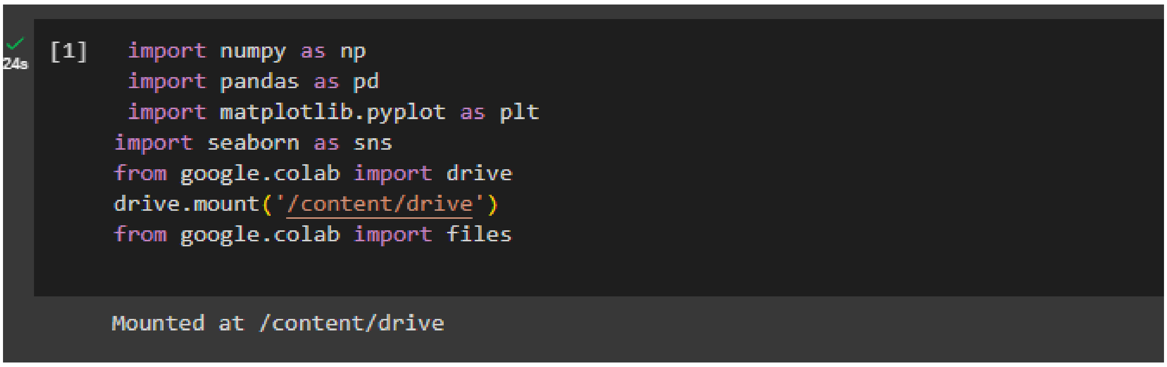
Prodigy InfoTech Internship

Task 2

Perform data cleaning and exploratory data analysis (EDA) on a dataset of your choice, such as the Titanic dataset from Kaggle. Explore the relationships between variables and identify patterns and trends in the data.

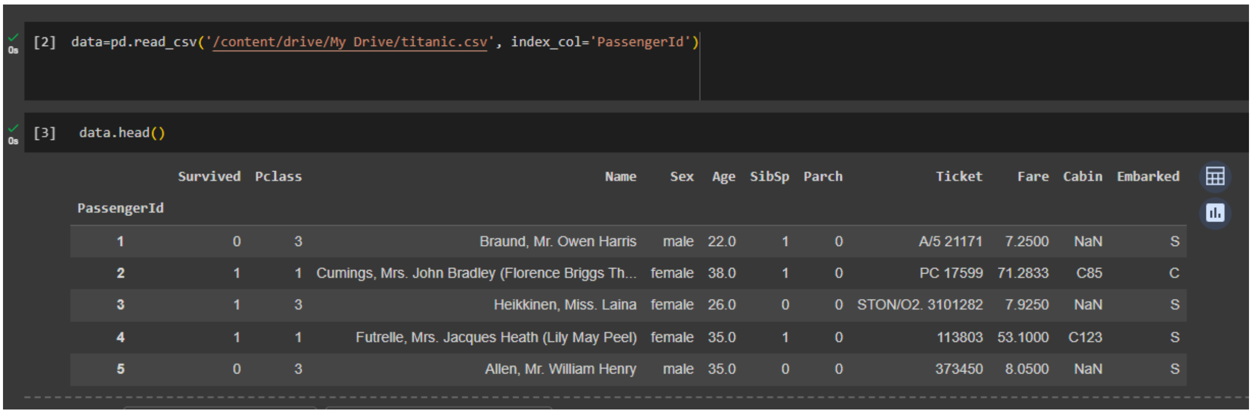
Sample Dataset:- Titanic Dataset



```
[1]  import numpy as np
     import pandas as pd
     import matplotlib.pyplot as plt
    import seaborn as sns
    from google.colab import drive
    drive.mount('/content/drive')
    from google.colab import files

    Mounted at /content/drive
```

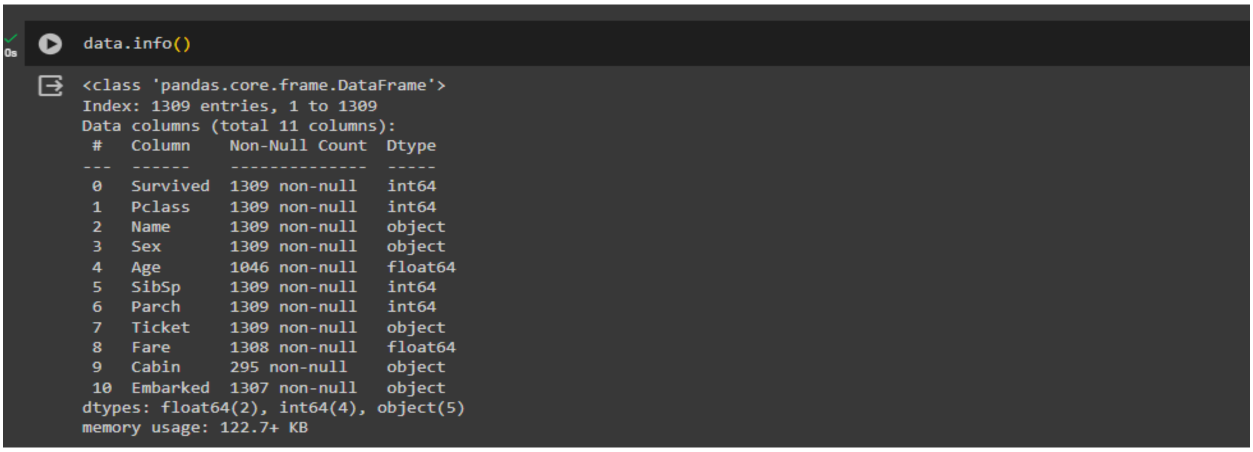
➢ Understanding the shape of the Dataset:



```
[2] data=pd.read_csv('/content/drive/My Drive/titanic.csv', index_col='PassengerId')
```

```
[3] data.head()
```

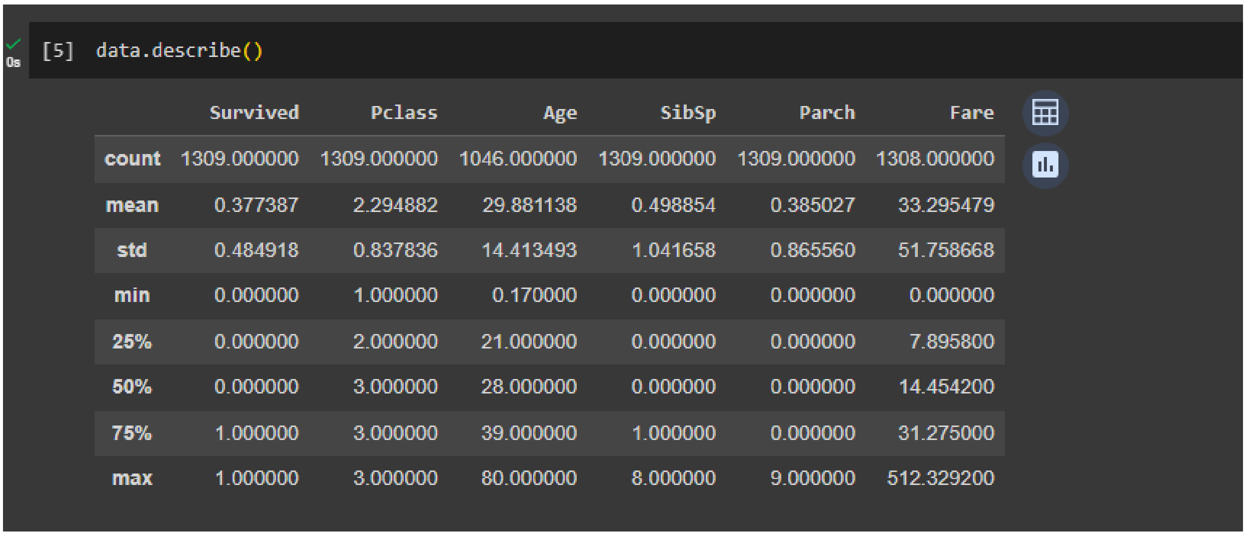
	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
PassengerId											
1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S
2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2.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



```
data.info()

<class 'pandas.core.frame.DataFrame'>
Index: 1309 entries, 1 to 1309
Data columns (total 11 columns):
 #   Column    Non-Null Count  Dtype  
---  ------    --------------  -----  
 0   Survived  1309 non-null   int64  
 1   Pclass    1309 non-null   int64  
 2   Name      1309 non-null   object 
 3   Sex       1309 non-null   object 
 4   Age       1046 non-null   float64
 5   SibSp     1309 non-null   int64  
 6   Parch     1309 non-null   int64  
 7   Ticket    1309 non-null   object 
 8   Fare      1308 non-null   float64
 9   Cabin     295 non-null    object 
 10  Embarked  1307 non-null   object 
dtypes: float64(2), int64(4), object(5)
memory usage: 122.7+ KB
```

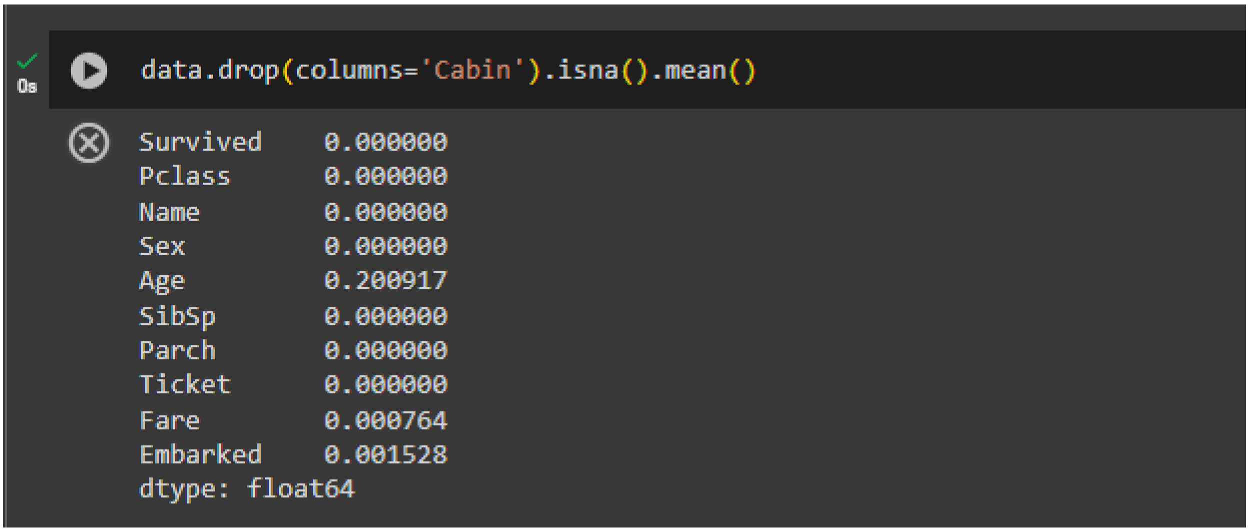
By :- Amolak Singh
singhamolak974@gmail.com



```
[5] data.describe()
```

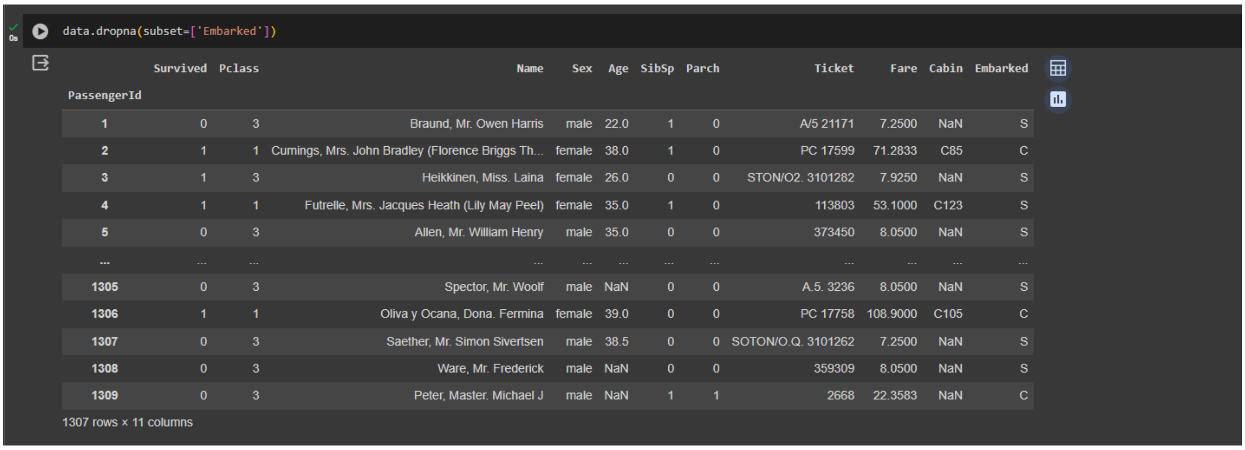
	Survived	Pclass	Age	SibSp	Parch	Fare
count	1309.000000	1309.000000	1046.000000	1309.000000	1309.000000	1308.000000
mean	0.377387	2.294882	29.881138	0.498854	0.385027	33.295479
std	0.484918	0.837836	14.413493	1.041658	0.865560	51.758668
min	0.000000	1.000000	0.170000	0.000000	0.000000	0.000000
25%	0.000000	2.000000	21.000000	0.000000	0.000000	7.895800
50%	0.000000	3.000000	28.000000	0.000000	0.000000	14.454200
75%	1.000000	3.000000	39.000000	1.000000	0.000000	31.275000
max	1.000000	3.000000	80.000000	8.000000	9.000000	512.329200

➢ Data Cleaning:



```
data.drop(columns='Cabin').isna().mean()
```

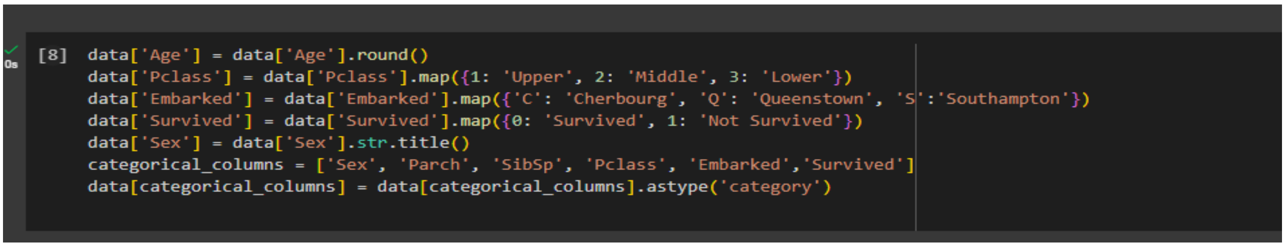
```
Survived    0.000000
Pclass      0.000000
Name        0.000000
Sex         0.000000
Age         0.200917
SibSp       0.000000
Parch       0.000000
Ticket      0.000000
Fare        0.000764
Embarked    0.001528
dtype: float64
```



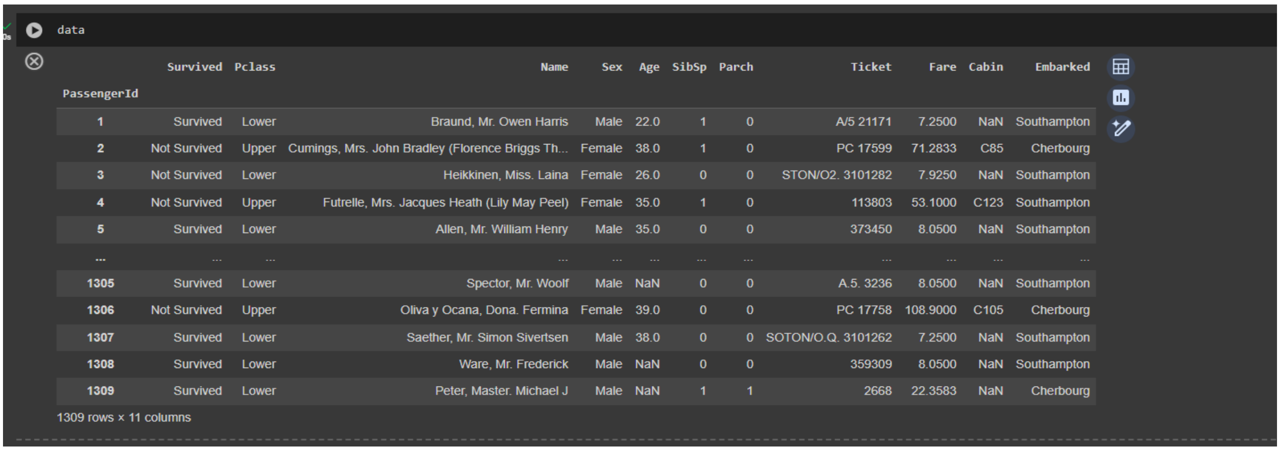
```
data.dropna(subset=['Embarked'])
```

	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
PassengerId											
1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S
2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	S
4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S
5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	S
...	...	...	...	...	...	...	...	...	...	...	...
1305	0	3	Spector, Mr. Woolf	male	NaN	0	0	A.5. 3236	8.0500	NaN	S
1306	1	1	Oliva y Ocana, Dona. Fermina	female	39.0	0	0	PC 17758	108.9000	C105	C
1307	0	3	Saether, Mr. Simon Sivertsen	male	38.5	0	0	SOTON/O.Q. 3101262	7.2500	NaN	S
1308	0	3	Ware, Mr. Frederick	male	NaN	0	0	359309	8.0500	NaN	S
1309	0	3	Peter, Master. Michael J	male	NaN	1	1	2668	22.3583	NaN	C

1307 rows × 11 columns



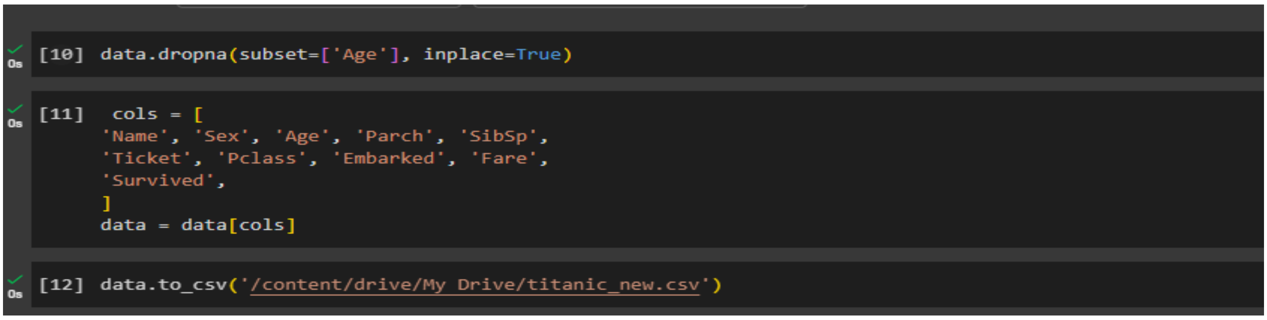
```
[8]  data['Age'] = data['Age'].round()
     data['Pclass'] = data['Pclass'].map({1: 'Upper', 2: 'Middle', 3: 'Lower'})
     data['Embarked'] = data['Embarked'].map({'C': 'Cherbourg', 'Q': 'Queenstown', 'S':'Southampton'})
     data['Survived'] = data['Survived'].map({0: 'Survived', 1: 'Not Survived'})
     data['Sex'] = data['Sex'].str.title()
     categorical_columns = ['Sex', 'Parch', 'SibSp', 'Pclass', 'Embarked','Survived']
     data[categorical_columns] = data[categorical_columns].astype('category')
```



```
data
```

PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
1	Survived	Lower	Braund, Mr. Owen Harris	Male	22.0	1	0	A/5 21171	7.2500	NaN	Southampton
2	Not Survived	Upper	Cumings, Mrs. John Bradley (Florence Briggs Th...	Female	38.0	1	0	PC 17599	71.2833	C85	Cherbourg
3	Not Survived	Lower	Heikkinen, Miss. Laina	Female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	Southampton
4	Not Survived	Upper	Futrelle, Mrs. Jacques Heath (Lily May Peel)	Female	35.0	1	0	113803	53.1000	C123	Southampton
5	Survived	Lower	Allen, Mr. William Henry	Male	35.0	0	0	373450	8.0500	NaN	Southampton
...	...	...	...	...	...	...	...	...	...	...	...
1305	Survived	Lower	Spector, Mr. Woolf	Male	NaN	0	0	A.5. 3236	8.0500	NaN	Southampton
1306	Not Survived	Upper	Oliva y Ocana, Dona. Fermina	Female	39.0	0	0	PC 17758	108.9000	C105	Cherbourg
1307	Survived	Lower	Saether, Mr. Simon Sivertsen	Male	38.0	0	0	SOTON/O.Q. 3101262	7.2500	NaN	Southampton
1308	Survived	Lower	Ware, Mr. Frederick	Male	NaN	0	0	359309	8.0500	NaN	Southampton
1309	Survived	Lower	Peter, Master. Michael J	Male	NaN	1	1	2668	22.3583	NaN	Cherbourg

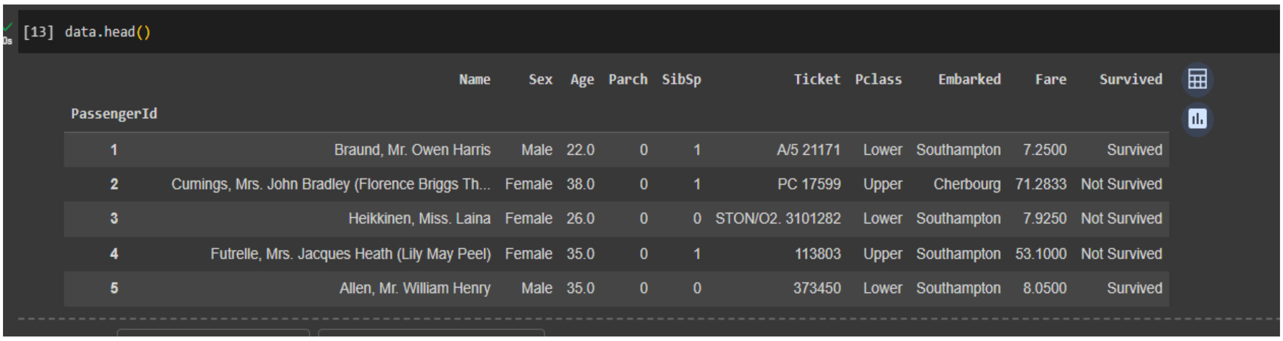
1309 rows × 11 columns



```
[10]  data.dropna(subset=['Age'], inplace=True)
```

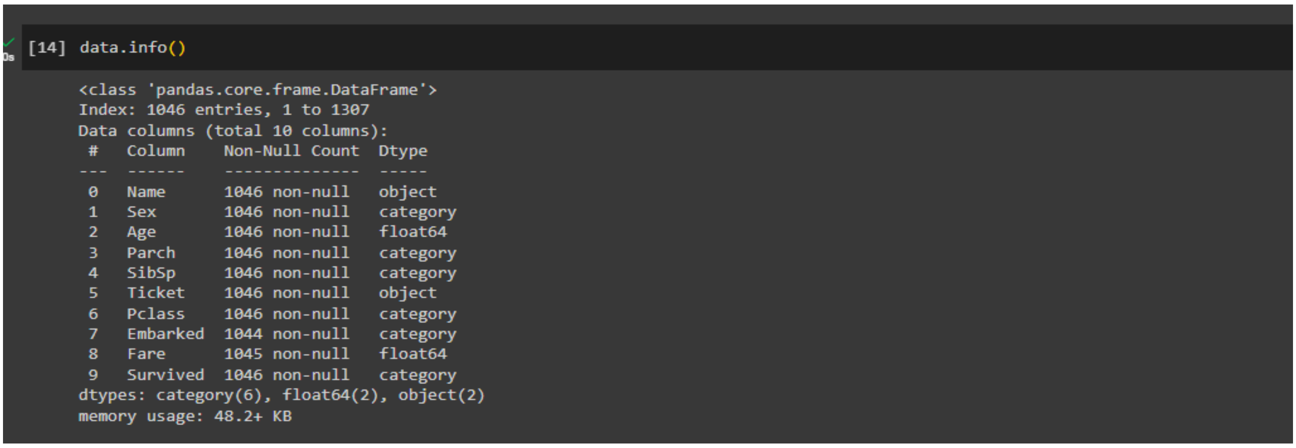
```
[11]   cols = [
      'Name', 'Sex', 'Age', 'Parch', 'SibSp',
      'Ticket', 'Pclass', 'Embarked', 'Fare',
      'Survived',
      ]
      data = data[cols]
```

```
[12]  data.to_csv('/content/drive/My Drive/titanic_new.csv')
```



```
[13] data.head()
```

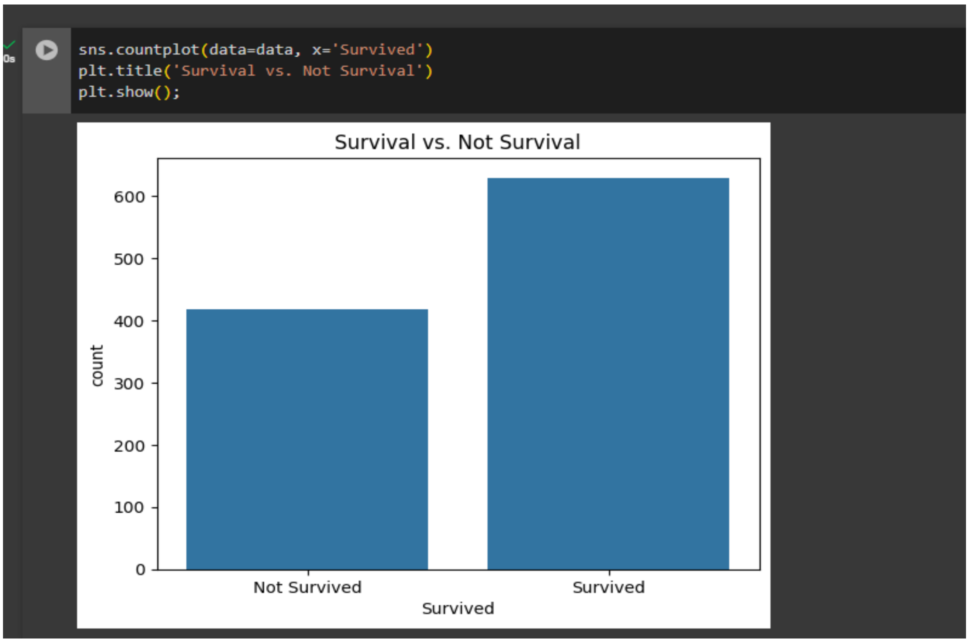
PassengerId	Name	Sex	Age	Parch	SibSp	Ticket	Pclass	Embarked	Fare	Survived
1	Braund, Mr. Owen Harris	Male	22.0	0	1	A/5 21171	Lower	Southampton	7.2500	Survived
2	Cumings, Mrs. John Bradley (Florence Briggs Th...	Female	38.0	0	1	PC 17599	Upper	Cherbourg	71.2833	Not Survived
3	Heikkinen, Miss. Laina	Female	26.0	0	0	STON/O2. 3101282	Lower	Southampton	7.9250	Not Survived
4	Futrelle, Mrs. Jacques Heath (Lily May Peel)	Female	35.0	0	1	113803	Upper	Southampton	53.1000	Not Survived
5	Allen, Mr. William Henry	Male	35.0	0	0	373450	Lower	Southampton	8.0500	Survived



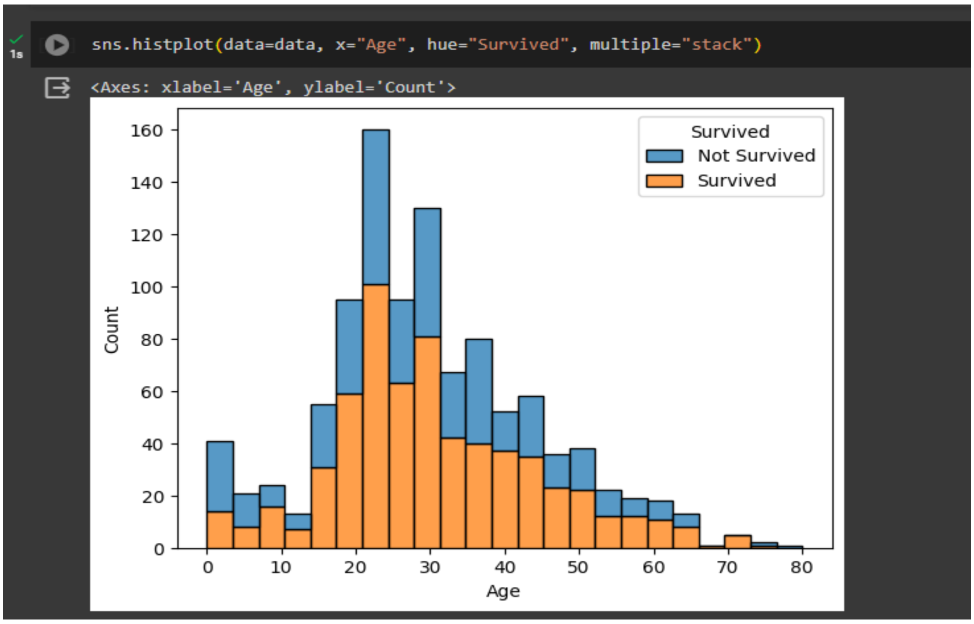
```
[14] data.info()

<class 'pandas.core.frame.DataFrame'>
Index: 1046 entries, 1 to 1307
Data columns (total 10 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   Name      1046 non-null   object
 1   Sex       1046 non-null   category
 2   Age       1046 non-null   float64
 3   Parch     1046 non-null   category
 4   SibSp     1046 non-null   category
 5   Ticket    1046 non-null   object
 6   Pclass    1046 non-null   category
 7   Embarked  1044 non-null   category
 8   Fare      1045 non-null   float64
 9   Survived  1046 non-null   category
dtypes: category(6), float64(2), object(2)
memory usage: 48.2+ KB
```

➢ Data Exploration :-

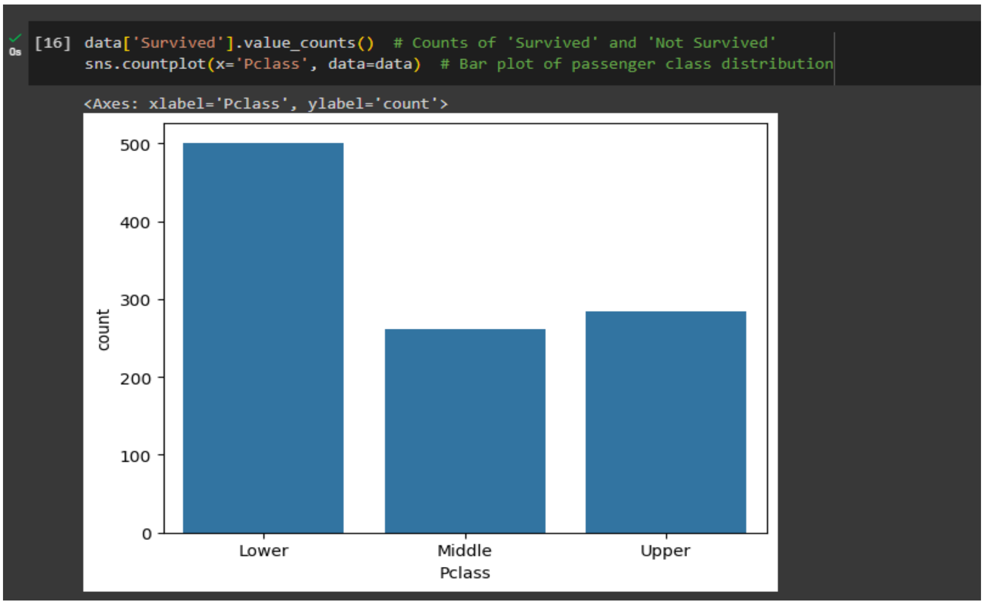


```
sns.countplot(data=data, x='Survived')
plt.title('Survival vs. Not Survival')
plt.show();
```



```
sns.histplot(data=data, x="Age", hue="Survived", multiple="stack")
```

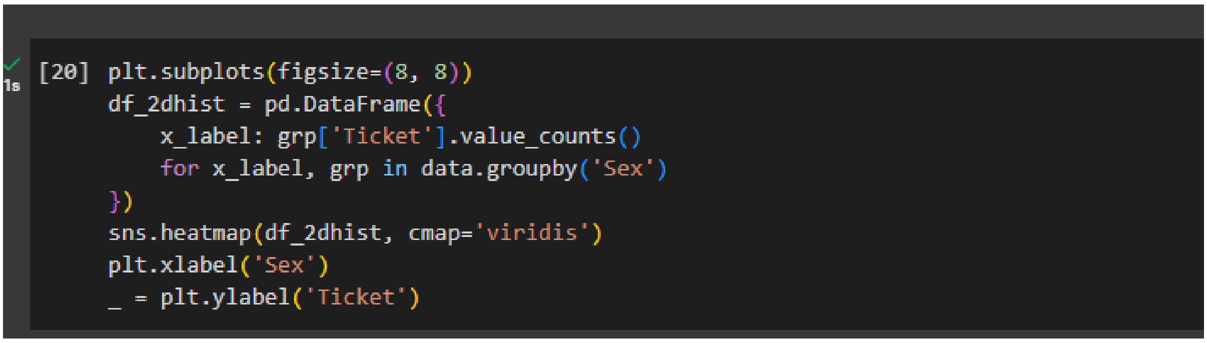
```
<Axes: xlabel='Age', ylabel='Count'>
```



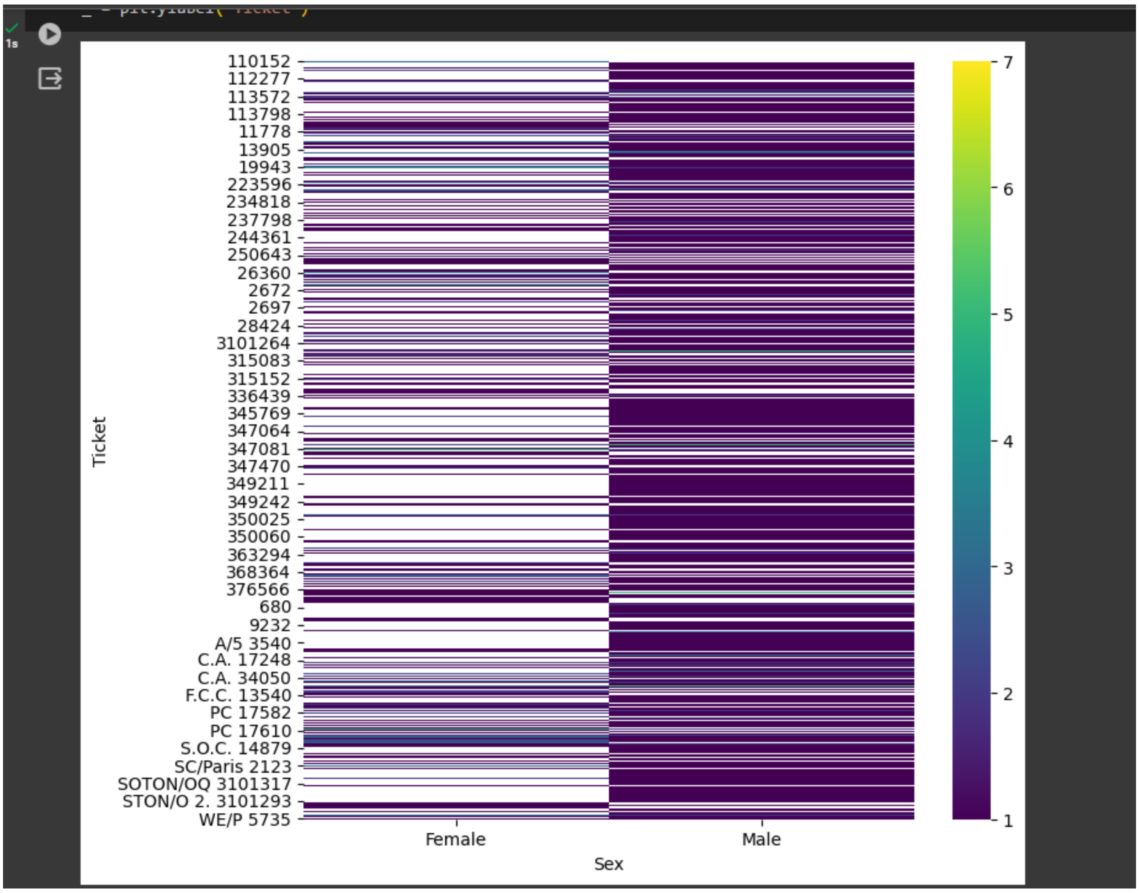
```
[16] data['Survived'].value_counts()  # Counts of 'Survived' and 'Not Survived'
     sns.countplot(x='Pclass', data=data)  # Bar plot of passenger class distribution
```

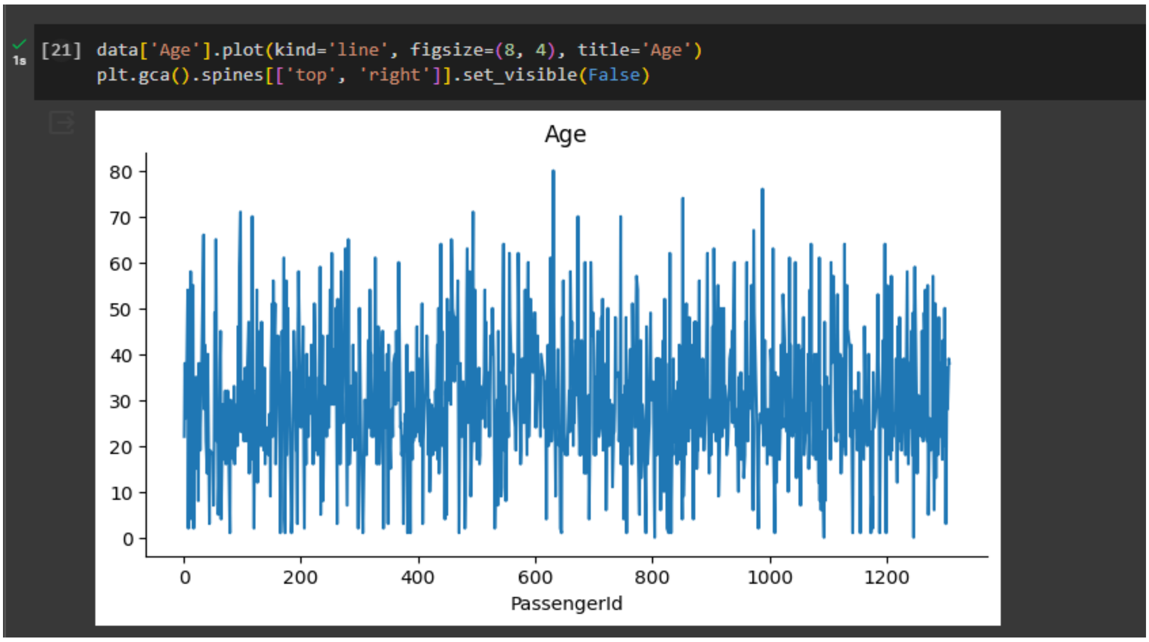
```
<Axes: xlabel='Pclass', ylabel='count'>
```

By :- Amolak Singh
singhamolak974@gmail.com



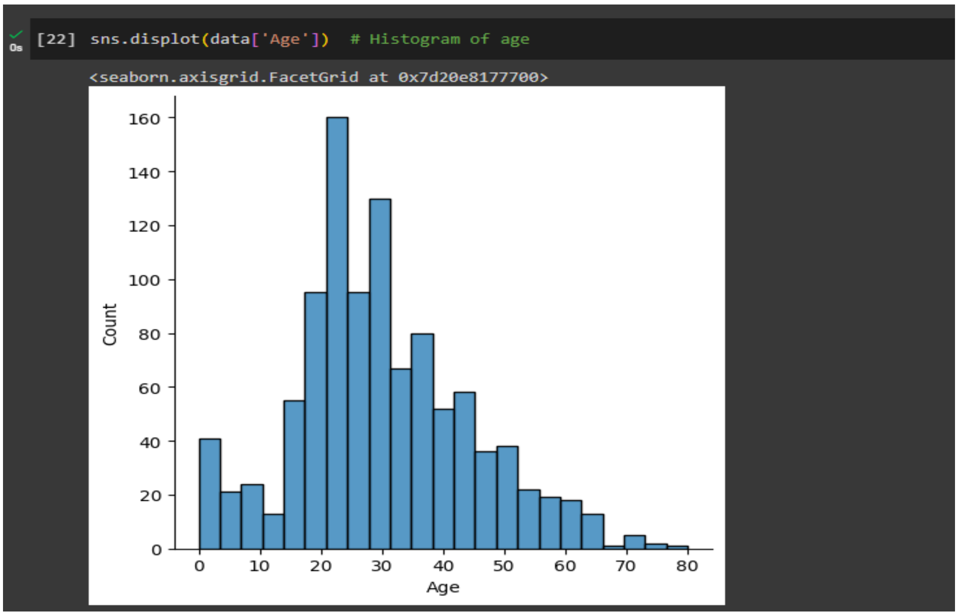
```
[20] plt.subplots(figsize=(8, 8))
     df_2dhist = pd.DataFrame({
         x_label: grp['Ticket'].value_counts()
         for x_label, grp in data.groupby('Sex')
     })
     sns.heatmap(df_2dhist, cmap='viridis')
     plt.xlabel('Sex')
     _ = plt.ylabel('Ticket')
```





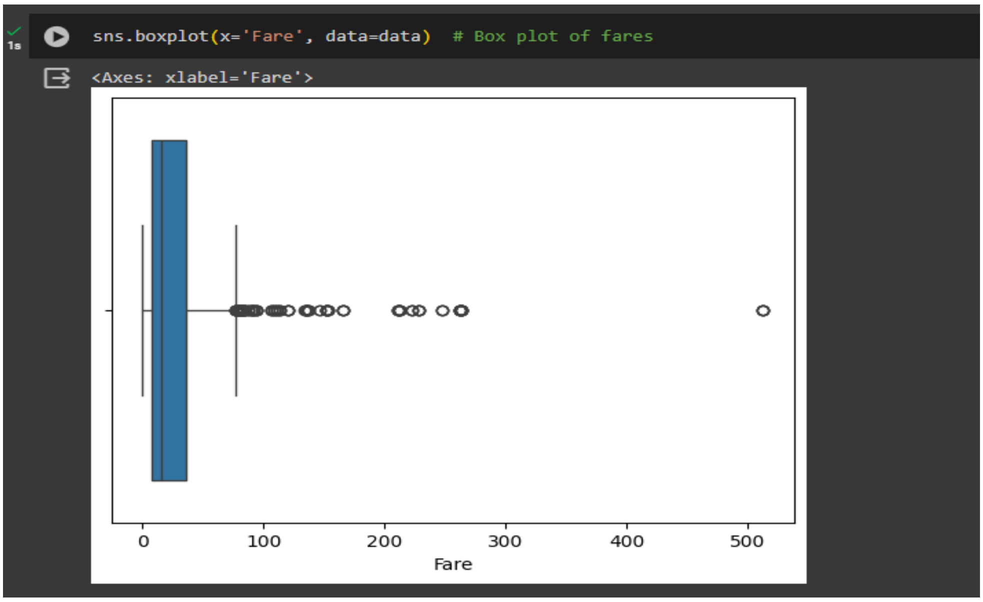
```
[21] data['Age'].plot(kind='line', figsize=(8, 4), title='Age')
     plt.gca().spines[['top', 'right']].set_visible(False)
```

By :- Amolak Singh
singhamolak974@gmail.com



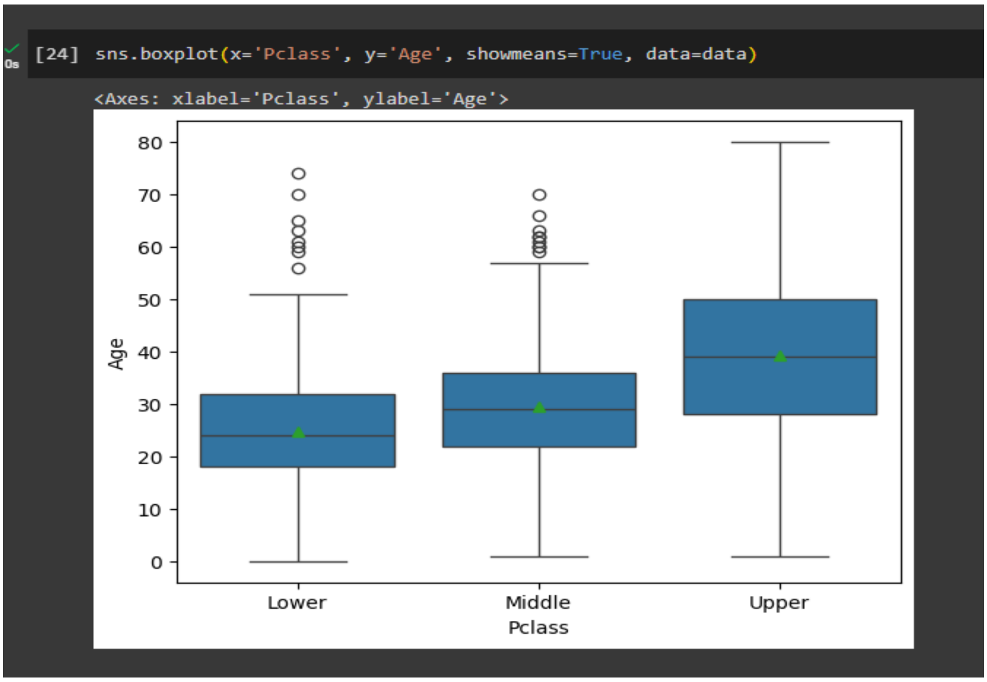
```
[22] sns.displot(data['Age'])  # Histogram of age
```

```
<seaborn.axisgrid.FacetGrid at 0x7d20e8177700>
```



```
sns.boxplot(x='Fare', data=data)  # Box plot of fares
```

```
<Axes: xlabel='Fare'>
```



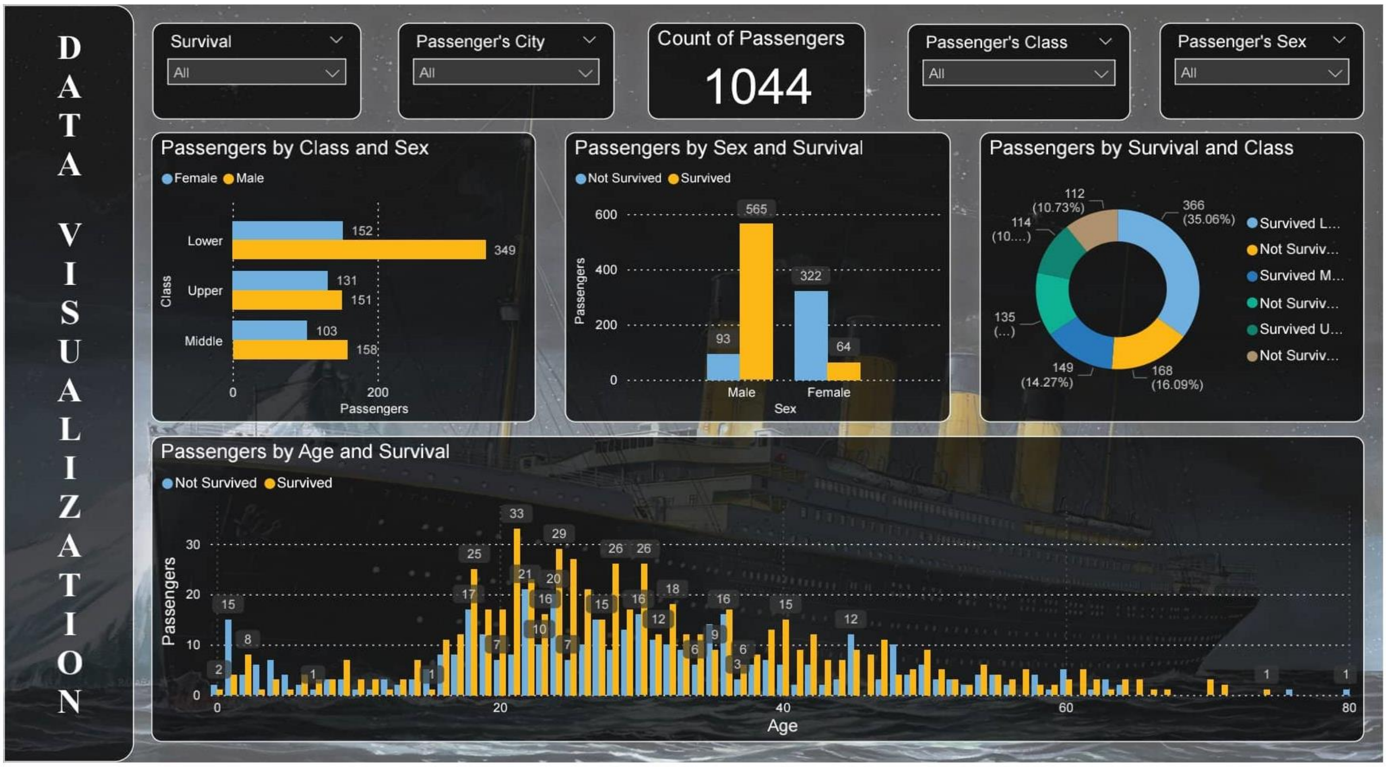
```
[24] sns.boxplot(x='Pclass', y='Age', showmeans=True, data=data)
```

```
<Axes: xlabel='Pclass', ylabel='Age'>
```

By :- Amolak Singh
singhamolak974@gmail.com

➢ Data Visualization (Using Power BI) :

You can see the analysis report using this link : Power BI Visualization (Titanic)



Survival: All

Passenger's City: All

Count of Passengers: 1044

Passenger's Class: All

Passenger's Sex: All

By :- Amolak Singh
singhamolak974@gmail.com