BHARAT INTERN TASK-2

TITANIC CLASSIFICATION

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

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

	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

```
titanic.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
```

```
titanic["Age"].fillna(titanic["Age"].mean(),inplace=True)
```

```
titanic["Embarked"].fillna(titanic["Embarked"].mode()[0],inplace=True)
```

```
titanic.isnull().sum()
```

```
PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age              0
SibSp            0
Parch            0
Ticket           0
Fare             0
Cabin          687
Embarked         0
dtype: int64
```

```
titanic
```

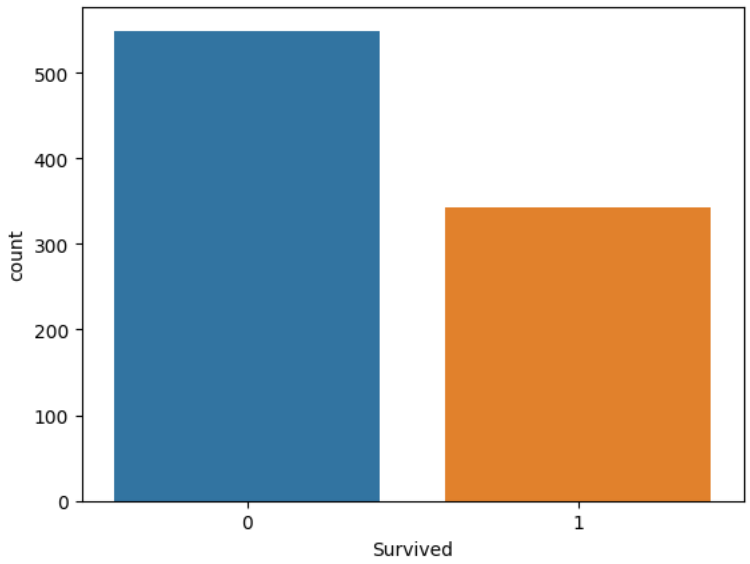
	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	1	0	3	Braund, Mr. Owen Harris	male	22.000000	1	0	A/5 21171	7.2500	NaN	S
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.000000	1	0	PC 17599	71.2833	C85	C
2	3	1	3	Heikkinen, Miss. Laina	female	26.000000	0	0	STON/O2. 3101282	7.9250	NaN	S
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.000000	1	0	113803	53.1000	C123	S
4	5	0	3	Allen, Mr. William Henry	male	35.000000	0	0	373450	8.0500	NaN	S
...	...	...	...	...	...	...	...	...	...	...	...	...

```
titanic.drop(["Name"],axis=1,inplace=True)
```

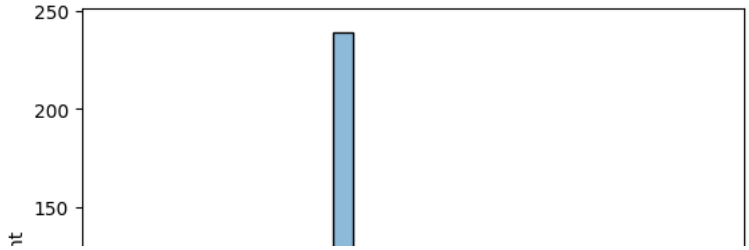
```
titanic.describe()
```

	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
count	891.000000	891.000000	891.000000	891.000000	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	13.002015	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	22.000000	0.000000	0.000000	7.910400
50%	446.000000	0.000000	3.000000	29.699118	0.000000	0.000000	14.454200
75%	668.500000	1.000000	3.000000	35.000000	1.000000	0.000000	31.000000
max	891.000000	1.000000	3.000000	80.000000	8.000000	6.000000	512.329200

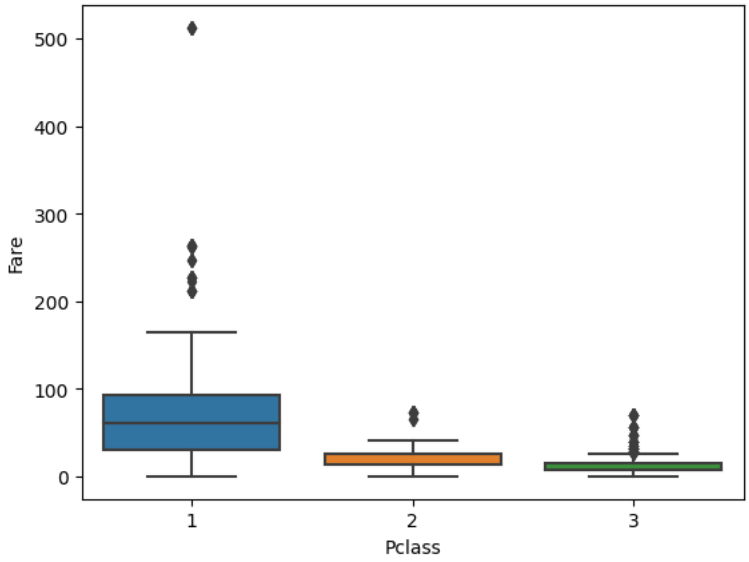
```
sns.countplot(x="Survived",data = titanic)
plt.show()
```



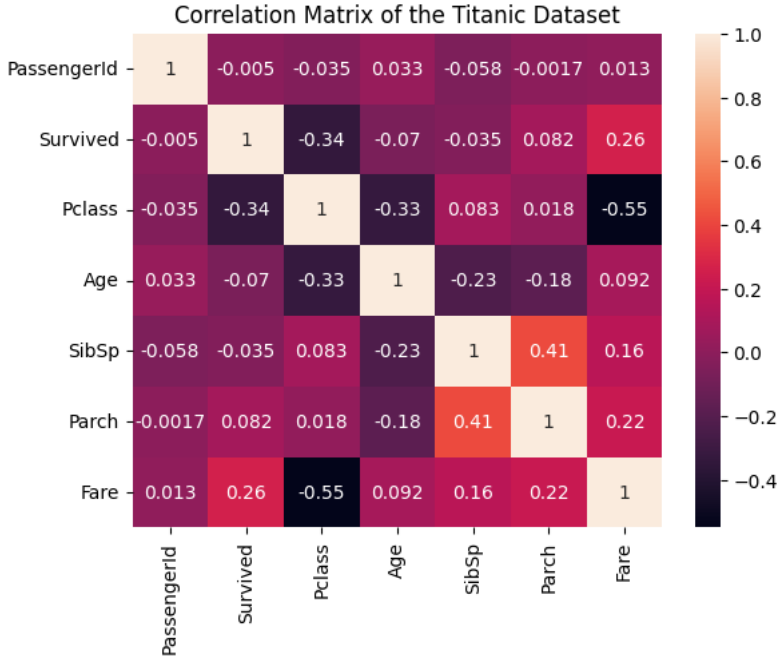

```
sns.histplot(titanic["Age"],bins=30,kde=True)
plt.show()
```



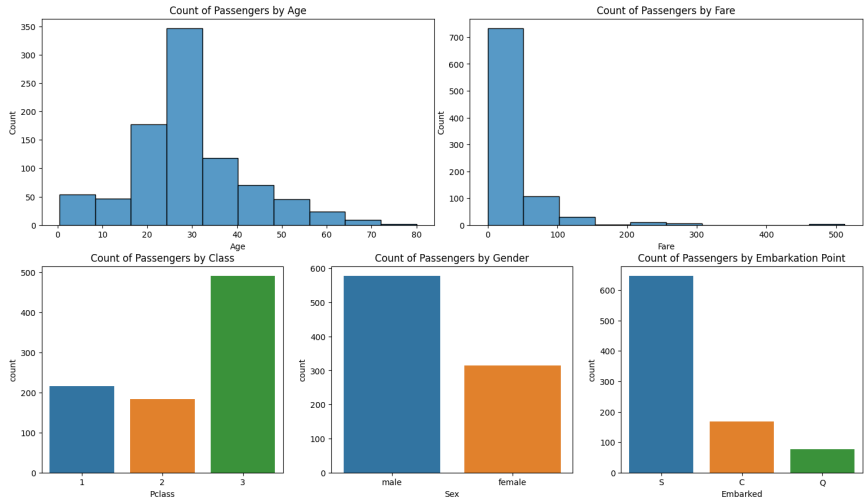

```
sns.boxplot(x="Pclass",y="Fare",data=titanic)
plt.show()
```



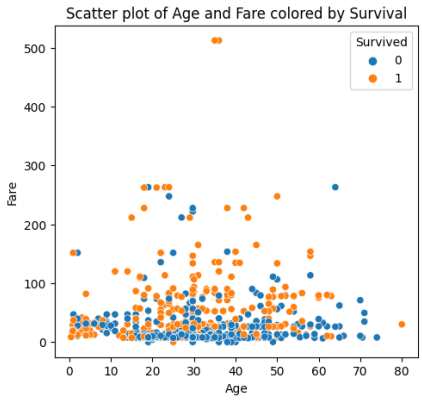

```
correlation_matrix = titanic.select_dtypes(include=['number']).corr()
sns.heatmap(correlation_matrix,annot=True)
plt.title("Correlation Matrix of the Titanic Dataset")
plt.show()
```

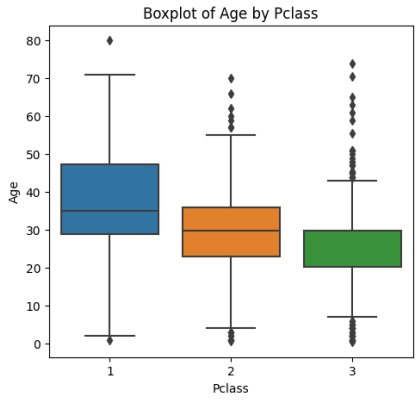


```
plt.figure(figsize=(18,10))

plt.subplot(2,4,(1,2))
sns.histplot(x="Age",bins=10,data=titanic)
plt.title("Count of Passengers by Age")

plt.subplot(2,4,(3,4))
sns.histplot(x="Fare",bins=10,data=titanic)

plt.title("Count of Passengers by Fare")

plt.subplot(2,3,4)
sns.countplot(x='Pclass', data=titanic)
plt.title('Count of Passengers by Class')

plt.subplot(2,3,5)
sns.countplot(x='Sex', data=titanic)
plt.title('Count of Passengers by Gender')

plt.subplot(2,3,6)
sns.countplot(x='Embarked', data=titanic)
plt.title('Count of Passengers by Embarkation Point')
plt.show()
```

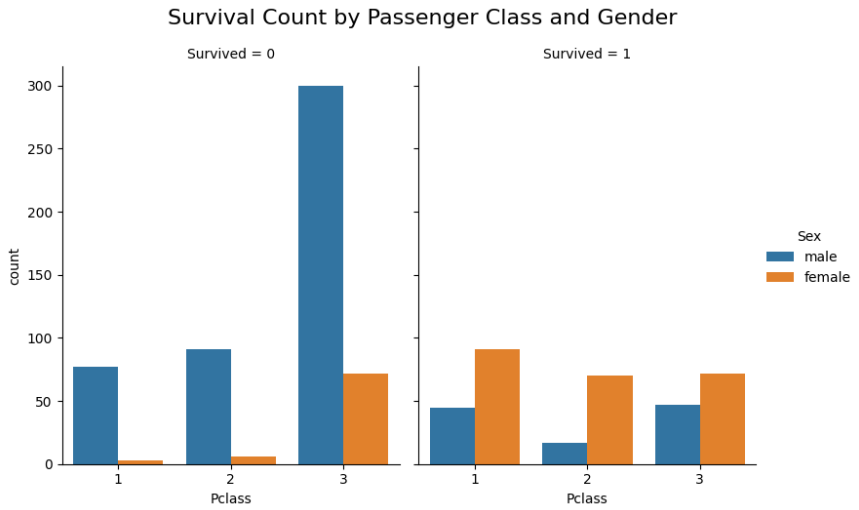



```
plt.figure(figsize=(12,5))

plt.subplot(1,2,1)
sns.scatterplot(x="Age",y="Fare",data = titanic,hue = "Survived")
plt.title('Scatter plot of Age and Fare colored by Survival')

plt.subplot(1,2,2)
sns.boxplot(x="Pclass",y="Age",data=titanic)
plt.title('Boxplot of Age by Pclass')

plt.show()
```

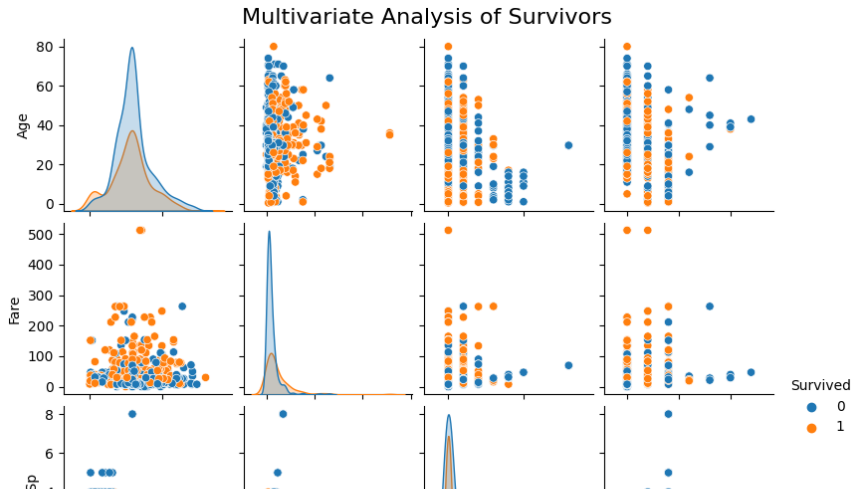





```
sns.catplot(x="Pclass",hue="Sex",col="Survived",data=titanic,kind ='count',height =5, aspect=0.8)
plt.suptitle("Survival Count by Passenger Class and Gender", y=1.05, fontsize=16)
plt.show()
```




```
sns.pairplot(titanic[['Age', 'Fare', 'SibSp', 'Parch', 'Survived']],hue = "Survived",height =2)
plt.suptitle("Multivariate Analysis of Survivors", y=1.02, fontsize=16)
plt.show()
```




```
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score,classification_report
from sklearn.preprocessing import LabelEncoder
```

```
label_encoder = LabelEncoder()
```

```
titanic['Embarked'] = label_encoder.fit_transform(titanic['Embarked'])
titanic['Sex']=label_encoder.fit_transform(titanic['Sex'])
titanic.drop("Ticket",axis=1,inplace=True)
titanic.drop("PassengerId",axis=1,inplace=True)
```

```
titanic
```

	Survived	Pclass	Sex	Age	SibSp	Parch	Fare	Cabin	Embarked
0	0	3	1	22.000000	1	0	7.2500	NaN	2
1	1	1	0	38.000000	1	0	71.2833	C85	0
2	1	3	0	26.000000	0	0	7.9250	NaN	2
3	1	1	0	35.000000	1	0	53.1000	C123	2
4	0	3	1	35.000000	0	0	8.0500	NaN	2
...	...	...	...	...	...	...	...	...	...
886	0	2	1	27.000000	0	0	13.0000	NaN	2
887	1	1	0	19.000000	0	0	30.0000	B42	2
888	0	3	0	29.699118	1	2	23.4500	NaN	2
889	1	1	1	26.000000	0	0	30.0000	C148	0
890	0	3	1	32.000000	0	0	7.7500	NaN	1

891 rows × 9 columns

```
from sklearn.ensemble import RandomForestClassifier
from sklearn.model_selection import train_test_split

# Assuming 'titanic' is your DataFrame
x = titanic.drop("Survived", axis=1)
x = x.select_dtypes(include=['int64', 'float64'])  # Keep only numeric columns
y = titanic['Survived']

x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.2, random_state=42)

model = RandomForestClassifier(n_estimators=100, random_state=42)
model.fit(x_train, y_train)
```

```
RandomForestClassifier(random_state=42)
```

```
y_pred=model.predict(x_test)
```

```
print("Accuracy score :",accuracy_score(y_test,y_pred)*100,"%")

print("Report :\n",classification_report(y_test,y_pred))
```

```
Accuracy score : 81.00558659217877 %
Report :
                precision    recall  f1-score   support

           0       0.82      0.87      0.84       105
           1       0.79      0.73      0.76        74

    accuracy                           0.81       179
   macro avg       0.81      0.80      0.80       179
weighted avg       0.81      0.81      0.81       179
```