In [ ]:

```
```

PROBLEM STAEMENT: TO PREDICT AND ANALYZE WHICH GENDER HAS A HIGH CHANCE OF SURVIVAL AT THE TIME OF DISASTER

IMPORT DATASETS,PYTHON PACKAGES AND LIBRARIES

In [1]:

```
import numpy as np
import pandas as pd
from sklearn import preprocessing
import matplotlib.pyplot as plt
# plt.rc("font",size=14)
import seaborn as sns
sns.set(style='white') #white background style for seaborn plots
import warnings
warnings.simplefilter(action='ignore')
```

In [2]:

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

Out[2]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fa
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
...	...	...	...	...	...	...	...	...	...	
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.00
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.00
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.45
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.00
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.75

891 rows × 12 columns

In [3]:

```
test_df=pd.read_csv(r"C:\Users\mural\Downloads\test.gender_submission.csv")
test_df
```

Out[3]:

	PassengerId	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cal
0	892	3	Kelly, Mr. James	male	34.5	0	0	330911	7.8292	N
1	893	3	Wilkes, Mrs. James (Ellen Needs)	female	47.0	1	0	363272	7.0000	N
2	894	2	Myles, Mr. Thomas Francis	male	62.0	0	0	240276	9.6875	N
3	895	3	Wirz, Mr. Albert	male	27.0	0	0	315154	8.6625	N
4	896	3	Hirvonen, Mrs. Alexander (Helga E Lindqvist)	female	22.0	1	1	3101298	12.2875	N
...	...	...	...	...	...	...	...	...	...	
413	1305	3	Spector, Mr. Woolf	male	NaN	0	0	A.5. 3236	8.0500	N
414	1306	1	Oliva y Ocana, Dona. Fermina	female	39.0	0	0	PC 17758	108.9000	C1
415	1307	3	Saether, Mr. Simon Sivertsen	male	38.5	0	0	SOTON/O.Q. 3101262	7.2500	N
416	1308	3	Ware, Mr. Frederick	male	NaN	0	0	359309	8.0500	N
417	1309	3	Peter, Master. Michael J	male	NaN	1	1	2668	22.3583	N

418 rows × 11 columns

In [4]:

```
train_df.shape
```

Out[4]:

```
(891, 12)
```

In [5]:

```
test_df.shape
```

Out[5]:

```
(418, 11)
```

In [6]:

```
train_df.describe
```

Out[6]:

```
<bound method NDFrame.describe of      PassengerId  Survived  Pclass
0              1         0       3  \
1              2         1       1
2              3         1       3
3              4         1       1
4              5         0       3
..           ...       ...     ...
886          887         0       2
887          888         1       1
888          889         0       3
889          890         1       1
890          891         0       3

                                                 Name     Sex   Age  Sib
Sp
0                             Braund, Mr. Owen Harris    male  22.0
1  \
1    Cumings, Mrs. John Bradley (Florence Briggs Th...  female  38.0
1
2                              Heikkinen, Miss. Laina  female  26.0
0
3         Futrelle, Mrs. Jacques Heath (Lily May Peel)  female  35.0
1
4                           Allen, Mr. William Henry    male  35.0
0
..                                               ...     ...   ...
...
886                            Montvila, Rev. Juozas    male  27.0
0
887                      Graham, Miss. Margaret Edith  female  19.0
0
888          Johnston, Miss. Catherine Helen "Carrie"  female   NaN
1
889                              Behr, Mr. Karl Howell    male  26.0
0
890                                Dooley, Mr. Patrick    male  32.0
0

     Parch            Ticket     Fare Cabin Embarked
0        0         A/5 21171   7.2500   NaN        S
1        0          PC 17599  71.2833   C85        C
2        0  STON/O2. 3101282   7.9250   NaN        S
3        0            113803  53.1000  C123        S
4        0            373450   8.0500   NaN        S
..     ...               ...      ...   ...      ...
886      0            211536  13.0000   NaN        S
887      0            112053  30.0000   B42        S
888      2        W./C. 6607  23.4500   NaN        S
889      0            111369  30.0000  C148        C
890      0            370376   7.7500   NaN        Q

[891 rows x 12 columns]>
```

In [7]:

```
train_df.info
```

Out[7]:

```
<bound method DataFrame.info of      PassengerId  Survived  Pclass
0              1         0       3  \
1              2         1       1
2              3         1       3
3              4         1       1
4              5         0       3
..           ...       ...     ...
886          887         0       2
887          888         1       1
888          889         0       3
889          890         1       1
890          891         0       3

                                                 Name     Sex   Age  Sib
Sp
0                             Braund, Mr. Owen Harris    male  22.0
1  \
1    Cumings, Mrs. John Bradley (Florence Briggs Th...  female  38.0
1
2                              Heikkinen, Miss. Laina  female  26.0
0
3         Futrelle, Mrs. Jacques Heath (Lily May Peel)  female  35.0
1
4                           Allen, Mr. William Henry    male  35.0
0
..                                               ...     ...   ...
...
886                            Montvila, Rev. Juozas    male  27.0
0
887                      Graham, Miss. Margaret Edith  female  19.0
0
888          Johnston, Miss. Catherine Helen "Carrie"  female   NaN
1
889                              Behr, Mr. Karl Howell    male  26.0
0
890                            Dooley, Mr. Patrick    male  32.0
0

     Parch            Ticket     Fare Cabin Embarked
0        0         A/5 21171   7.2500   NaN        S
1        0          PC 17599  71.2833   C85        C
2        0  STON/O2. 3101282   7.9250   NaN        S
3        0            113803  53.1000  C123        S
4        0            373450   8.0500   NaN        S
..     ...               ...      ...   ...      ...
886      0            211536  13.0000   NaN        S
887      0            112053  30.0000   B42        S
888      2        W./C. 6607  23.4500   NaN        S
889      0            111369  30.0000  C148        C
890      0            370376   7.7500   NaN        Q

[891 rows x 12 columns]>
```

In [8]:

```
test_df.describe
```

Out[8]:

```
<bound method NDFrame.describe of      PassengerId  Pclass
Name
0            892       3                                Kelly, Mr. James  \
1            893       3              Wilkes, Mrs. James (Ellen Needs)
2            894       2                     Myles, Mr. Thomas Francis
3            895       3                              Wirz, Mr. Albert
4            896       3  Hirvonen, Mrs. Alexander (Helga E Lindqvist)
..           ...     ...                                           ...
413         1305       3                            Spector, Mr. Woolf
414         1306       1                  Oliva y Ocana, Dona. Fermina
415         1307       3                  Saether, Mr. Simon Sivertsen
416         1308       3                           Ware, Mr. Frederick
417         1309       3                      Peter, Master. Michael J

        Sex   Age  SibSp  Parch              Ticket      Fare Cabin Embar
ked
0      male  34.5      0      0              330911    7.8292   NaN
Q
1    female  47.0      1      0              363272    7.0000   NaN
S
2      male  62.0      0      0              240276    9.6875   NaN
Q
3      male  27.0      0      0              315154    8.6625   NaN
S
4    female  22.0      1      1             3101298   12.2875   NaN
S
..      ...   ...    ...    ...                 ...       ...   ...
...
413    male   NaN      0      0           A.5. 3236    8.0500   NaN
S
414  female  39.0      0      0            PC 17758  108.9000  C105
C
415    male  38.5      0      0  SOTON/O.Q. 3101262    7.2500   NaN
S
416    male   NaN      0      0              359309    8.0500   NaN
S
417    male   NaN      1      1                2668   22.3583   NaN
C

[418 rows x 11 columns]>
```

In [9]:

```
test_df.info
```

Out[9]:

```
<bound method DataFrame.info of      PassengerId  Pclass
Name
0            892       3                                Kelly, Mr. James  \
1            893       3                Wilkes, Mrs. James (Ellen Needs)
2            894       2                       Myles, Mr. Thomas Francis
3            895       3                               Wirz, Mr. Albert
4            896       3    Hirvonen, Mrs. Alexander (Helga E Lindqvist)
..           ...     ...                                             ...
413         1305       3                             Spector, Mr. Woolf
414         1306       1                   Oliva y Ocana, Dona. Fermina
415         1307       3                   Saether, Mr. Simon Sivertsen
416         1308       3                            Ware, Mr. Frederick
417         1309       3                       Peter, Master. Michael J

        Sex   Age  SibSp  Parch              Ticket      Fare Cabin Embar
ked
0      male  34.5      0      0              330911    7.8292   NaN
Q
1    female  47.0      1      0              363272    7.0000   NaN
S
2      male  62.0      0      0              240276    9.6875   NaN
Q
3      male  27.0      0      0              315154    8.6625   NaN
S
4    female  22.0      1      1             3101298   12.2875   NaN
S
..      ...   ...    ...    ...                 ...       ...   ...
...
413    male   NaN      0      0           A.5. 3236    8.0500   NaN
S
414  female  39.0      0      0            PC 17758  108.9000  C105
C
415    male  38.5      0      0  SOTON/O.Q. 3101262    7.2500   NaN
S
416    male   NaN      0      0              359309    8.0500   NaN
S
417    male   NaN      1      1                2668   22.3583   NaN
C

[418 rows x 11 columns]>
```

TO FIND MISSING VALUES

In [10]:

```
train_df.isnull().sum()
```

Out[10]:

```
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 [11]:

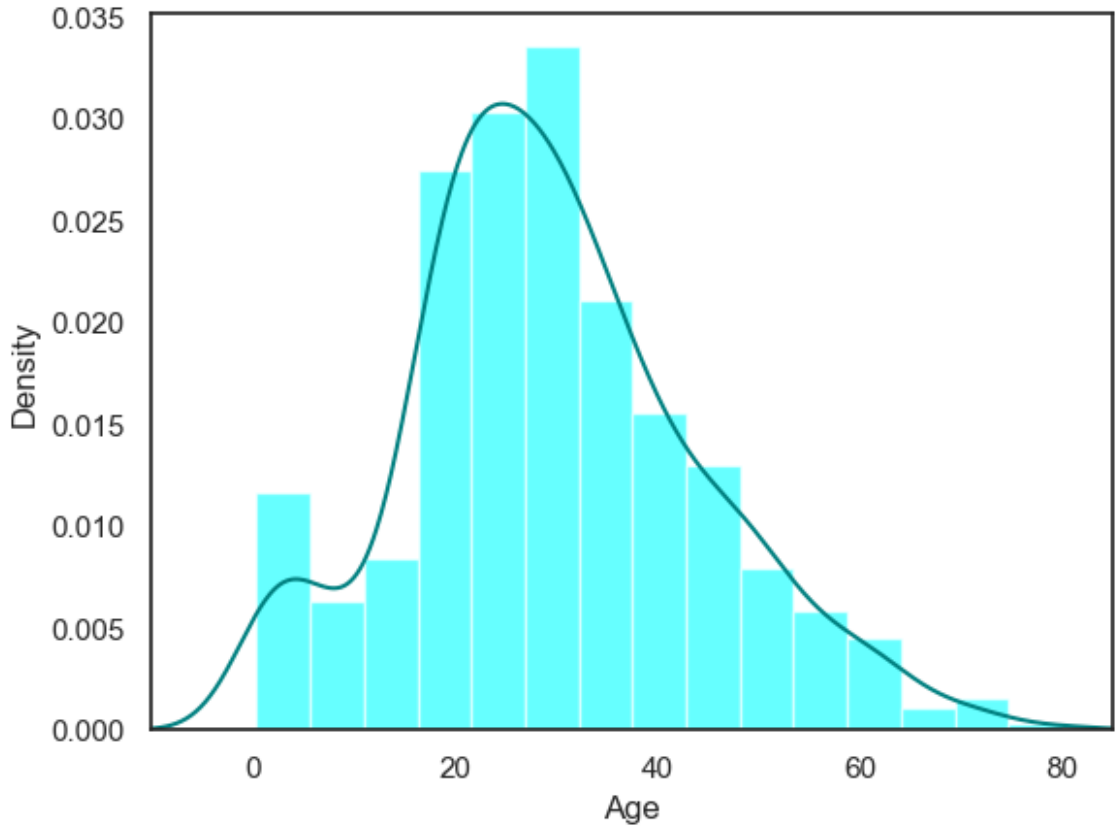
```
test_df.isnull().sum()
```

Out[11]:

```
PassengerId      0
Pclass           0
Name             0
Sex              0
Age             86
SibSp            0
Parch            0
Ticket           0
Fare             1
Cabin          327
Embarked         0
dtype: int64
```

In [12]:

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



In [13]:

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

```
29.69911764705882
28.0
```

In [14]:

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

```
77.10437710437711
```

In [15]:

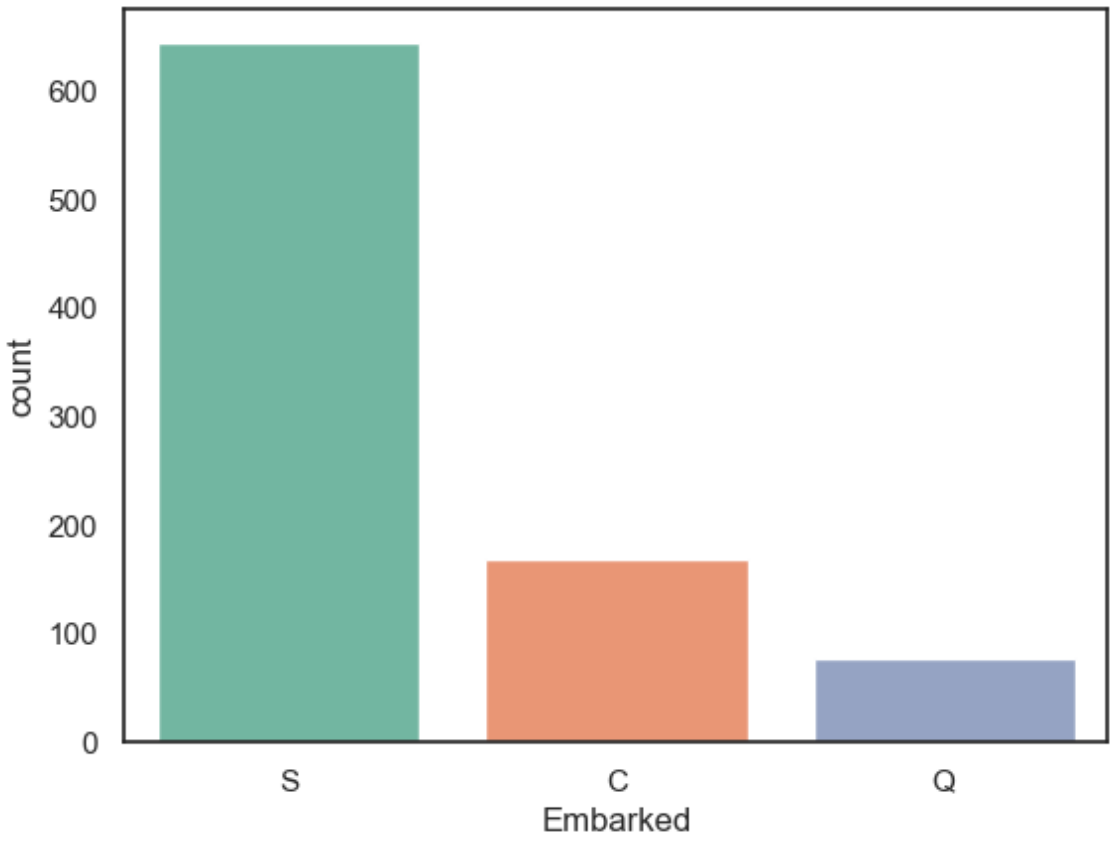
```
print((train_df['Embarked'].isnull().sum()/train_df.shape[0])*100)
```

```
0.22446689113355783
```

In [16]:

```
print('Boarded passengers grouped by port of embarkation (C=Cherbourg,Q=Queenstown,S=Sou
print(train_df['Embarked'].value_counts())
sns.countplot(x='Embarked',data=train_df,palette='Set2')
plt.show()
```

```
Boarded passengers grouped by port of embarkation (C=Cherbourg,Q=Queensto
wn,S=Southampton):
Embarked
S    644
C    168
Q     77
Name: count, dtype: int64
```



In [17]:

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

```
S
```

In [18]:

```
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(),inplace=True)
train_data.drop('Cabin',axis=1,inplace=True)
```

In [19]:

```
train_data.isnull().sum()
```

Out[19]:

```
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 [20]:

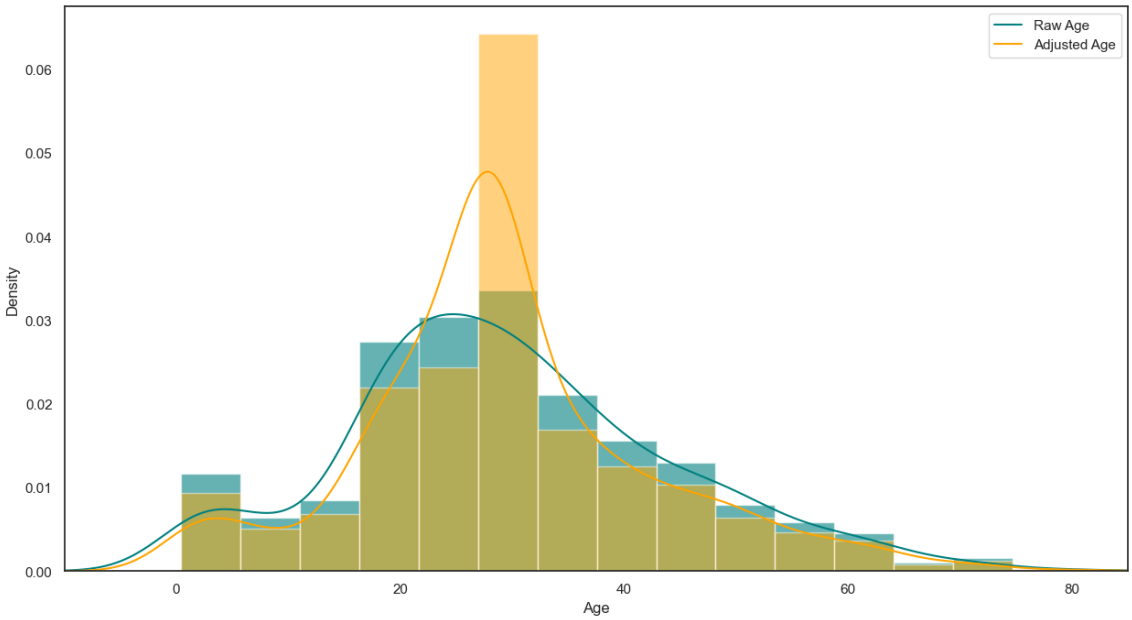
```
train_data.head()
```

Out[20]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500

In [21]:

```
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')
ax=train_data["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 [22]:

```
## Create categorical variable for travelling alone
train_data['TravelAlone']=np.where((train_data["SibSp"]+train_data["Parch"])>0,0,1)
train_data.drop('SibSp',axis=1,inplace=True)
train_data.drop('Parch',axis=1,inplace=True)
```

In [23]:

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

Out[23]:

	Survived	Age	Fare	TravelAlone	Pclass_1	Pclass_2	Pclass_3	Embarked_C	Embark
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 [24]:

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

Out[24]:

```
PassengerId      0
Pclass           0
Name             0
Sex              0
Age             86
SibSp            0
Parch            0
Ticket           0
Fare             1
Cabin          327
Embarked         0
dtype: int64
```

In [25]:

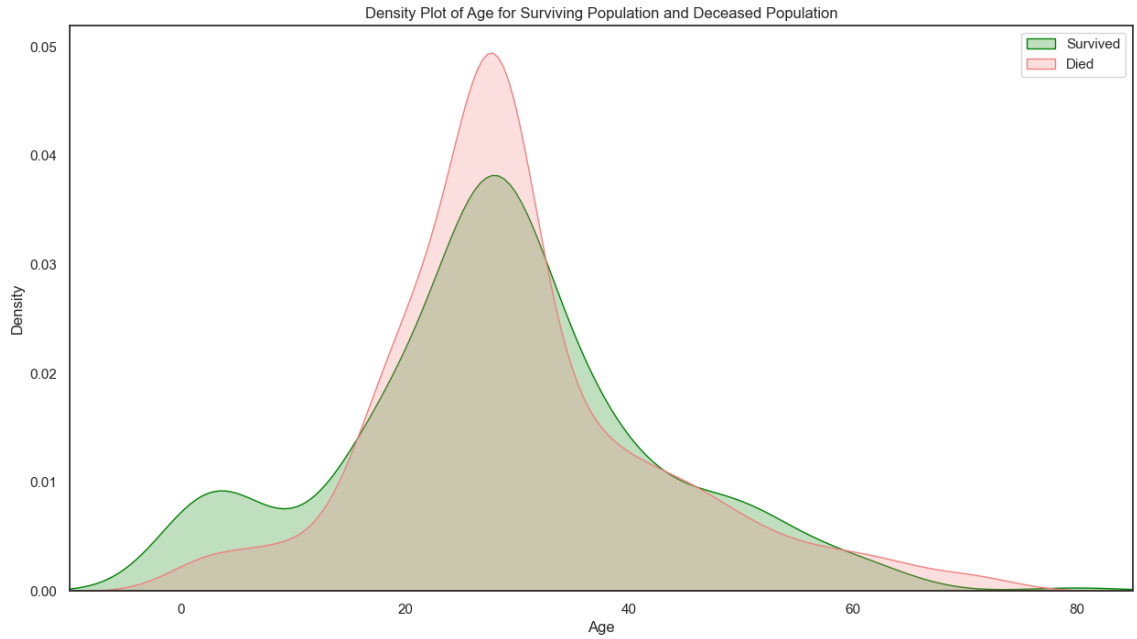
```
test_data=test_df.copy()
test_data["Age"].fillna(train_df["Age"].median(skipna=True),inplace=True)
test_data["Fare"].fillna(train_df["Fare"].median(skipna=True),inplace=True)
test_data.drop('Cabin',axis=1,inplace=True)
test_data['TravelAlone']=np.where((test_data["SibSp"]+test_data["Parch"])>0,0,1)
test_data.drop('SibSp',axis=1,inplace=True)
test_data.drop('Parch',axis=1,inplace=True)
testing=pd.get_dummies(train_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[25]:

	Survived	Age	Fare	TravelAlone	Pclass_1	Pclass_2	Pclass_3	Embarked_C	Embark
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	

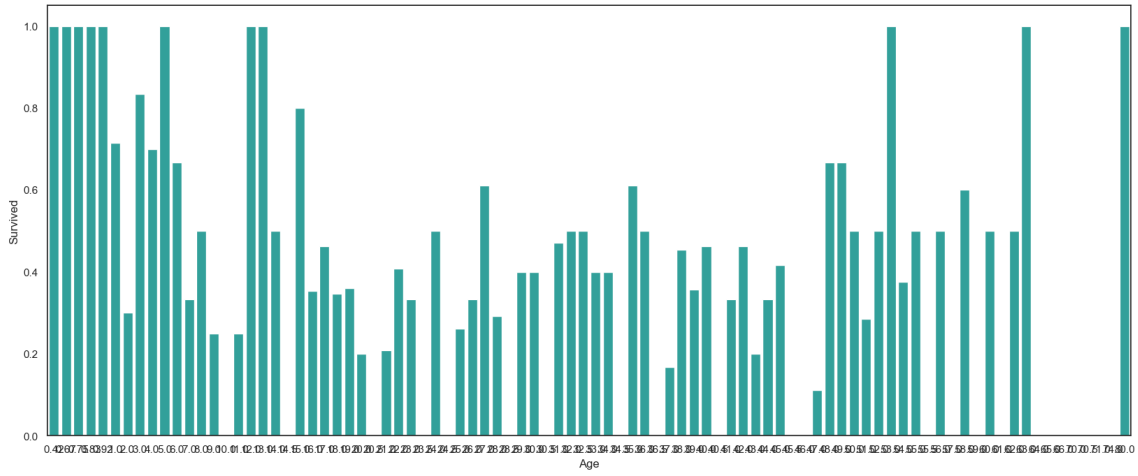
In [26]:

```
plt.figure(figsize=(15,8))
ax = sns.kdeplot(final_train["Age"][final_train.Survived == 1], color="green", shade=Tru
sns.kdeplot(final_train["Age"][final_train.Survived == 0], color="lightcoral", shade=Tru
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 [27]:

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



In [28]:

```
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
```

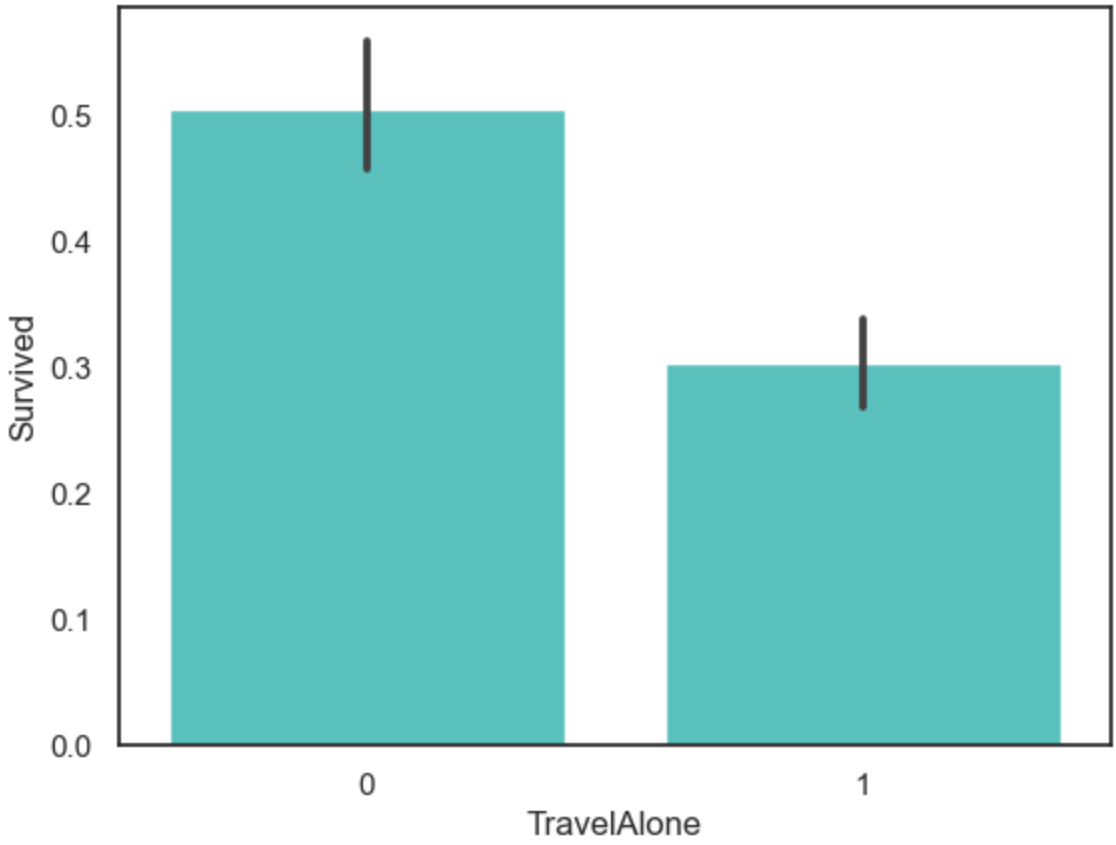
In [29]:

```
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
```

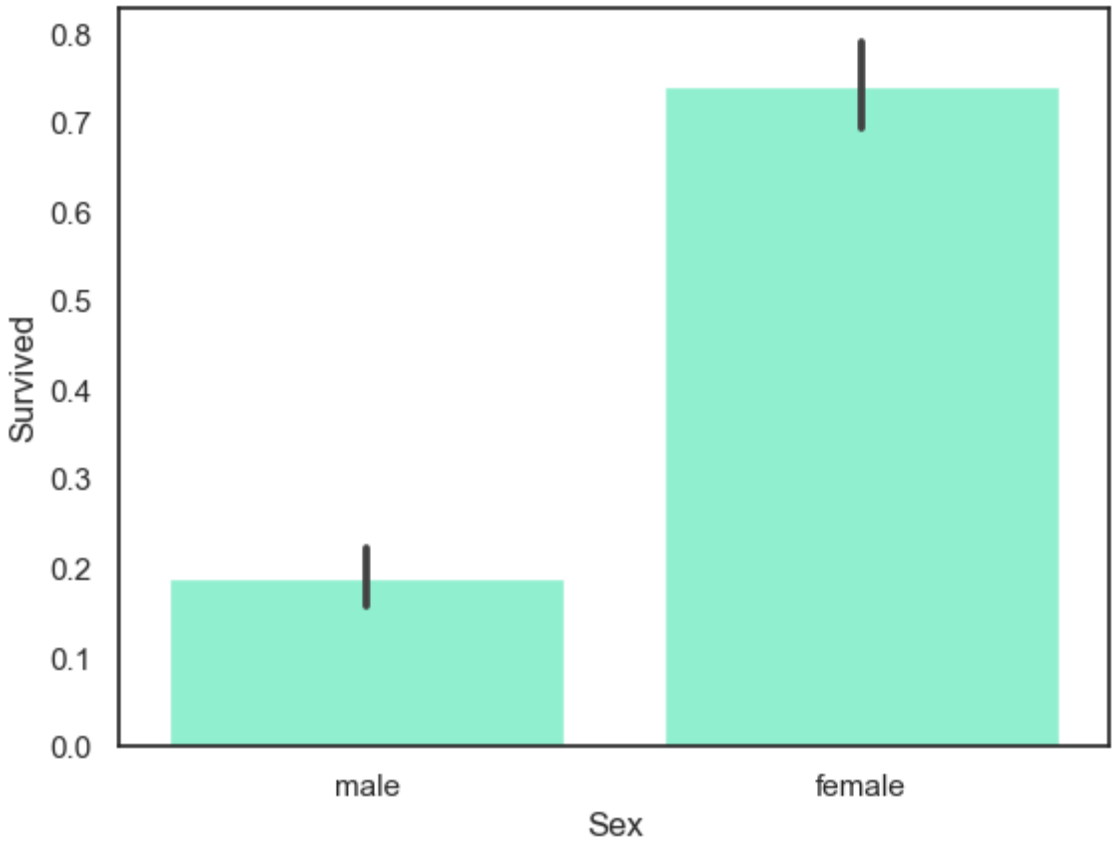
In [30]:

```
sns.barplot(x='TravelAlone', y='Survived', data=final_train, color="mediumturquoise")
plt.show()
```



In [31]:

```
import seaborn as sns
import matplotlib.pyplot as plt
# Assuming 'train_df' is your DataFrame containing the data
sns.barplot(x='Sex', y='Survived', data=train_df, color='aquamarine')
plt.show()
```



In [ ]: