Name – SURANA GAURAV

REG NO – 20BEE0371

In [30]:
```python
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import os


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

Out[30]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	who	adult_male	deck	embark_town	alive	alone
0	0	3	male	22.0	1	0	7.2500	S	Third	man	True	NaN	Southampton	no	False
1	1	1	female	38.0	1	0	71.2833	C	First	woman	False	C	Cherbourg	yes	False
2	1	3	female	26.0	0	0	7.9250	S	Third	woman	False	NaN	Southampton	yes	True
3	1	1	female	35.0	1	0	53.1000	S	First	woman	False	C	Southampton	yes	False
4	0	3	male	35.0	0	0	8.0500	S	Third	man	True	NaN	Southampton	no	True
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
886	0	2	male	27.0	0	0	13.0000	S	Second	man	True	NaN	Southampton	no	True
887	1	1	female	19.0	0	0	30.0000	S	First	woman	False	B	Southampton	yes	True
888	0	3	female	NaN	1	2	23.4500	S	Third	woman	False	NaN	Southampton	no	False
889	1	1	male	26.0	0	0	30.0000	C	First	man	True	C	Cherbourg	yes	True
890	0	3	male	32.0	0	0	7.7500	Q	Third	man	True	NaN	Queenstown	no	True

891 rows × 15 columns

In [18]:
```python
#Handle the missing values(Mean mode median imputation)
df.isnull().sum()
```

Out[18]:
```
survived      0
pclass        0
sex           0
age         177
sibsp         0
parch         0
fare          0
embarked      2
class         0
who           0
```

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```
fare            0
embarked        2
class           0
who             0
adult_male      0
deck          688
embark_town     2
alive           0
alone           0
dtype: int64
```

In [20]:

```
def mean_median(df,variable):
    df[variable+'_mean']  = df[variable].fillna(df[variable].mean())
    df[variable+'_median']  = df[variable].fillna(df[variable].median())
```

In [23]:

```
mean_median(df,'age')
df.head()
```

Out[23]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	who	adult_male	deck	embark_town	alive	alone	age_mean	age_median
0	0	3	male	22.0	1	0	7.2500	S	Third	man	True	NaN	Southampton	no	False	22.0	22.0
1	1	1	female	38.0	1	0	71.2833	C	First	woman	False	C	Cherbourg	yes	False	38.0	38.0
2	1	3	female	26.0	0	0	7.9250	S	Third	woman	False	NaN	Southampton	yes	True	26.0	26.0
3	1	1	female	35.0	1	0	53.1000	S	First	woman	False	C	Southampton	yes	False	35.0	35.0
4	0	3	male	35.0	0	0	8.0500	S	Third	man	True	NaN	Southampton	no	True	35.0	35.0

In [32]:

```
#Finding  the outliers(using INTER QUARTILE RANGE)
Q1=df['fare'].quantile(0.25)
Q3=df['fare'].quantile(0.75)
IQR=Q3-Q1
```

In [33]:

```
Q1 = df['fare'].quantile(0.25)
Q3 = df['fare'].quantile(0.75)
IQR = Q3 - Q1
whisker_width = 1.5
Fare_outliers = df[(df['fare'] < Q1 - whisker_width*IQR) | (df['fare'] > Q3 + whisker_width*IQR)]
Fare_outliers.head()
```

Out[33]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	who	adult_male	deck	embark_town	alive	alone
1	1	1	female	38.0	1	0	71.2833	C	First	woman	False	C	Cherbourg	yes	False
27	0	1	male	19.0	3	2	263.0000	S	First	man	True	C	Southampton	no	False

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31	1	1	female	NaN	1	0	146.5208	C	First	woman	False	B	Cherbourg	yes	False
34	0	1	male	28.0	1	0	82.1708	C	First	man	True	NaN	Cherbourg	no	False
52	1	1	female	49.0	1	0	76.7292	C	First	woman	False	D	Cherbourg	yes	False

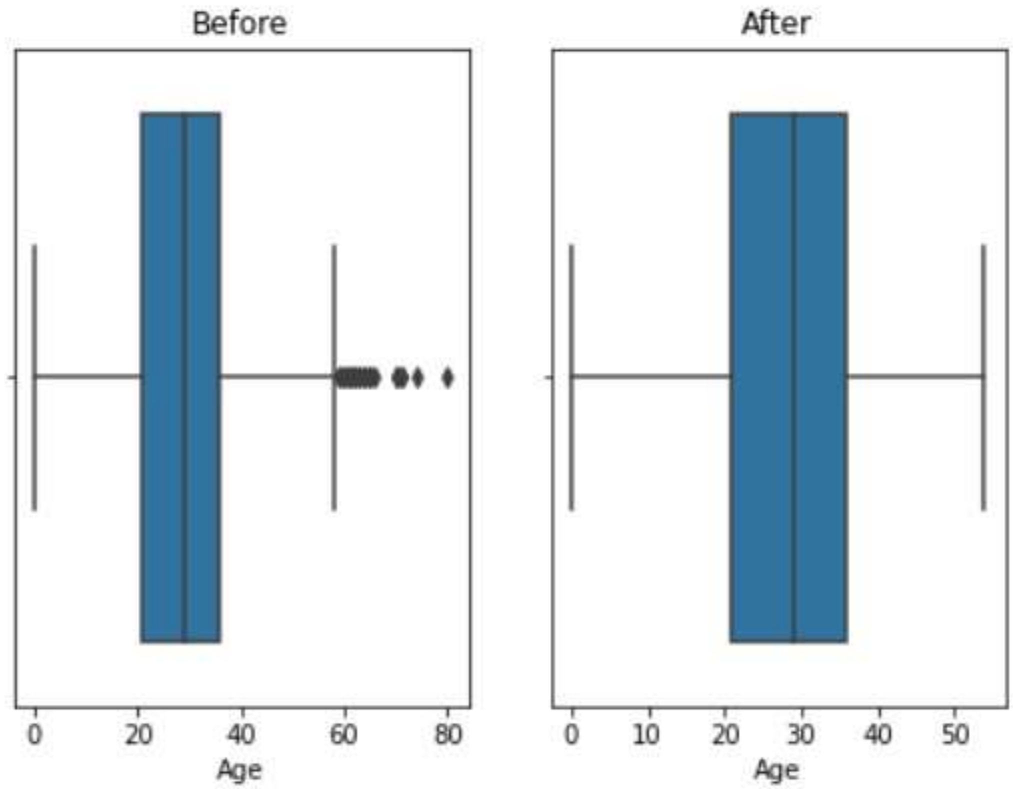
In [45]:

```
import warnings
warnings.filterwarnings("ignore")
plt.tight_layout()

print("Previous Shape With Outlier: ",df.shape)
sns.boxplot(df['age'],orient='v',ax=axes[0])
axes[0].title.set_text("Before")
#HANDLING OUTLIER #
Q1 = df.age.quantile(0.25)
Q3 = df.age.quantile(0.75)
print(Q1,Q3)
IQR = Q3-Q1
print(IQR)
lower_limit = Q1 - 1.5*IQR
upper_limit = Q3 + 1.5*IQR
print(lower_limit,upper_limit)
df2 = df
# REPLACING ALL THE Large values with MAX QUANTILE VALUE #

df2['age'] = np.where(df2['age']>upper_limit,upper_limit,df2['age'])
df2['age'] = np.where(df2['age']<lower_limit,lower_limit,df2['age'])
print("Shape After Removing Outliers:", df2.shape)
sns.boxplot(df2['age'],orient='v',ax=axes[1])
axes[1].title.set_text("After")
plt.show()
```

```
Previous Shape With Outlier:  (891, 15)
20.125 38.0
17.875
-6.6875 64.8125
Shape After Removing Outliers: (891, 15)

<Figure size 640x480 with 0 Axes>
```

In [ ]:

```
Previous Shape With Outlier:  (891, 11)
Shape After Removing Outliers: (891, 11)
```



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```
In [58]: #split the data into training and testing
X_train, X_test, y_train, y_test = train_test_split(
    df['embarked'],
    df['survived'],

    test_size=0.3,
    random_state=0,
)
```

```
In [52]: #categorical columns encoding
X_train_enc = pd.get_dummies(X_train,  drop_first=True)
X_test_enc = pd.get_dummies(X_test , drop_first=True)

X_train_enc.head()
```

Out[52]:

	Q	S
857	0	1
52	0	0
386	0	1
124	0	1
578	0	0

```
In [59]: # Splitting Dataset into the Independent variables:
X = df.iloc[:, :-1].values
print(X)

[[0 3 'male' ... nan 'Southampton' 'no']
 [1 1 'female' ... 'C' 'Cherbourg' 'yes']
 [1 3 'female' ... nan 'Southampton' 'yes']
 ...
 [0 3 'female' ... nan 'Southampton' 'no']
 [1 1 'male' ... 'C' 'Cherbourg' 'yes']
 [0 3 'male' ... nan 'Queenstown' 'no']]
```

```
In [60]: ## Splitting Dataset into the dependent variables:
Y = df.iloc[:, -1].values
print(Y)

[False False  True False  True  True  True False False False False  True
  True False  True  True False  True False  True  True  True  True  True
 False False  True False  True  True  True False  True  True False False
  True  True False False False False  True False  True  True False  True
```

SCALING OF INDEPENDENT VARIABLE

```
In [51]: #Using the concept of feature scaling
from sklearn.preprocessing import StandardScaler
sc =  StandardScaler()
X_train[:,3:] = sc.fit_transform(X_train[:,3:])
X_test[:,3:] = sc.transform(X_test[:,3:])
```

```
In [52]: print(X_train)

[[ 2.03000000e+02  3.40000000e+01  0.00000000e+00 ... -4.88677777e-01
  -1.93649167e-01  5.44862368e-01]
 [ 4.40000000e+02  3.10000000e+01  0.00000000e+00 ... -4.88677777e-01
  -1.93649167e-01  5.44862368e-01]
 [ 1.03000000e+02  2.10000000e+01  0.00000000e+00 ... -4.88677777e-01
  -1.93649167e-01  5.44862368e-01]
 ...
 [ 7.92000000e+02  1.60000000e+01  0.00000000e+00 ... -4.88677777e-01
  -1.93649167e-01  5.44862368e-01]
 [ 7.06000000e+02  3.90000000e+01  0.00000000e+00 ... -4.88677777e-01
  -1.93649167e-01  5.44862368e-01]
 [ 8.59000000e+02  2.40000000e+01  0.00000000e+00 ...  2.04633819e+00
  -1.93649167e-01 -1.83532587e+00]]
```

In [67]:
```
#DESCRIPTIVE STATS
df.describe
```

Out[67]:
```
<bound method NDFrame.describe of      survived  pclass     sex   age  sibsp  parch     fare embarked   class  \
0           0       3    male  22.0      1      0   7.2500        S   Third
1           1       1  female  38.0      1      0  71.2833        C   First
2           1       3  female  26.0      0      0   7.9250        S   Third
3           1       1  female  35.0      1      0  53.1000        S   First
4           0       3    male  35.0      0      0   8.0500        S   Third
..        ...     ...     ...   ...    ...    ...      ...      ...     ...
886         0       2    male  27.0      0      0  13.0000        S  Second
887         1       1  female  19.0      0      0  30.0000        S   First
888         0       3  female   NaN      1      2  23.4500        S   Third
889         1       1    male  26.0      0      0  30.0000        C   First
890         0       3    male  32.0      0      0   7.7500        Q   Third

       who  adult_male deck  embark_town alive  alone
0      man        True  NaN  Southampton    no  False
1    woman       False    C    Cherbourg   yes  False
2    woman       False  NaN  Southampton   yes   True
3    woman       False    C  Southampton   yes  False
4      man        True  NaN  Southampton    no   True
..     ...         ...  ...          ...   ...    ...
886    man        True  NaN  Southampton    no   True
887  woman       False    B  Southampton   yes   True
888  woman       False  NaN  Southampton    no  False
889    man        True    C    Cherbourg   yes   True
890    man        True  NaN   Queenstown    no   True

[891 rows x 15 columns]>
```

In [69]:
```
df2 = df["age"].mean()
df2
```

Out[69]:
```
29.69911764705882
```

In [70]:
```
df3=df["age"].median
df3
```

Out[70]:
```
<bound method NDFrame._add_numeric_operations.<locals>.median of 0      22.0
1      38.0
2      26.0
3      35.0
4      35.0
       ...
886    27.0
887    19.0
888     NaN
889    26.0
890    32.0
Name: age, Length: 891, dtype: float64>
```

In [72]:
```
df4=df["age"].mode
df4
```

Out[72]:
```
<bound method Series.mode of 0      22.0
1      38.0
2      26.0
3      35.0
4      35.0
       ...
886    27.0
887    19.0
888     NaN
889    26.0
890    32.0
Name: age, Length: 891, dtype: float64>
```

In [ ]:

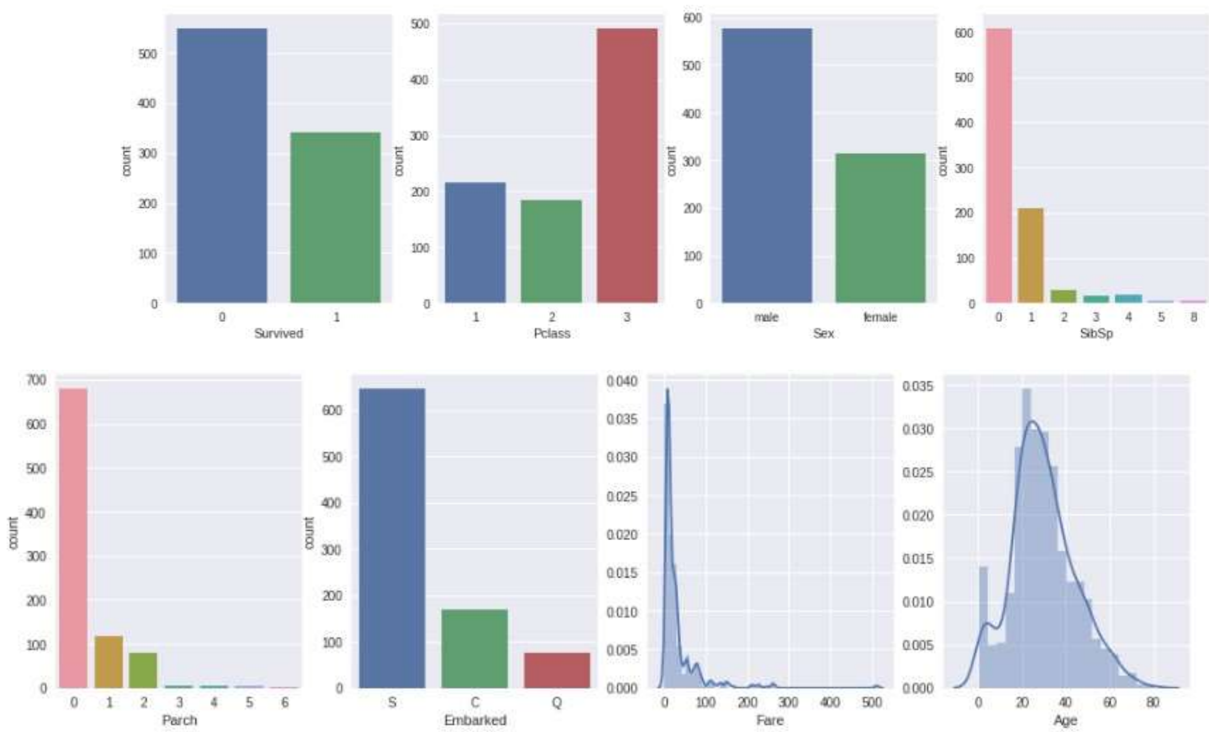
#UNIVARIATE ANALYSIS

In [17]:

```
fig, axes = plt.subplots(2, 4, figsize=(16, 10))
sns.countplot('Survived',data=train,ax=axes[0,0])
sns.countplot('Pclass',data=train,ax=axes[0,1])
sns.countplot('Sex',data=train,ax=axes[0,2])
sns.countplot('SibSp',data=train,ax=axes[0,3])
sns.countplot('Parch',data=train,ax=axes[1,0])
sns.countplot('Embarked',data=train,ax=axes[1,1])
sns.distplot(train['Fare'], kde=True,ax=axes[1,2])
sns.distplot(train['Age'].dropna(),kde=True,ax=axes[1,3])
```

Out[17]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7ffa6366bdd8>
```



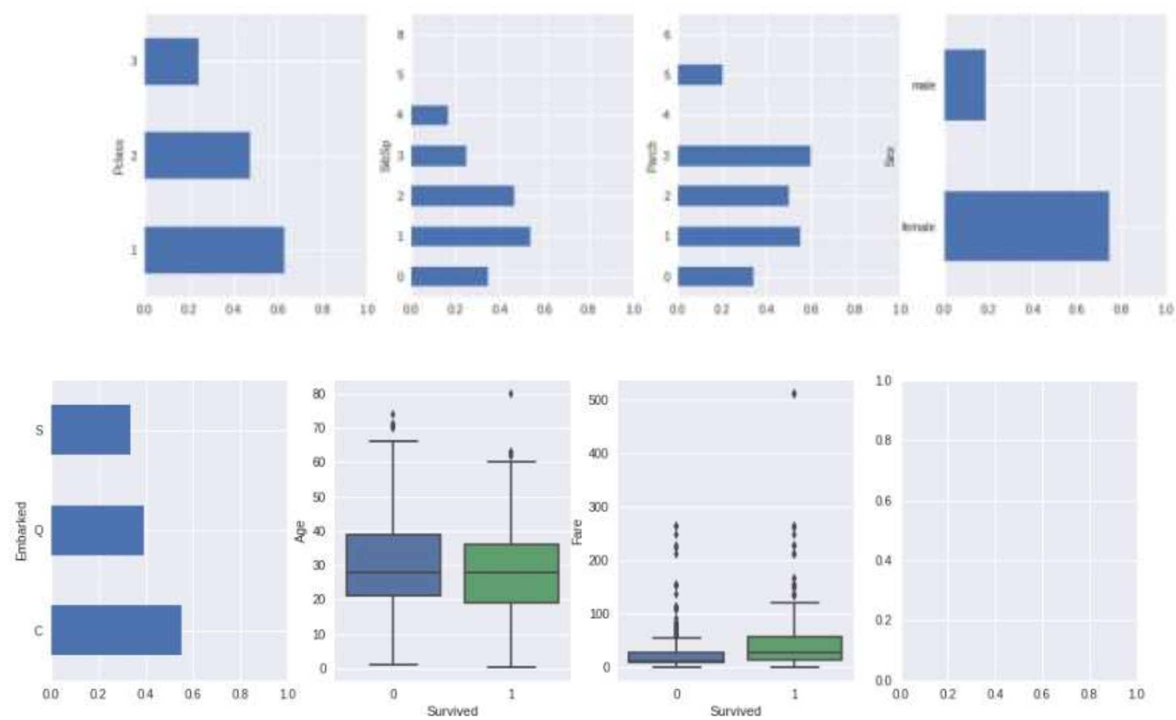
BIVRIATE ANALYSIS

In [18]:

```
figbi, axesbi = plt.subplots(2, 4, figsize=(16, 10))
train.groupby('Pclass')['Survived'].mean().plot(kind='barh',ax=axesbi[0,0],xlim=[0,1])
train.groupby('SibSp')['Survived'].mean().plot(kind='barh',ax=axesbi[0,1],xlim=[0,1])
train.groupby('Parch')['Survived'].mean().plot(kind='barh',ax=axesbi[0,2],xlim=[0,1])
train.groupby('Sex')['Survived'].mean().plot(kind='barh',ax=axesbi[0,3],xlim=[0,1])
train.groupby('Embarked')['Survived'].mean().plot(kind='barh',ax=axesbi[1,0],xlim=[0,1])
sns.boxplot(x="Survived", y="Age", data=train,ax=axesbi[1,1])
sns.boxplot(x="Survived", y="Fare", data=train,ax=axesbi[1,2])
```

Out[18]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7ffa631ff9e8>
```



MULTIVARIATE ANALYSIS

In [20]:

```
import seaborn as sns

f, ax = plt.subplots(figsize=(10, 8))
corr = train.corr()
sns.heatmap(corr,
            mask=np.zeros_like(corr, dtype=np.bool),
            cmap=sns.diverging_palette(220, 10, as_cmap=True),
            square=True, ax=ax)
```

Out[20]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7ffa590f7160>
```