1. IMPORTING ALL THE LIBRARIES

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

2. IMPORTING THE DATASET

```
df = pd.read_csv("Titanic-Dataset.csv")
```

```
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
```

```
df.describe()
```

	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
count	891.000000	891.000000	891.000000	714.000000	891.000000	891.000000	891.000000
mean	446.000000	0.383838	2.308642	29.699118	0.523008	0.381594	32.204208
std	257.353842	0.486592	0.836071	14.526497	1.102743	0.806057	49.693429
min	1.000000	0.000000	1.000000	0.420000	0.000000	0.000000	0.000000
25%	223.500000	0.000000	2.000000	20.125000	0.000000	0.000000	7.910400
50%	446.000000	0.000000	3.000000	28.000000	0.000000	0.000000	14.454200
75%	668.500000	1.000000	3.000000	38.000000	1.000000	0.000000	31.000000
max	891.000000	1.000000	3.000000	80.000000	8.000000	6.000000	512.329200

```
df.head()
```

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN

3. Checking for null values

```
df.isnull().any()
```

```
PassengerId    False
Survived       False
Pclass         False
Name           False
Sex            False
Age             True
SibSp          False
Parch          False
Ticket         False
Fare           False
Cabin           True
Embarked        True
dtype: bool
```

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

```
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
```

Dropping all the irrevelant columns

we drop cabin column because 77% of the data is null in that column

```
df.drop(['PassengerId', 'Name', 'Ticket', 'Cabin'], axis = 1, inplace = True)
```

Impute the mean value of age in place of null values

```
df["Age"] = df["Age"].fillna(df["Age"].mode()[0])
```

As Embarked is also categorical value -- impute it with mode of the value

```
df["Embarked"] = df["Embarked"].fillna(df["Embarked"].mode()[0])
```

```
df.isnull().any()
```

```
Survived    False
Pclass      False
Sex         False
Age         False
SibSp       False
Parch       False
Fare        False
Embarked    False
dtype: bool
```

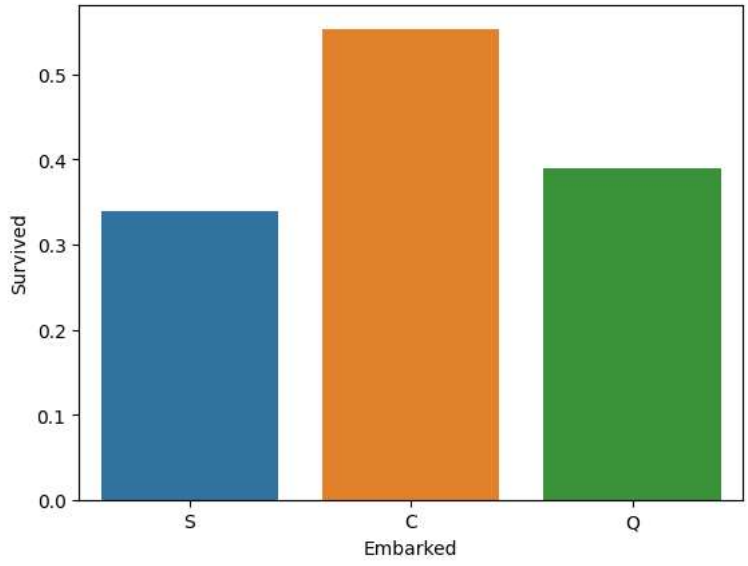
4. Data Visualization

```
sns.heatmap(df.corr(), annot = True)
```

```
<ipython-input-44-fe43fffaf13b>:1: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version
  sns.heatmap(df.corr(), annot = True)
<Axes: >
```

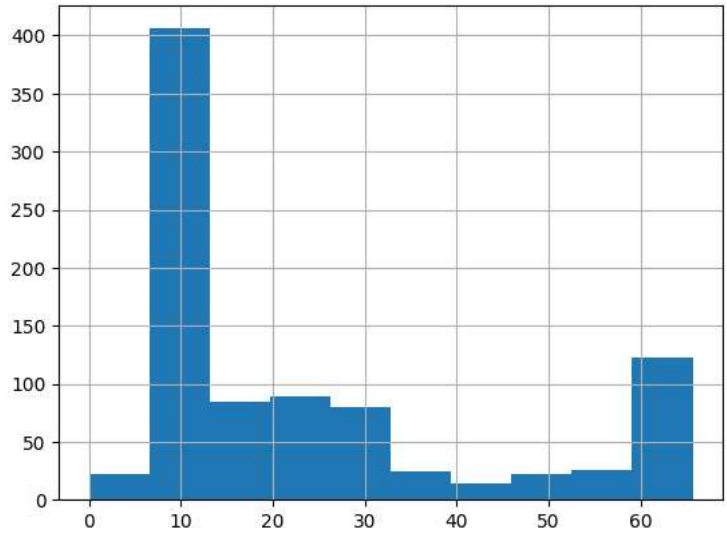

```
sns.barplot(x = "Embarked", y = "Survived", data = df, ci = None)
```

```
<ipython-input-14-6f27886c73a2>:1: FutureWarning:

The `ci` parameter is deprecated. Use `errorbar=None` for the same effect.

  sns.barplot(x = "Embarked", y = "Survived", data = df, ci = None)
<Axes: xlabel='Embarked', ylabel='Survived'>
```



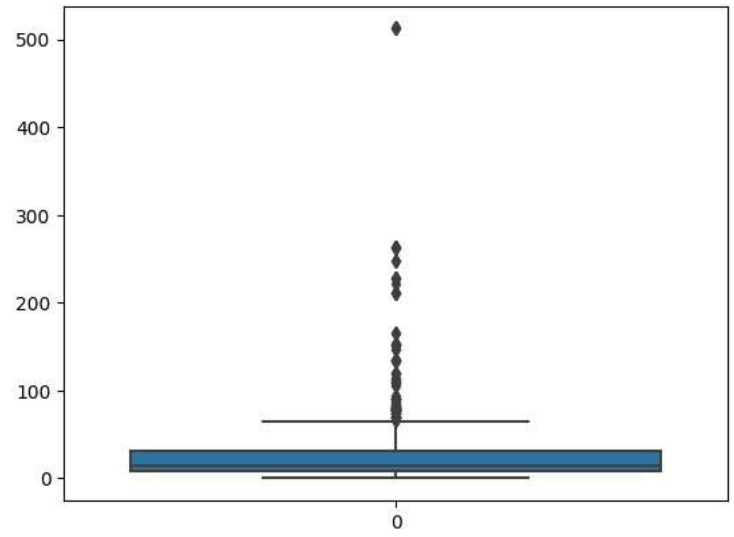

```
df['Fare'].hist()
```

```
<Axes: >
```



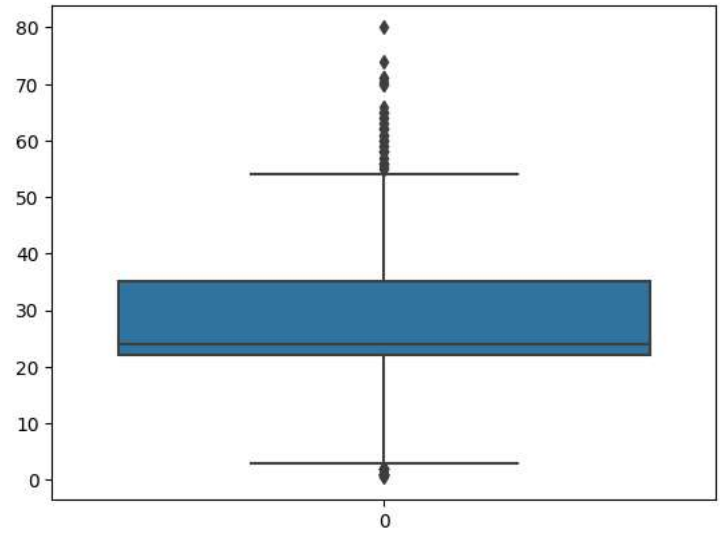

```
sns.boxplot(df.Fare)
```

```
<Axes: >
```




```
sns.boxplot(df.Age)
```

```
<Axes: >
```



5. Outlier detection

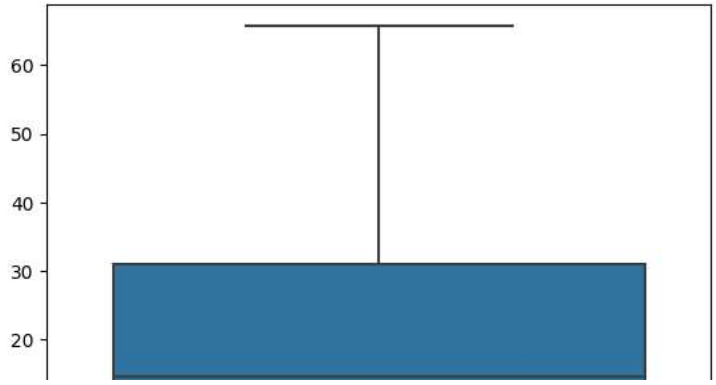
As we see from the above two boxplots, fare and age columns have outliers that needs to be deleted so as to increase accuracy of prediction

FOR OUTLIERS IN AGE --- Using IQR method as it given better performance

```
Q1 = df['Fare'].quantile(0.25)
Q3 = df['Fare'].quantile(0.75)
IQR = Q3 - Q1
d = 1.5
lower_lim = Q1 -(d*IQR)
upper_lim = Q3 + (d*IQR)
df['Fare']=np.where(df['Fare']>upper_lim,upper_lim,np.where(df['Fare']<lower_lim,lower_lim,df['Fare']))
```

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

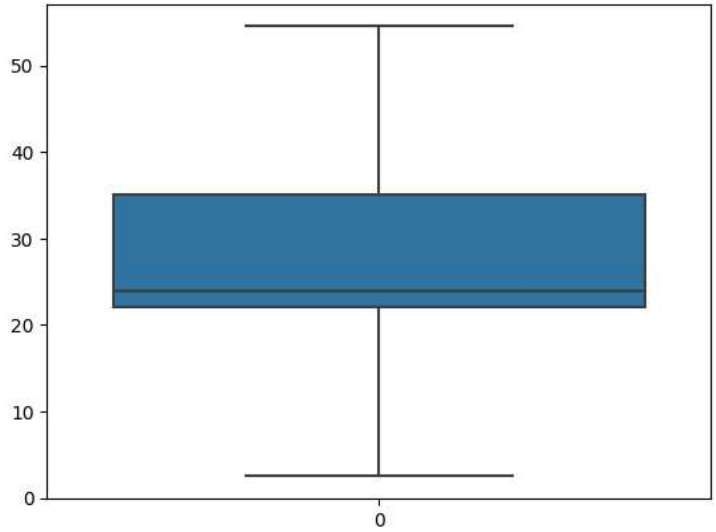
```
<Axes: >
```



Using the same technique for removing outliers in Age column

```
q1 = df['Age'].quantile(0.25)
q3 = df['Age'].quantile(0.75)
iqr = q3 - q1
D = 1.5
lower_lim1 = q1 -(D*iqr)
upper_lim1 = q3 + (D*iqr)
df['Age']=np.where(df['Age']>upper_lim1,upper_lim1,np.where(df['Age']<lower_lim1,lower_lim1,df['Age']))


sns.boxplot(df.Age)
```

```
<Axes: >
```

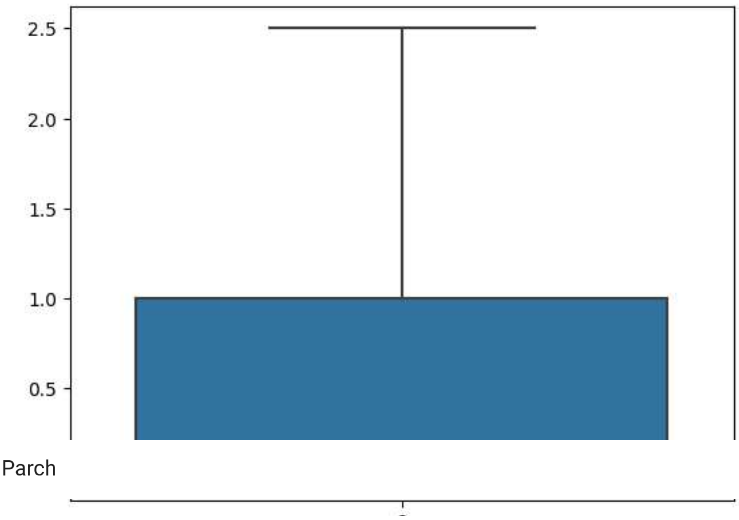


We also remove the outliers in SibSp and Parch columns

For SibSp

```
Q1 = df['SibSp'].quantile(0.25)
Q3 = df['SibSp'].quantile(0.75)
IQR = Q3 - Q1
d = 1.5
lower_lim = Q1 - (d*IQR)
upper_lim = Q3 + (d*IQR)
df['SibSp']=np.where(df['SibSp']>upper_lim,upper_lim,np.where(df['SibSp']<lower_lim,lower_lim,df['SibSp']))


sns.boxplot(df.SibSp)
```

```
<Axes: >
```

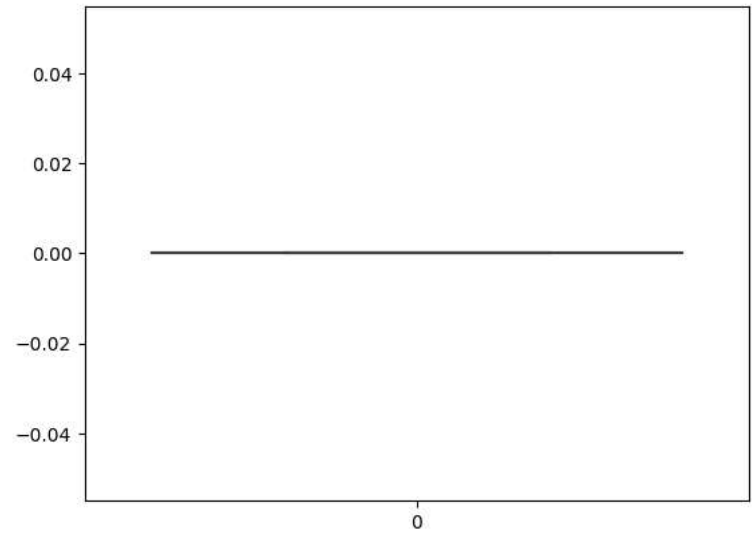


For Parch

```
Q1 = df['Parch'].quantile(0.25)
Q3 = df['Parch'].quantile(0.75)
IQR = Q3 - Q1
d = 1.5
lower_lim = Q1 - (d*IQR)
upper_lim = Q3 + (d*IQR)
df['Parch']=np.where(df['Parch']>upper_lim,upper_lim,np.where(df['Parch']<lower_lim,lower_lim,df['Parch']))
```

```
sns.boxplot(df.Parch)
```

```
<Axes: >
```



Finally we again check if any columns have outliers

```
sns.boxplot(df)
```

```
<Axes: >
```

6. Splitting the data into dependent and independent variables

```
x = df.drop(columns = ["Survived"], axis = 1) # Independent variables in the form of 2-D array
y = df["Survived"] # Survived column is the only dependent varaible here
```

```
x.head()
```

	Pclass	Sex	Age	SibSp	Parch	Fare	Embarked
0	3	male	22.0	1.0	0.0	7.2500	S
1	1	female	38.0	1.0	0.0	65.6344	C
2	3	female	26.0	0.0	0.0	7.9250	S
3	1	female	35.0	1.0	0.0	53.1000	S
4	3	male	35.0	0.0	0.0	8.0500	S

```
y.head()
```

```
0    0
1    1
2    1
3    1
4    0
Name: Survived, dtype: int64
```

7. Encoding the categorical columns

```
from sklearn.preprocessing import LabelEncoder
le = LabelEncoder()
```

```
x["Sex"] = le.fit_transform(x["Sex"])
x["Embarked"] = le.fit_transform(x["Embarked"])
x.head()
```

	Pclass	Sex	Age	SibSp	Parch	Fare	Embarked
0	3	1	22.0	1.0	0.0	7.2500	2
1	1	0	38.0	1.0	0.0	65.6344	0
2	3	0	26.0	0.0	0.0	7.9250	2
3	1	0	35.0	1.0	0.0	53.1000	2
4	3	1	35.0	0.0	0.0	8.0500	2

8. Feature Scaling -- Bringing all the independent variables in a single scalable format in order to process them

```
from sklearn.preprocessing import MinMaxScaler
ms = MinMaxScaler()
```

```
x_scaled = pd.DataFrame(ms.fit_transform(x), columns = x.columns)
```

9. Splitting the data in train test set

```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x_scaled, y, test_size = 0.2, random_state = 0)
```

```
x_train.head()
```

	Pclass	Sex	Age	SibSp	Parch	Fare	Embarked
140	1.0	0.0	0.413462	0.0	0.0	0.232284	0.0
439	0.5	1.0	0.548077	0.0	0.0	0.159977	1.0
817	0.5	1.0	0.548077	0.4	0.0	0.563793	0.0
378	1.0	1.0	0.336538	0.0	0.0	0.061134	0.0
491	1.0	1.0	0.355769	0.0	0.0	0.110460	1.0

```
x_test.head()
```

	Pclass	Sex	Age	SibSp	Parch	Fare	Embarked
495	1.0	1.0	0.413462	0.0	0.0	0.220285	0.0
648	1.0	1.0	0.413462	0.0	0.0	0.115031	1.0
278	1.0	1.0	0.086538	1.0	0.0	0.443746	0.5
31	0.0	0.0	0.413462	0.4	0.0	1.000000	0.0
255	1.0	0.0	0.509615	0.0	0.0	0.232284	0.0

```
y_train.head()
```

```
140    0
439    0
817    0
378    0
491    0
Name: Survived, dtype: int64
```

```
y_test.head()
```

```
495    0
648    0
278    0
31     1
255    1
Name: Survived, dtype: int64
```

```
print(x_train.shape, x_test.shape, y_train.shape, y_test.shape)
```

```
(712, 7) (179, 7) (712,) (179,)
```