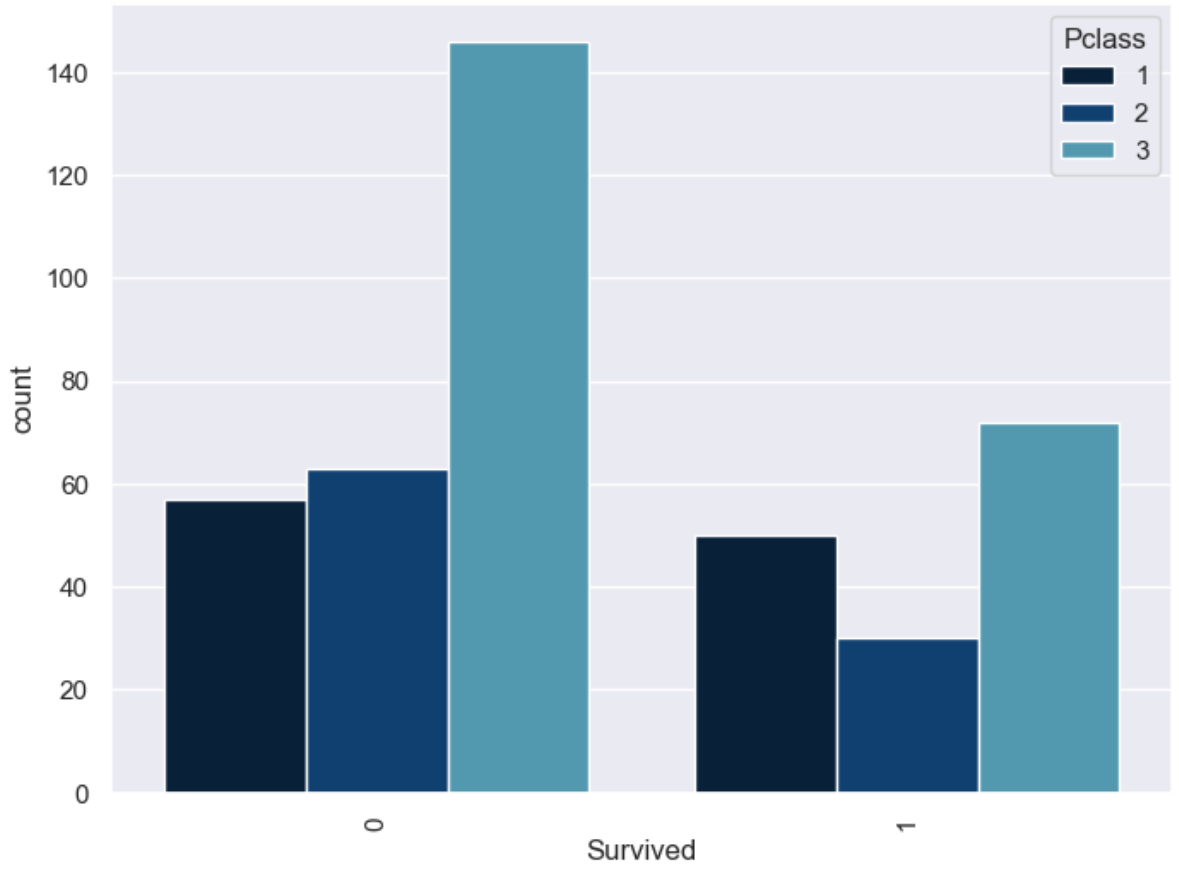
```
C:\Users\mairah nisar\AppData\Local\Temp\ipykernel_27804\407388859.py:1: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.
  sns.heatmap(test_data.corr(),annot=True,cmap="BrBG")
```



In [330…

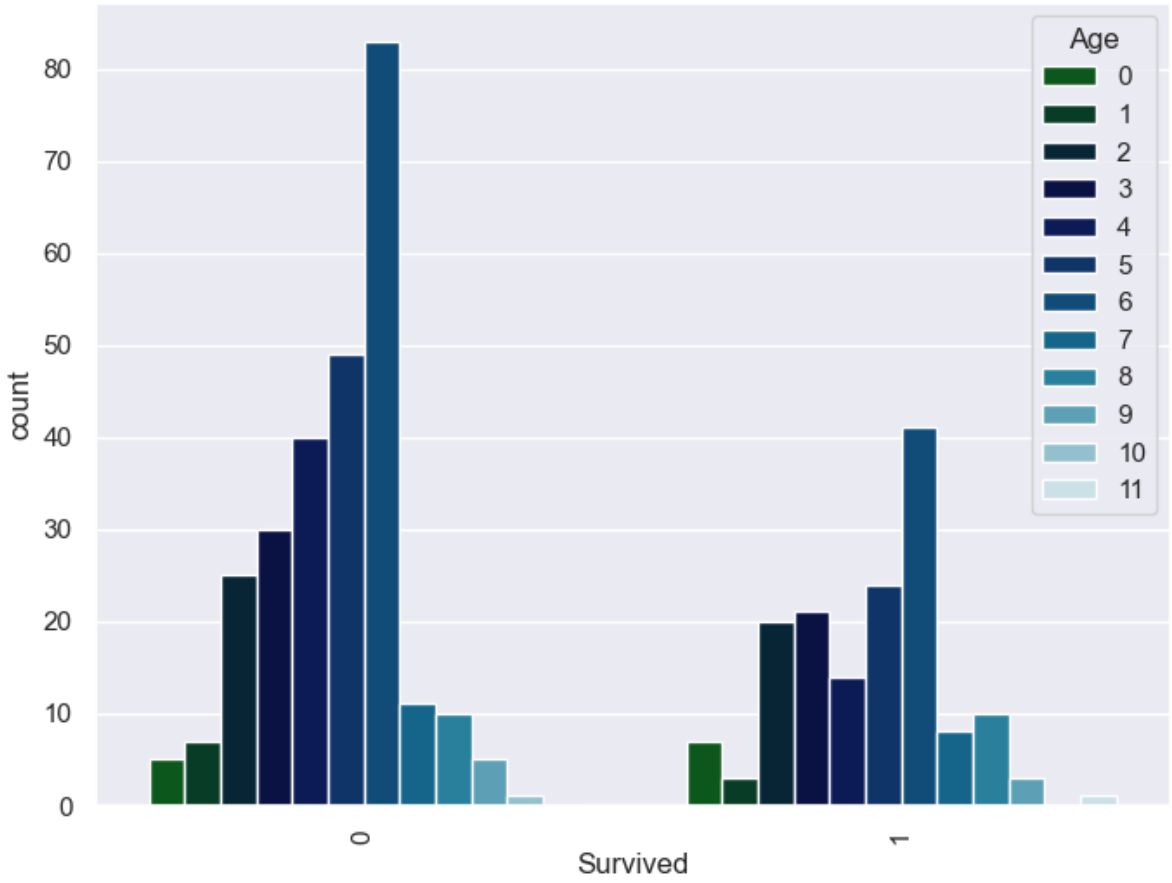
```
sur_pclass = sns.countplot(x='Survived',hue='Pclass',data=test_data,palette='ocean'
sur_pclass.set_xticklabels(sur_pclass.get_xticklabels(),rotation=90)

sns.set(rc={'figure.figsize':(8,6)})
```



In [331…
```
sur_pclass = sns.countplot(x='Survived',hue='Age',data=test_data,palette='ocean')
sur_pclass.set_xticklabels(sur_pclass.get_xticklabels(),rotation=90)

sns.set(rc={'figure.figsize':(8,6)})
```



In [332…
```
test_data.groupby(['Pclass'])['Survived'].mean()
```

Out[332]:
```
Pclass
1    0.467290
2    0.322581
3    0.330275
Name: Survived, dtype: float64
```

In [333…
```
test_data.groupby(['Fare'])['Survived'].mean()
```

Out[333]:
```
Fare
0.0000      0.0
3.1708      0.0
6.4375      0.0
6.4958      0.0
6.9500      1.0
           ...
227.5250    0.0
247.5208    1.0
262.3750    0.6
263.0000    1.0
512.3292    1.0
Name: Survived, Length: 170, dtype: float64
```

In [334…
```
test_data.groupby(['Parch'])['Survived'].mean()
```

Out[334]:
```
Parch
0    0.305556
1    0.538462
2    0.606061
3    0.666667
4    1.000000
5    0.000000
6    0.000000
9    0.500000
Name: Survived, dtype: float64
```

In [335…
```
tab = pd.crosstab(test_data['Pclass'], test_data['Gender'])
print (tab)
```

```
Gender    0   1
Pclass
1        57  50
2        63  30
3       146  72
```

In [336…
```
test_data.groupby(['Gender'])['Survived'].mean()
```

Out[336]:
```
Gender
0    0.0
1    1.0
Name: Survived, dtype: float64
```

In [337…
```
test_data.groupby(['Age'])['Survived'].mean()
```

Out[337]:
```
Age
0     0.583333
1     0.300000
2     0.444444
3     0.411765
4     0.259259
5     0.328767
6     0.330645
7     0.421053
8     0.500000
9     0.375000
10    0.000000
11    1.000000
Name: Survived, dtype: float64
```

In [338…
```
test_data['Age']
```

Out[338]:
```
0      6
1      7
2      9
3      5
4      3
      ..
413    6
414    6
415    6
416    5
417    2
Name: Age, Length: 418, dtype: int32
```

In [339…
```
test_data.head(10)
```

Out[339]:

	PassengerId	Survived	Pclass	Name	Gender	Age	SibSp	Parch	Ticket	Fare	Embar
0	892	0	3	Kelly, Mr. James	0	6	0	0	330911	7.8292	
1	893	1	3	Wilkes, Mrs. James (Ellen Needs)	1	7	1	0	363272	7.0000	
2	894	0	2	Myles, Mr. Thomas Francis	0	9	0	0	240276	9.6875	
3	895	0	3	Wirz, Mr. Albert	0	5	0	0	315154	8.6625	
4	896	1	3	Hirvonen, Mrs. Alexander (Helga E Lindqvist)	1	3	1	1	3101298	12.2875	
5	897	0	3	Svensson, Mr. Johan Cervin	0	2	0	0	7538	9.2250	
6	898	1	3	Connolly, Miss. Kate	1	5	0	0	330972	7.6292	
7	899	0	2	Caldwell, Mr. Albert Francis	0	5	1	1	248738	29.0000	
8	900	1	3	Abrahim, Mrs. Joseph (Sophie Halaut Easu)	1	2	0	0	2657	7.2292	
9	901	0	3	Davies, Mr. John Samuel	0	3	2	0	A/4 48871	24.1500	

In [340…

```
#dropping unecessary columns
test_data= test_data.drop(['Name','Ticket','Fare','Embarked','SibSp','Parch','Age']
test_data
```

Out[340]:

	PassengerId	Survived	Pclass	Gender
0	892	0	3	0
1	893	1	3	1
2	894	0	2	0
3	895	0	3	0
4	896	1	3	1
...	...	...	...	...
413	1305	0	3	0
414	1306	1	1	1
415	1307	0	3	0
416	1308	0	3	0
417	1309	0	3	0

418 rows × 4 columns

In [341...
```
#storing values of passenger id for later use. the final result must have passenger
passenger=test_data['PassengerId'].values
```

In [342...
```
test_data=test_data.drop(['PassengerId'],axis=1)
test_data.head(5)
```

Out[342]:

	Survived	Pclass	Gender
0	0	3	0
1	1	3	1
2	0	2	0
3	0	3	0
4	1	3	1

applying classification algorithm

In [522...
```
from sklearn import datasets
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.tree import DecisionTreeClassifier
from sklearn.cluster import KMeans
```

In [583...
```
X=test_data.iloc[:,1:].values
y=test_data.iloc[:,0].values
```

In [584...
```
from sklearn.model_selection import train_test_split
X_train,X_test,y_train,y_test=train_test_split(X,y,test_size=0.2)
```

In [585...
```
from sklearn.tree import DecisionTreeClassifier
classifier=DecisionTreeClassifier(max_features=4)
```

In [586...
```
classifier.fit(X_train,y_train)
```

Out[586]:
```
DecisionTreeClassifier(max_features=4)
```

In [ ]:

In [587…
```
y_pred=classifier.predict(X_train)
```

In [588…
```
from sklearn.metrics import accuracy_score
accuracy_score(y_pred,y_train)
```

Out[588]:
```
1.0
```

In [589…
```
xf=test_data.iloc[:,1:3].values
```

In [590…
```
test_data.shape
```

Out[590]:
```
(418, 3)
```

In [591…
```
y_final=classifier.predict(xf)
```

In [592…
```
y_final.shape
```

Out[592]:
```
(418,)
```

In [593…
```
y_final
```

Out[593]:
```
array([0, 1, 0, 0, 1, 0, 1, 0, 1, 0, 0, 0, 1, 0, 1, 1, 0, 0, 1, 1, 0, 0,
       1, 0, 1, 0, 1, 0, 0, 0, 0, 0, 1, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 1,
       1, 0, 0, 0, 1, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 1,
       1, 0, 0, 1, 1, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 1, 1,
       1, 0, 1, 0, 1, 0, 0, 0, 1, 0, 1, 0, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0,
       0, 1, 1, 1, 1, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0,
       1, 0, 0, 0, 0, 0, 1, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1,
       0, 0, 1, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 1,
       1, 0, 1, 1, 0, 0, 1, 0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1,
       0, 1, 1, 0, 0, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 1, 1, 0, 1, 0, 1, 0,
       1, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1,
       0, 0, 0, 0, 1, 0, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 1,
       0, 0, 0, 0, 1, 0, 0, 0, 1, 1, 0, 1, 0, 0, 0, 0, 1, 0, 1, 1, 1, 0,
       0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0,
       0, 1, 0, 0, 0, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0,
       1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 1, 0, 1, 1, 0,
       0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1, 1, 0, 1, 1, 0, 0, 1, 0, 0,
       1, 1, 1, 0, 0, 0, 0, 0, 1, 1, 0, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1,
       0, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 0, 1, 0, 0, 0],
      dtype=int64)
```

In [594…
```
result=pd.DataFrame()
```

In [595…
```
result['PassengerId']=passenger
result['survived']=y_final
```

In [596…
```
result.to_csv('sample.csv',index=False)
```

In [ ]: