In [ ]:

```
1
```

In [88]:

```
1 import numpy as np
2 import pandas as pd
3 from sklearn import preprocessing
4 import matplotlib.pyplot as plt
5 import seaborn as sb
```

In [89]:

```
1 sb.set(style="white")
2 sb.set(style="whitegrid",color_codes=True)
3 import warnings
4 warnings.simplefilter(action='ignore')
```

In [90]:

```
train_df=pd.read_csv(r"C:\Users\kunam\Downloads\train.gender_submission.csv")
train_df
```

Out[90]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8
...	...	...	...	...	...	...	...	...	...	
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7

891 rows × 12 columns

In [91]:

```
1 train_df.head()
```

Out[91]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	F
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0

In [92]:

```
1 train_df.shape
```

Out[92]:

```
(891, 12)
```

In [93]:

```
1 test_df=pd.read_csv(r"C:\Users\magam\Downloads\train.gender_submission.csv")
```

In [94]:

```
1 test_df.head()
```

Out[94]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	F
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.25
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.28
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.92
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.10
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.05

In [95]:

```
1 test_df.shape
```

Out[95]:

```
(891, 12)
```

In [96]:

```
1 train_df.describe()
```

Out[96]:

	PassengerId	Survived	Pclass	Age	SibSp	Parch	F
count	891.000000	891.000000	891.000000	714.000000	891.000000	891.000000	891.000(
mean	446.000000	0.383838	2.308642	29.699118	0.523008	0.381594	32.204
std	257.353842	0.486592	0.836071	14.526497	1.102743	0.806057	49.693
min	1.000000	0.000000	1.000000	0.420000	0.000000	0.000000	0.000(
25%	223.500000	0.000000	2.000000	20.125000	0.000000	0.000000	7.910
50%	446.000000	0.000000	3.000000	28.000000	0.000000	0.000000	14.454
75%	668.500000	1.000000	3.000000	38.000000	1.000000	0.000000	31.000(
max	891.000000	1.000000	3.000000	80.000000	8.000000	6.000000	512.329

In [97]:

```
1 train_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   PassengerId  891 non-null    int64  
 1   Survived     891 non-null    int64  
 2   Pclass       891 non-null    int64  
 3   Name         891 non-null    object 
 4   Sex          891 non-null    object 
 5   Age          714 non-null    float64
 6   SibSp        891 non-null    int64  
 7   Parch        891 non-null    int64  
 8   Ticket       891 non-null    object 
 9   Fare         891 non-null    float64
 10  Cabin        204 non-null    object 
 11  Embarked     889 non-null    object 
dtypes: float64(2), int64(5), object(5)
memory usage: 83.7+ KB
```

In [98]:

```
1 test_df.describe()
```

Out[98]:

	PassengerId	Survived	Pclass	Age	SibSp	Parch	F
count	891.000000	891.000000	891.000000	714.000000	891.000000	891.000000	891.000(
mean	446.000000	0.383838	2.308642	29.699118	0.523008	0.381594	32.204
std	257.353842	0.486592	0.836071	14.526497	1.102743	0.806057	49.693
min	1.000000	0.000000	1.000000	0.420000	0.000000	0.000000	0.000(
25%	223.500000	0.000000	2.000000	20.125000	0.000000	0.000000	7.910
50%	446.000000	0.000000	3.000000	28.000000	0.000000	0.000000	14.454
75%	668.500000	1.000000	3.000000	38.000000	1.000000	0.000000	31.000(
max	891.000000	1.000000	3.000000	80.000000	8.000000	6.000000	512.329

In [99]:

```
1 test_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   PassengerId  891 non-null    int64  
 1   Survived     891 non-null    int64  
 2   Pclass       891 non-null    int64  
 3   Name         891 non-null    object 
 4   Sex          891 non-null    object 
 5   Age          714 non-null    float64
 6   SibSp        891 non-null    int64  
 7   Parch        891 non-null    int64  
 8   Ticket       891 non-null    object 
 9   Fare         891 non-null    float64
 10  Cabin        204 non-null    object 
 11  Embarked     889 non-null    object 
dtypes: float64(2), int64(5), object(5)
memory usage: 83.7+ KB
```

In [100]:

```
#to find missing values
train_df.isnull().sum()
```

Out[100]:

```
PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age            177
SibSp            0
Parch            0
Ticket           0
Fare             0
Cabin          687
Embarked         2
dtype: int64
```

In [101]:

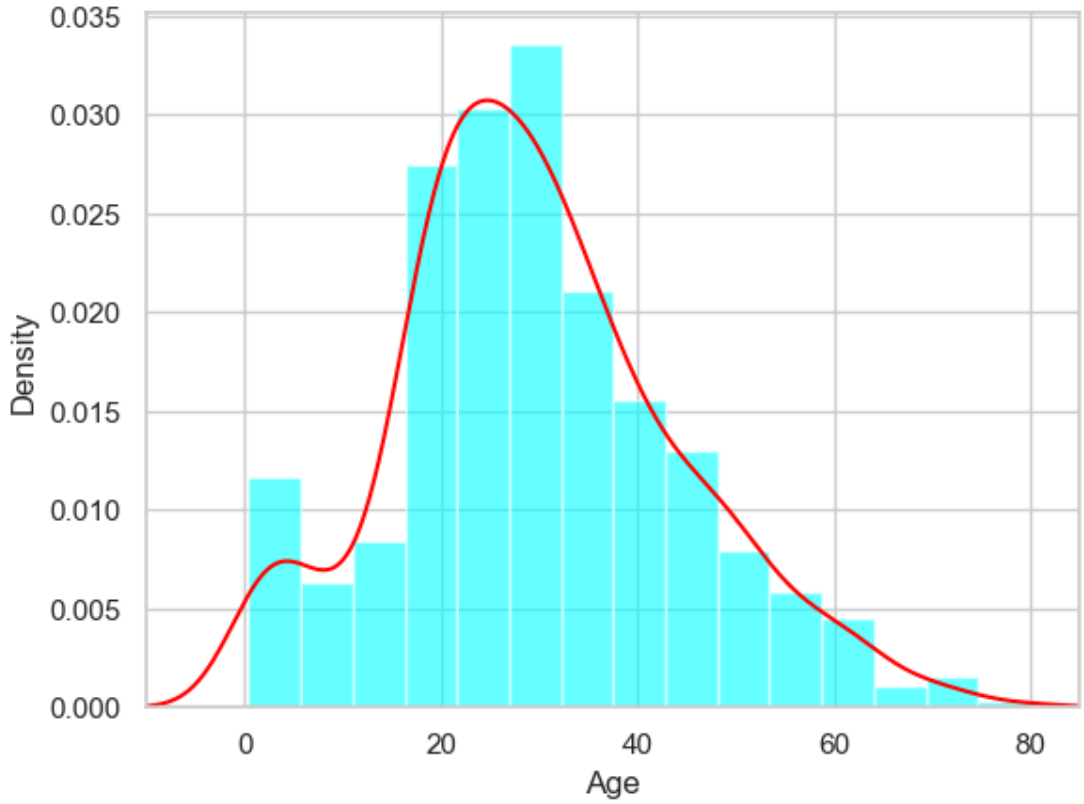
```
test_df.isnull().sum()
```

Out[101]:

```
PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age            177
SibSp            0
Parch            0
Ticket           0
Fare             0
Cabin          687
Embarked         2
dtype: int64
```

In [102]:

```
ax=train_df["Age"].hist(bins=15,density=True,stacked=True,color='cyan',alpha=0.6)
train_df["Age"].plot(kind='density',color='red')
ax.set(xlabel='Age')
plt.xlim(-10,85)
plt.show()
```



In [103]:

```
print(train_df["Age"].mean(skipna=True))
print(train_df["Age"].median(skipna=True))
```

```
29.69911764705882
28.0
```

In [104]:

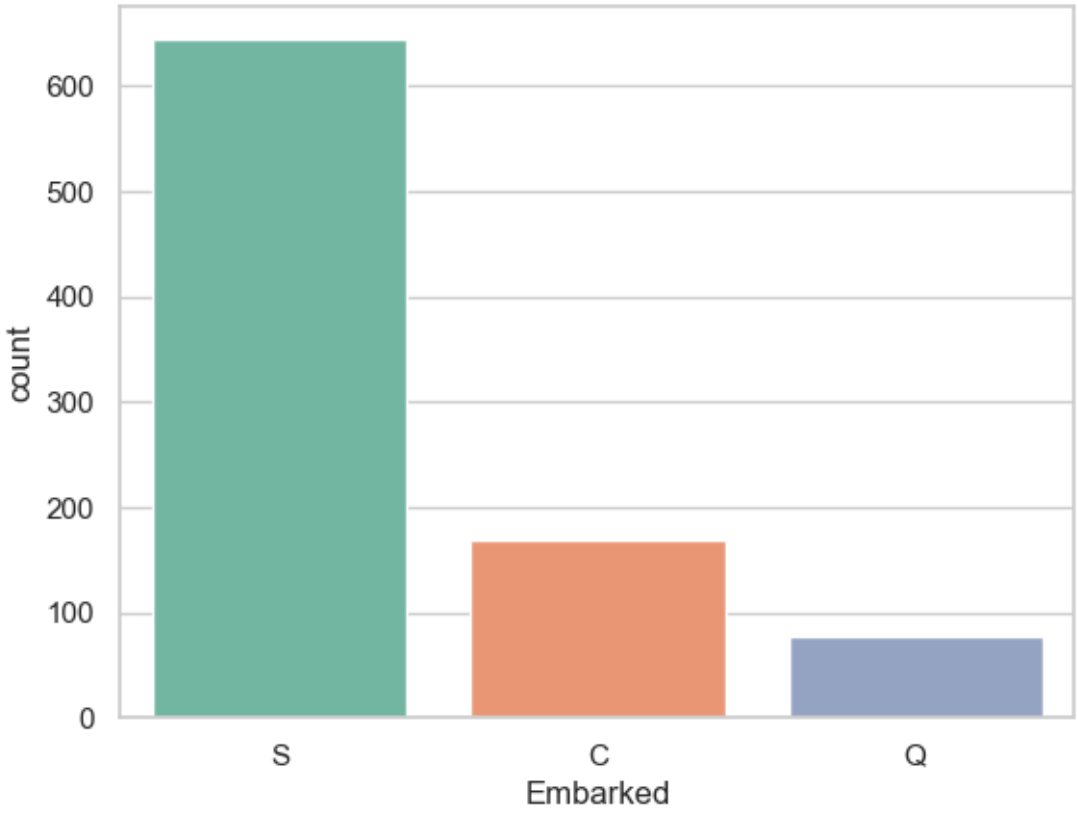
```
print((train_df['Cabin'].isnull().sum()/train_df.shape[0]*100))
print((train_df['Embarked'].isnull().sum()/train_df.shape[0]*100))
```

```
77.10437710437711
0.22446689113355783
```

In [105]:

```
print('Boarded passangers grouped by port of embarkation(C=cherbourge,Q=Queensten
print(train_df['Embarked'].value_counts())
sb.countplot(x='Embarked',data=train_df,palette='Set2')
plt.show()
```

```
Boarded passangers grouped by port of embarkation(C=cherbourge,Q=Queens
ten,S=Southamption):
Embarked
S    644
C    168
Q     77
Name: count, dtype: int64
```



In [106]:

```
print(train_df['Embarked'].value_counts().idxmax())
```

```
S
```

In [107]:

```
train_data=train_df.copy()
train_data['Age'].fillna(train_df['Age'].median(skipna=True),inplace=True)
train_data["Embarked"].fillna(train_df['Embarked'].value_counts().idxmax(),inplac
train_data.drop('Cabin',axis=1,inplace=True)
train_data.isnull().sum()
```

Out[107]:

```
PassengerId    0
Survived       0
Pclass         0
Name           0
Sex            0
Age            0
SibSp          0
Parch          0
Ticket         0
Fare           0
Embarked       0
dtype: int64
```

In [108]:

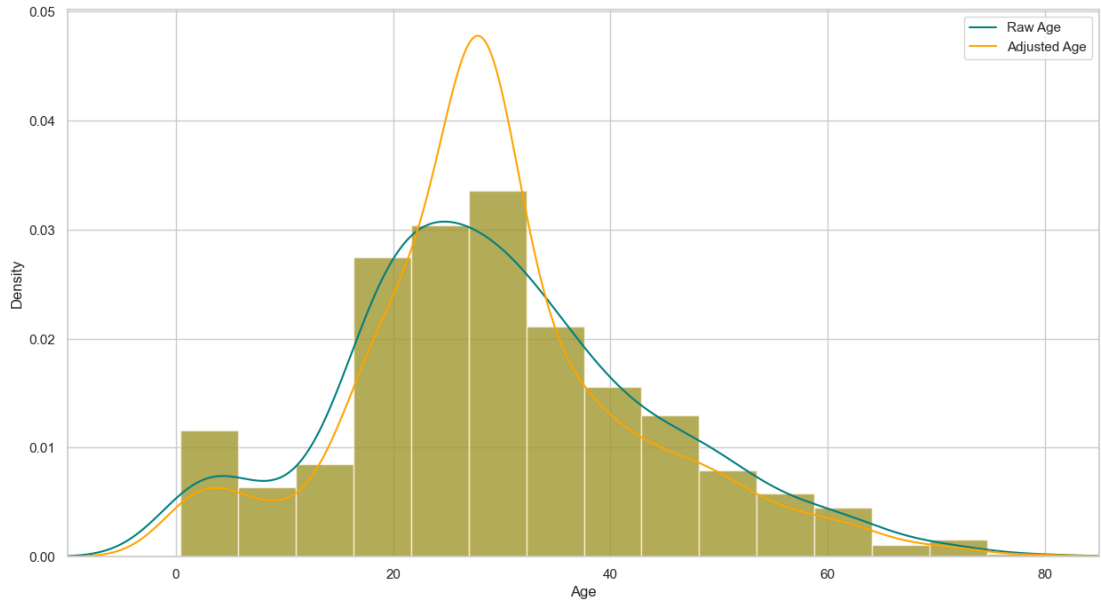
```
train_data.head()
```

Out[108]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	F
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.25
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.28
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.92
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.10
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.05

In [109]:

```
plt.figure(figsize=(15,8))
ax=train_df['Age'].hist(bins=15,density=True,stacked=True,color='teal',alpha=0.6)
train_df['Age'].plot(kind='density',color='teal')
train_df["Age"].hist(bins=15,density=True,stacked=True,color='orange',alpha=0.5)
train_data["Age"].plot(kind='density',color='orange')
ax.legend(['Raw Age','Adjusted Age'])
ax.set(xlabel='Age')
plt.xlim(-10,85)
plt.show()
```



In [110]:

```
#catagorical variables travelling alone
train_data['Travel Alone']=np.where((train_data['SibSp']+train_data['Parch'])>0,0
train_data.drop('SibSp',axis=1,inplace=True)
train_data.drop('Parch',axis=1,inplace=True)
```

In [111]:

```
#create categorical variables and drop some variables
training=pd.get_dummies(train_data,columns=["Pclass","Embarked","Sex"])
training.drop('Sex_female',axis=1,inplace=True)
training.drop('PassengerId',axis=1,inplace=True)
training.drop('Name',axis=1,inplace=True)
training.drop('Ticket',axis=1,inplace=True)
```

In [112]:

```
final_train=training
final_train.head()
```

Out[112]:

	Survived	Age	Fare	Travel Alone	Pclass_1	Pclass_2	Pclass_3	Embarked_C	Embarked
0	0	22.0	7.2500	0	False	False	True	False	Fa
1	1	38.0	71.2833	0	True	False	False	True	Fa
2	1	26.0	7.9250	1	False	False	True	False	Fa
3	1	35.0	53.1000	0	True	False	False	False	Fa
4	0	35.0	8.0500	1	False	False	True	False	Fa

In [113]:

```
test_df.isnull().sum()
```

Out[113]:

```
PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age            177
SibSp            0
Parch            0
Ticket           0
Fare             0
Cabin          687
Embarked         2
dtype: int64
```

In [114]:

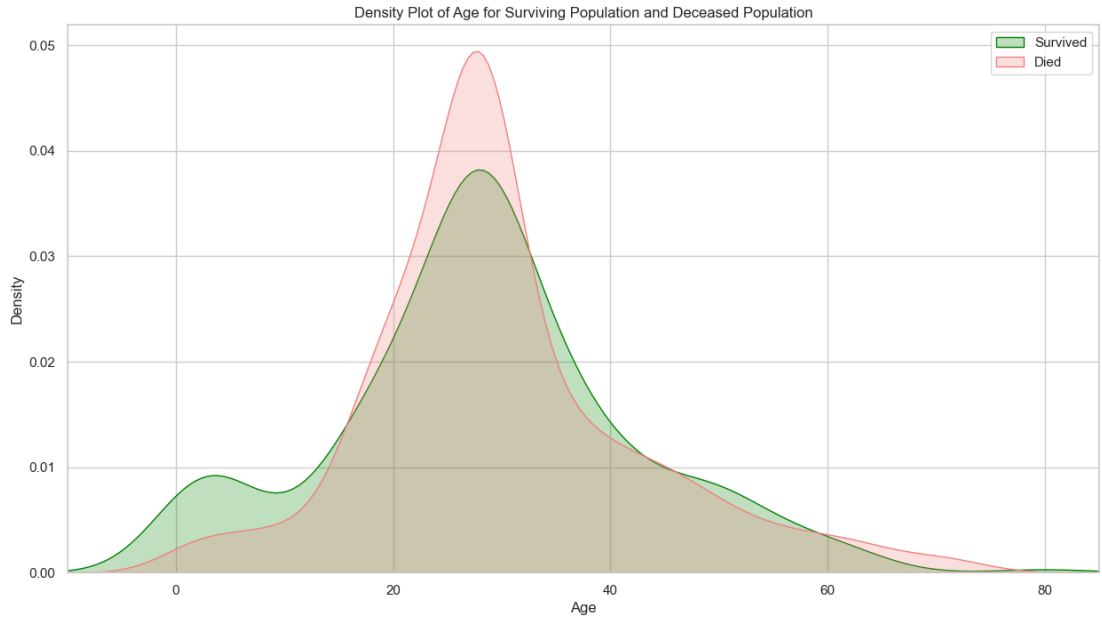
```
test_data = test_df.copy()
test_data["Age"].fillna(train_df["Age"].median(skipna=True), inplace=True)
test_data["Fare"].fillna(train_df["Fare"].median(skipna=True), inplace=True)
test_data.drop('Cabin', axis=1, inplace=True)
test_data['TravelAlone']=np.where((test_data["SibSp"]+test_data["Parch"])>0, 0, 1
test_data.drop('SibSp', axis=1, inplace=True)
test_data.drop('Parch', axis=1, inplace=True)
testing = pd.get_dummies(test_data, columns=["Pclass","Embarked","Sex"])
testing.drop('Sex_female', axis=1, inplace=True)
testing.drop('PassengerId', axis=1, inplace=True)
testing.drop('Name', axis=1, inplace=True)
testing.drop('Ticket', axis=1, inplace=True)
final_test=testing
final_test.head()
```

Out[114]:

	Survived	Age	Fare	TravelAlone	Pclass_1	Pclass_2	Pclass_3	Embarked_C	Emb
0	0	22.0	7.2500	0	False	False	True	False	
1	1	38.0	71.2833	0	True	False	False	True	
2	1	26.0	7.9250	1	False	False	True	False	
3	1	35.0	53.1000	0	True	False	False	False	
4	0	35.0	8.0500	1	False	False	True	False	

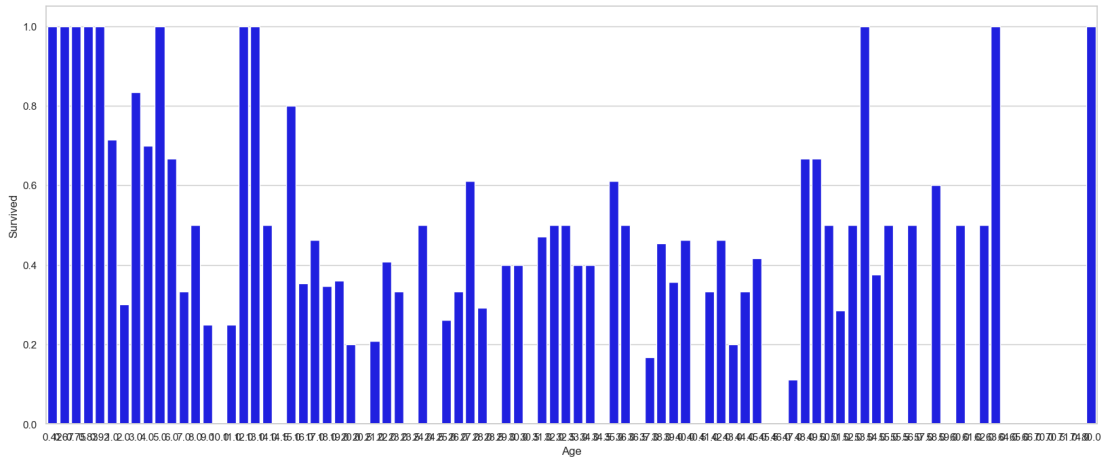
In [115]:

```
plt.figure(figsize=(15,8))
ax = sb.kdeplot(final_test["Age"][final_test.Survived == 1], color="green", shade
sb.kdeplot(final_test["Age"][final_test.Survived == 0], color="lightcoral", shade
plt.legend(['Survived', 'Died'])
plt.title('Density Plot of Age for Surviving Population and Deceased Population')
ax.set(xlabel='Age')
plt.xlim(-10,85)
plt.show()
```



In [116]:

```
plt.figure(figsize=(20,8))
avg_survival_byage=final_train[["Age","Survived"]].groupby(['Age'], as_index=Fals
g = sb.barplot(x='Age',y='Survived', data=avg_survival_byage, color="blue")
plt.show()
```



In [117]:

```
final_train['IsMinor']=np.where(final_train['Age']<=16,1,0)
print(final_train['IsMinor'])
```

```
0      0
1      0
2      0
3      0
4      0
      ..
886    0
887    0
888    0
889    0
890    0
Name: IsMinor, Length: 891, dtype: int32
```

In [118]:

```
final_test['IsMinor']=np.where(final_test['Age']<=16,1,0)
print(final_test['IsMinor'])
```

```
0      0
1      0
2      0
3      0
4      0
      ..
886    0
887    0
888    0
889    0
890    0
Name: IsMinor, Length: 891, dtype: int32
```

In [122]:

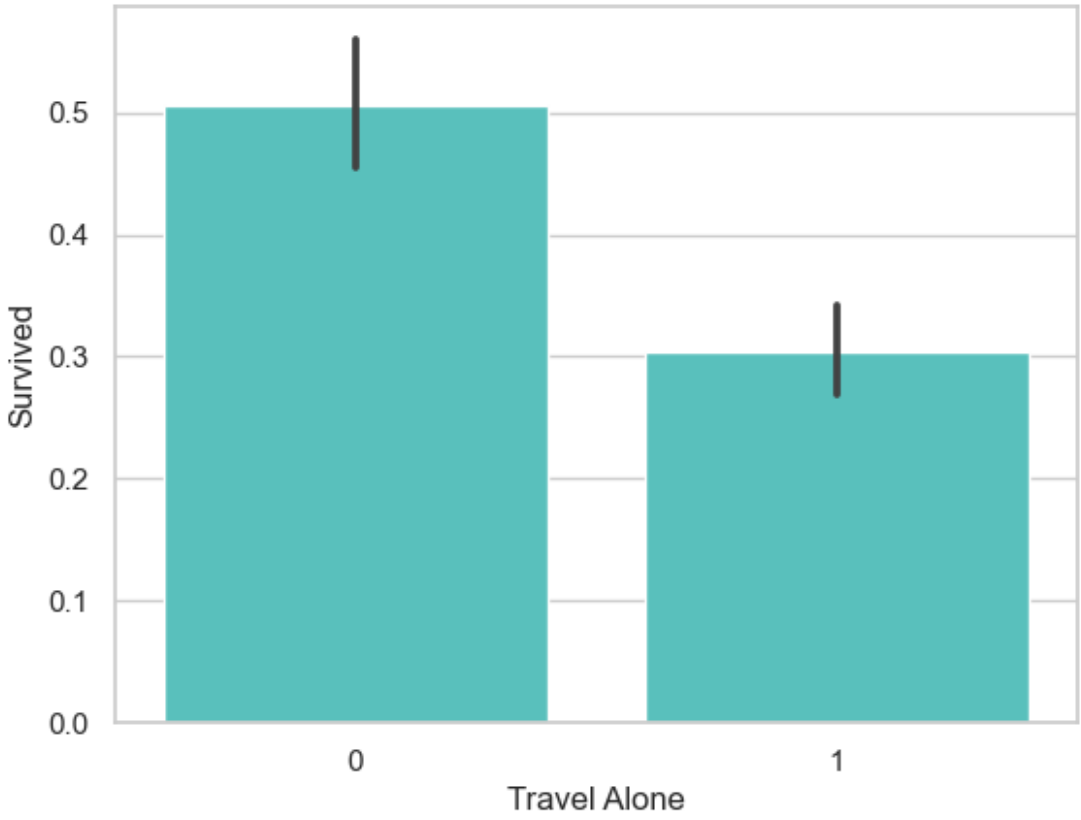
```
final_train.head()
```

Out[122]:

	Survived	Age	Fare	Travel Alone	Pclass_1	Pclass_2	Pclass_3	Embarked_C	Embarked
0	0	22.0	7.2500	0	False	False	True	False	Fa
1	1	38.0	71.2833	0	True	False	False	True	Fa
2	1	26.0	7.9250	1	False	False	True	False	Fa
3	1	35.0	53.1000	0	True	False	False	False	Fa
4	0	35.0	8.0500	1	False	False	True	False	Fa

In [124]:

```
sb.barplot(x='Travel Alone', y='Survived', data=final_train, color="mediumturquoi
plt.show()
```



In [ ]:

```

```