Practical No 01

Data Wrangling, I Perform the following operations using Python on any open source dataset (e.g., data.csv) Import all the required Python Libraries. Locate an open source data from the web (e.g. https://www.kaggle.com). Provide a clear description of the data and its source (i.e., URL of the web site).

Import all the python Libraries

In [2]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

Load the Dataset into pandas data frame.

In [3]:
```
df = pd.read_csv('titanic_train.csv')
df
```

Out [3]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	S
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	S
...	...	...	...	...	...	...	...	...	...	...	...	...
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.0000	NaN	S
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.0000	B42	S
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.4500	NaN	S
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.0000	C148	C
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.7500	NaN	Q

891 rows × 12 columns

In [4]:
```
df.head() # It's showing top 5 result
```

Out [4]:

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

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	S

In [5]:
```
df.tail() # It's showing bottom 5 result
```

Out [5]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.00	NaN	S
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.00	B42	S
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.45	NaN	S
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.00	C148	C
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.75	NaN	Q

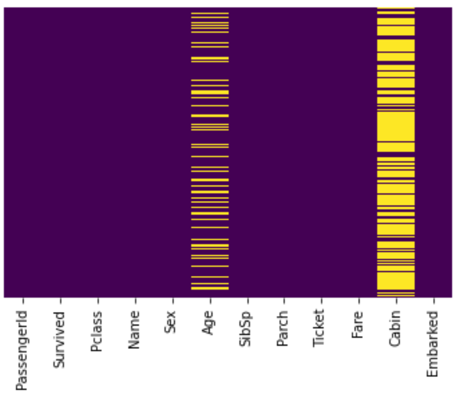
Data Preprocessing: check for missing values in the data using pandas insult(), describe() function to get some initial statistics. Provide variable descriptions. Types of variables etc. Check the dimensions of the data frame.

In [6]:
```
df.isnull().sum() # Caluclating the Null values
```

Out [6]:
```
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 [7]:
```
sns.heatmap(df.isnull(),yticklabels=False,cbar=False,cmap='viridis') # Finding Null values by usir
```

Out [7]:
```
<AxesSubplot:>
```



In [8]:
```
df['Age'].isnull().sum() # Calcualting the Null Values in AGE Columns
```

Out [8]:
```
177
```

In [9]:
```
df['Cabin'].isnull().sum() # Calcualting the Null Values in Cabin Columns
```

Out [9]:
```
687
```

In [10]:
```
df.describe() # Get some initial statistics.
```

Out [10]:

	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

	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
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

In [11]:
```
df.info() # Getting some informatation about dataset
```

```
<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 [12]:
```
df.dtypes # Finding Data Types
```

Out [12]:
```
PassengerId      int64
Survived         int64
Pclass           int64
Name            object
Sex             object
Age            float64
SibSp            int64
Parch            int64
Ticket          object
Fare           float64
Cabin           object
Embarked        object
dtype: object
```

In [13]:
```
df.shape # Finding Dimensions of the data frame.
```

Out [13]:
```
(891, 12)
```

Making Impute function for filling Null values

In [14]:
```
def impute_age(cols):
    Age = cols[0]
    Pclass = cols[1]

    if pd.isnull(Age):

        if Pclass == 1:
            return 37

        elif Pclass == 2:
            return 29

        else:
            return 24

    else:
        return Age
```

In [15]:
```
df['Age'] = df[['Age','Pclass']].apply(impute_age,axis=1) # Appyling the function
```

In [16]:
```
df.drop('Cabin',axis=1,inplace=True) # Droping Cabin Column becasue here lots of null values so it
```

In [17]:
```
df.dropna(inplace=True)
```

In [18]:
```
df.head()
```

Out [18]:

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

In [19]:

```
df.tail()
```

Out [19]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Embarked
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.00	S
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.00	S
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	24.0	1	2	W./C. 6607	23.45	S
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.00	C
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.75	Q

In [20]:

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

Out [20]:

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

Data Formatting and Data Normalization: Summarize the types of variables by checking the data types (i.e., character, numeric, integer, factor, and logical) of the variables in the data set. If variables are not in the correct data type, apply proper type conversions.

In [21]:

```
df['Age'] = df['Age'].astype('int') # Data Type Coversion
```

In [22]:

```
df.dtypes
```

Out [22]:

```
PassengerId      int64
Survived         int64
Pclass           int64
Name            object
Sex             object
Age              int64
SibSp            int64
Parch            int64
Ticket          object
Fare           float64
Embarked        object
dtype: object
```

In [23]:

```
df['Age'] = df['Age'].round(0).astype('int')  # Data Type Coversion
```

In [24]:

```
df.dtypes
```

Out [24]:

```
PassengerId      int64
Survived         int64
Pclass           int64
Name            object
Sex             object
Age              int64
SibSp            int64
Parch            int64
Ticket          object
Fare           float64
Embarked        object
dtype: object
```

In [25]:

```
df.head()
```

Out [25]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Embarked
0	1	0	3	Braund, Mr. Owen Harris	male	22	1	0	A/5 21171	7.2500	S
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38	1	0	PC 17599	71.2833	C
2	3	1	3	Heikkinen, Miss. Laina	female	26	0	0	STON/O2. 3101282	7.9250	S
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35	1	0	113803	53.1000	S
4	5	0	3	Allen, Mr. William Henry	male	35	0	0	373450	8.0500	S

Converting Categorical Variables to Quantitative Variables

In [31]:

```
cat = pd.get_dummies(df, columns=['Sex']) # Converting Categorical Variables to Quantitative Varia
```

In [32]:

```
cat.head()
```

Out [32]:

	PassengerId	Survived	Pclass	Name	Age	SibSp	Parch	Ticket	Fare	Embarked	female	Sex_female	Sex_ma
0	1	0	3	Braund, Mr. Owen Harris	22	1	0	A/5 21171	7.2500	S	0	0	1
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	38	1	0	PC 17599	71.2833	C	1	1	0
2	3	1	3	Heikkinen, Miss. Laina	26	0	0	STON/O2. 3101282	7.9250	S	1	1	0
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	35	1	0	113803	53.1000	S	1	1	0
4	5	0	3	Allen, Mr. William Henry	35	0	0	373450	8.0500	S	0	0	1

In [33]:

```
cat['Sex_female'] # Female = 0
```

Out [33]:

```
0      0
1      1
2      1
3      1
4      0
      ..
886    0
887    1
888    1
889    0
890    0
Name: Sex_female, Length: 889, dtype: uint8
```

In [34]:

```
cat['Sex_male'] # Male = 1
```

Out [34]:

```
0      1
1      0
2      0
3      0
4      1
      ..
886    1
887    0
888    0
889    1
890    1
Name: Sex_male, Length: 889, dtype: uint8
```

--------- END ---------