In [56]:

```
import sys
print(f"Python Version: {sys.version}")
```

```
Python Version: 3.7.6 (default, Jan  8 2020, 20:23:39) [MSC v.1916 64 bit (AMD64)]
```

In [26]:

```
import numpy as np
print(f"Numpy Version: {np.__version__}")
```

```
Numpy Version: 1.18.1
```

In [27]:

```
import pandas as pd
print(f"Pandas Version: {pd.__version__}")
```

```
Pandas Version: 1.0.3
```

In [28]:

```
import sklearn
print(f"Sklearn Version: {sklearn.__version__}")
```

```
Sklearn Version: 0.22.1
```

In [29]:

```
import matplotlib
print(f"Matplot Version: {matplotlib.__version__}")
```

```
Matplot Version: 3.1.3
```

In [30]:

```
import scipy as sc
print(f"Scipy Version: {sc.__version__}")
```

```
Scipy Version: 1.4.1
```

In [31]:

```
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score
from sklearn.metrics import confusion_matrix
from sklearn.metrics import classification_report
from pandas.plotting import scatter_matrix
```

Loading the dataset using pandas (Titanic dataset)

In [32]:

```
titanic_dataset = pd.read_csv("titanic.csv",)
titanic_dataset.head()
```

Out[32]:

	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

In [33]:

```
titanic_dataset.tail()
```

Out[33]:

	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

In [34]:

```
print(f"Shape of dataframe: {titanic_dataset.shape}")
```

```
Shape of dataframe: (891, 12)
```

In [36]:

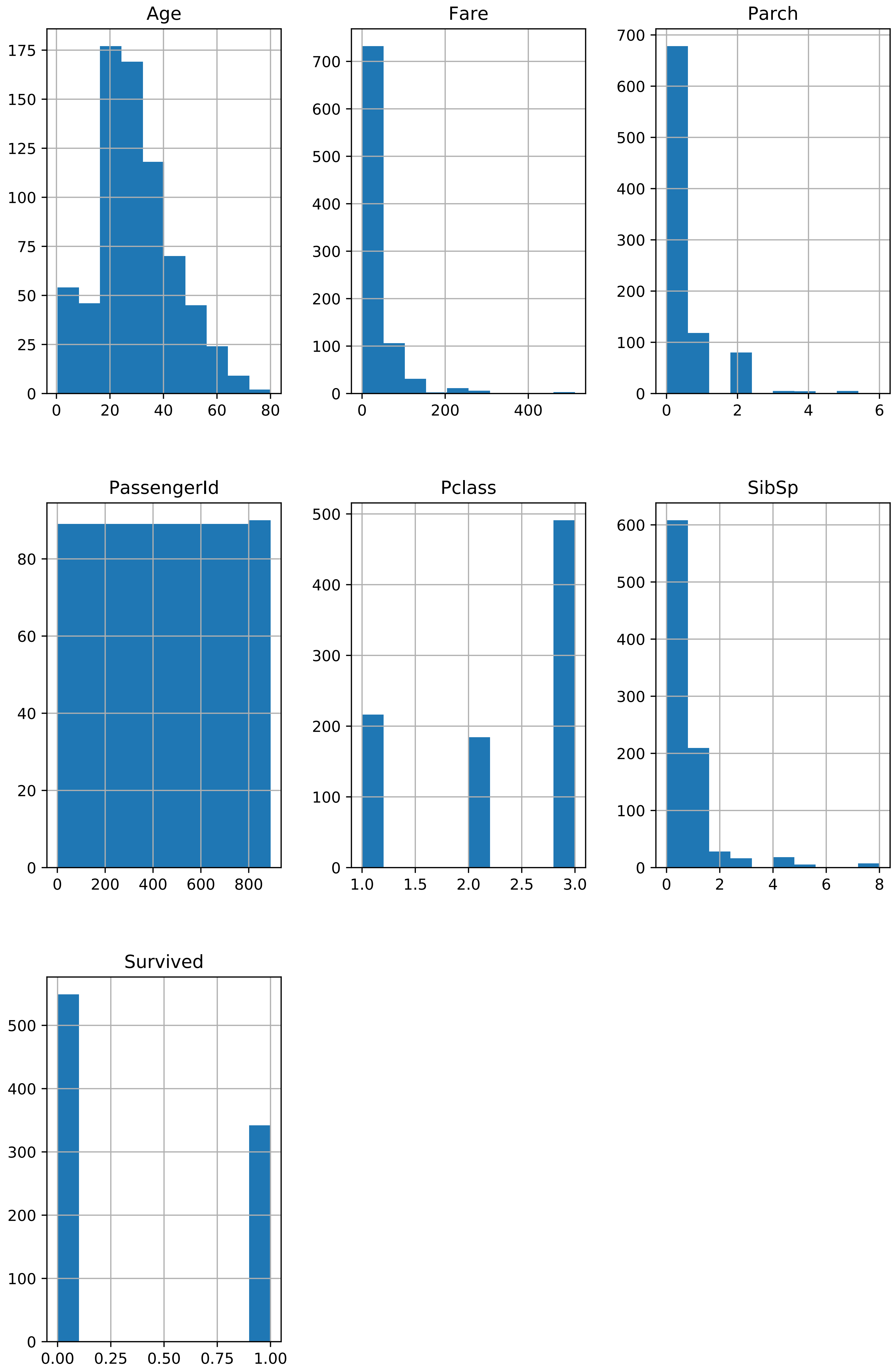
```
titanic_dataset.describe()
```

Out[36]:

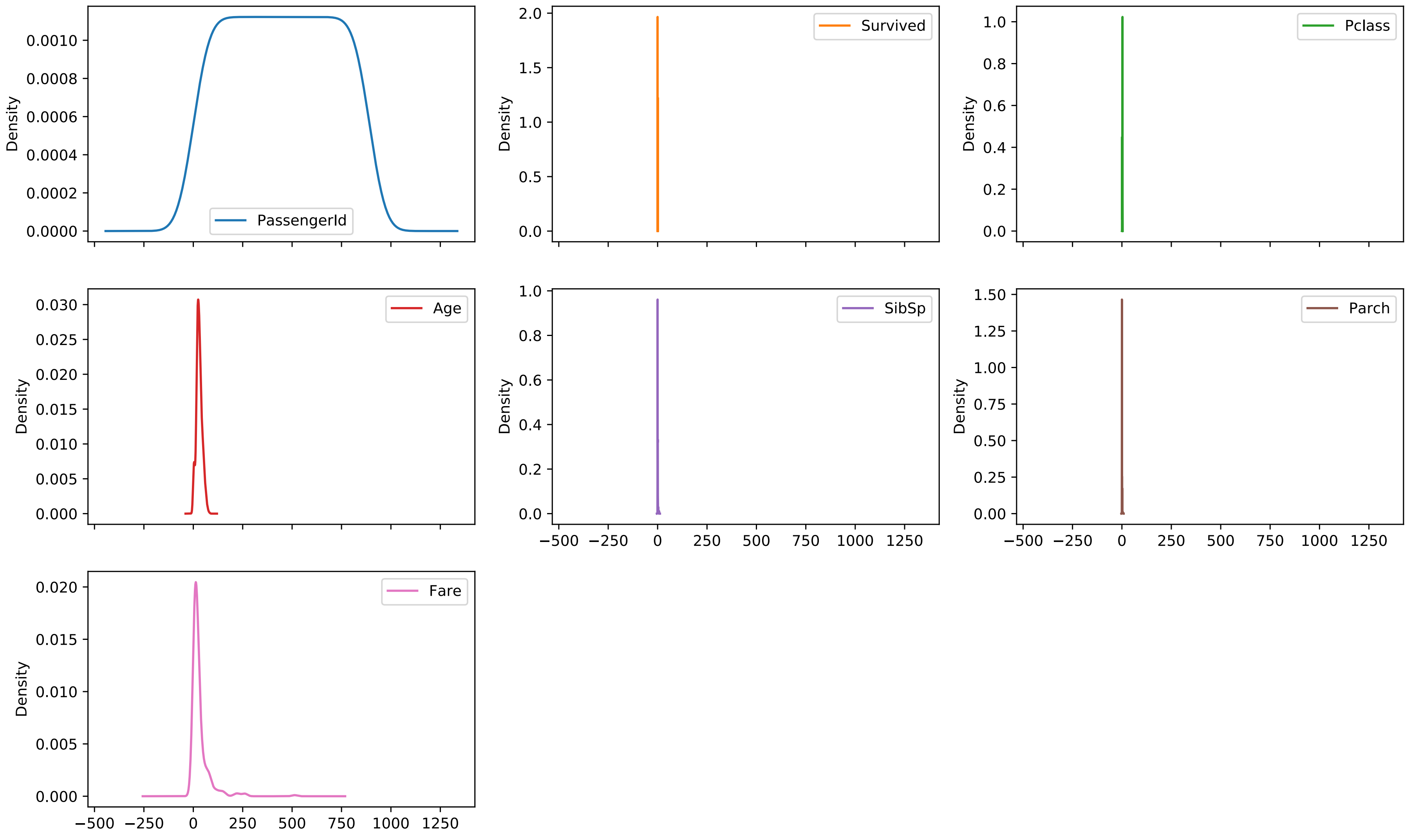
	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
count	891.000000	891.000000	891.000000	714.000000	891.000000	891.000000	891.000000
mean	446.000000	0.383838	2.308642	29.699118	0.523008	0.381594	32.204208
std	257.353842	0.486592	0.836071	14.526497	1.102743	0.806057	49.693429
min	1.000000	0.000000	1.000000	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

Data Visualisation

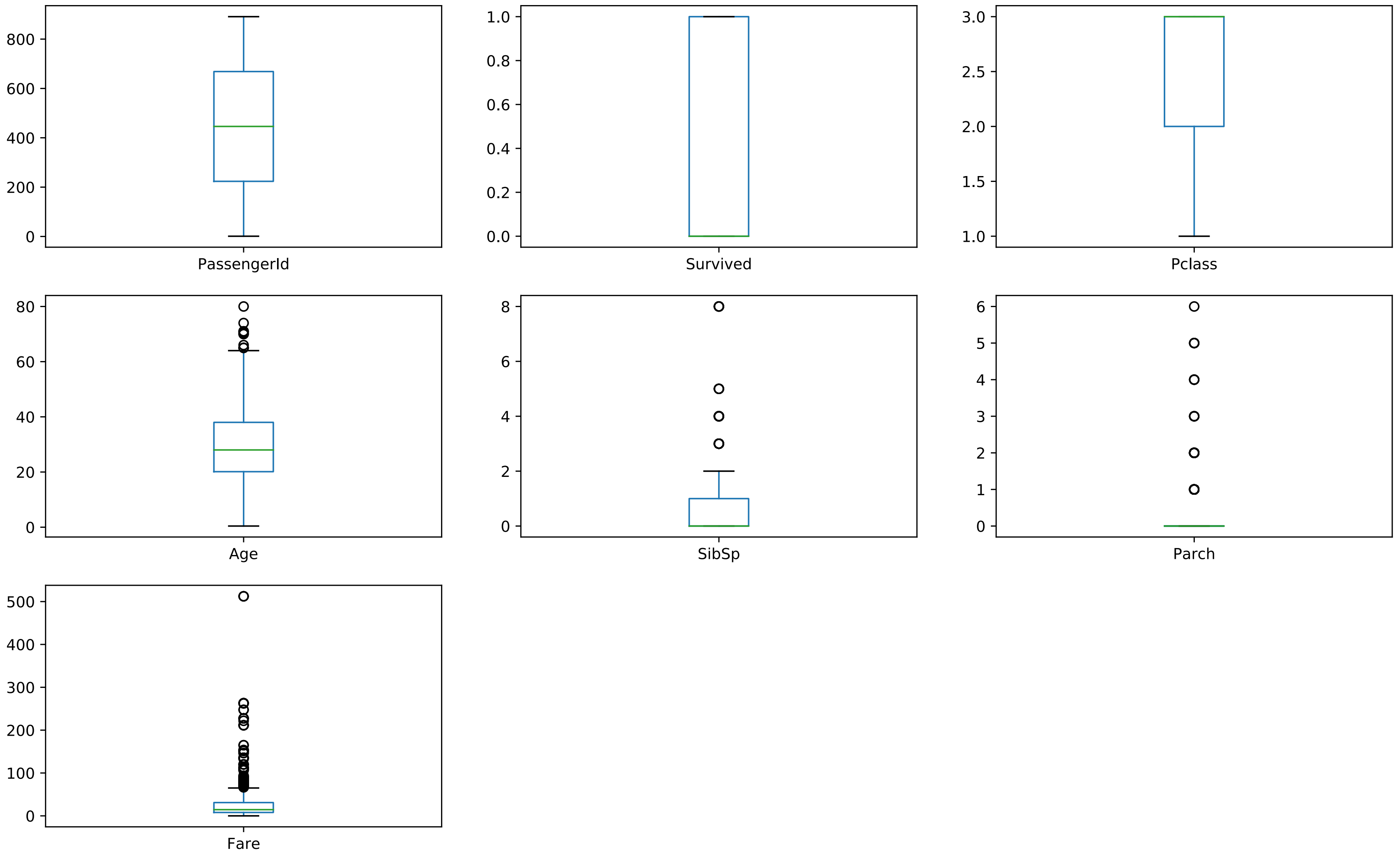
In [37]:
```
# histogram
titanic_dataset.hist(figsize=(10,16))
plt.show()
```



In [38]:
```
# density plot
titanic_dataset.plot(kind='density',subplots=True,layout=(3,3), sharex=True, figsize=(16,10))
plt.show()
```



In [39]:
```
#box plot
titanic_dataset.plot(kind='box', subplots=True, layout=(3,3), sharex=True, figsize=(16,10))
plt.show()
```

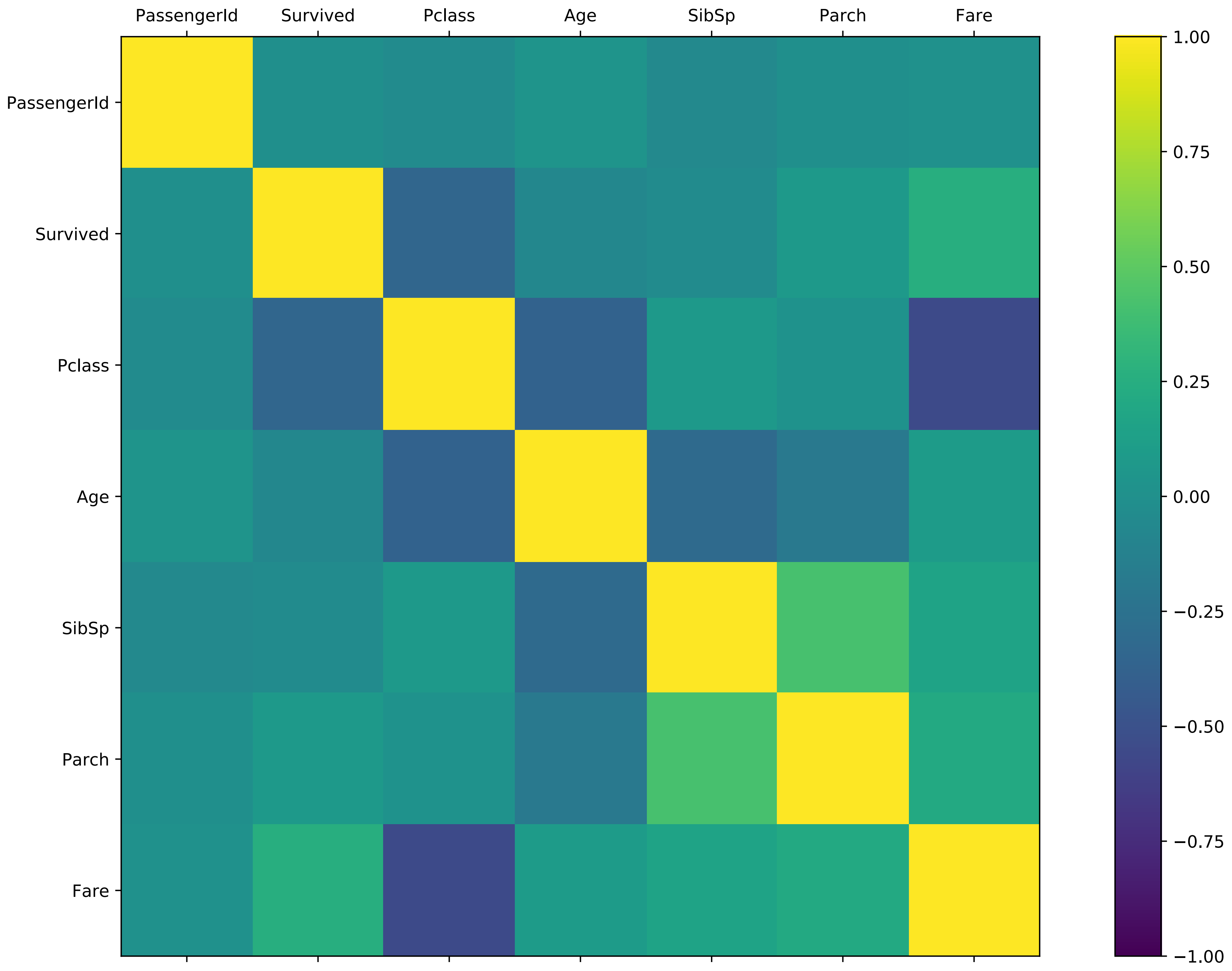


In [40]:
```
correlation = titanic_dataset.corr()
correlation
```

Out[40]:

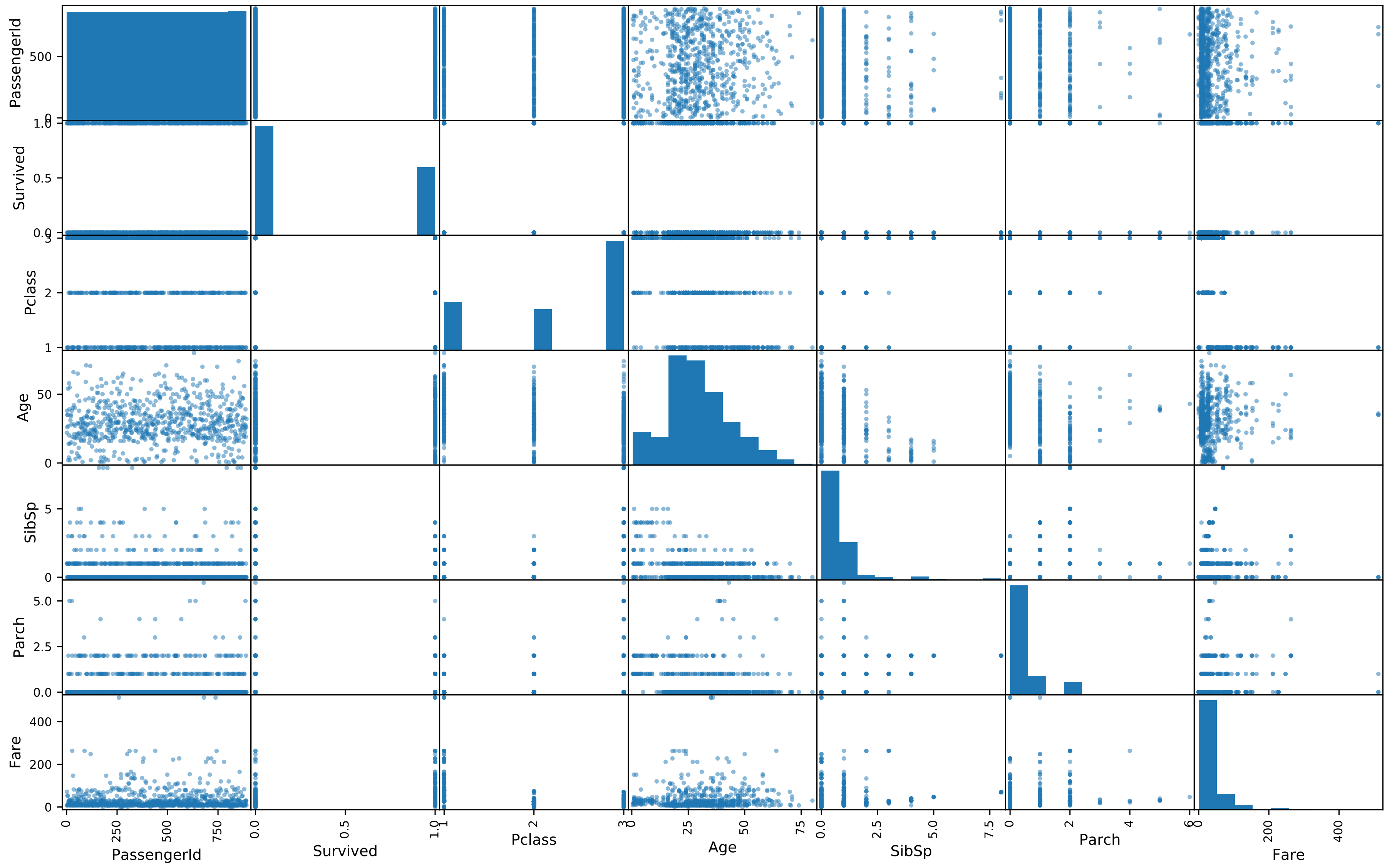
	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
PassengerId	1.000000	-0.005007	-0.035144	0.036847	-0.057527	-0.001652	0.012658
Survived	-0.005007	1.000000	-0.338481	-0.077221	-0.035322	0.081629	0.257307
Pclass	-0.035144	-0.338481	1.000000	-0.369226	0.083081	0.018443	-0.549500
Age	0.036847	-0.077221	-0.369226	1.000000	-0.308247	-0.189119	0.096067
SibSp	-0.057527	-0.035322	0.083081	-0.308247	1.000000	0.414838	0.159651
Parch	-0.001652	0.081629	0.018443	-0.189119	0.414838	1.000000	0.216225
Fare	0.012658	0.257307	-0.549500	0.096067	0.159651	0.216225	1.000000

In [41]:
```
# matshow
fig = plt.figure(figsize=(16,10))
ax = fig.add_subplot(111)
cax = ax.matshow(correlation, vmax=1, vmin=-1)
fig.colorbar(cax)
label = correlation.columns
ticks = np.arange(len(correlation))
ax.set_xticks(ticks)
ax.set_xticklabels(label)
ax.set_yticks(ticks)
ax.set_yticklabels(label)
plt.show()
```



In [42]:

```
# scatter matrix
scatter_matrix(titanic_dataset, figsize=(16,10))
plt.show()
```



Data Preprocessing

In [57]:

```
# finding the missing values
print(f"Missing Values: \n{titanic_dataset.isna().sum()}")
```

```
Missing Values:
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
```

In [44]:

```
# missing value treatment
titanic_dataset['Embarked'] = titanic_dataset['Embarked'].fillna(titanic_dataset['Embarked'].mode()[0])
titanic_dataset['Age'] = titanic_dataset['Age'].fillna(titanic_dataset['Age'].mean())
```

In [45]:

```
# Feature Generation, total number of family members from SibSp and Parch
family_member = []
for i in range(len(titanic_dataset['Parch'])):
    family_member.append(titanic_dataset['SibSp'][i] + titanic_dataset['Parch'][i] + 1)
family_member = pd.DataFrame({'FamilyMember': family_member})
```

In [46]:
```
# Feature Generation, title from Name
title = []
for i in range(len(titanic_dataset.Name)):
    if('Mr.' in titanic_dataset['Name'][i]):
        title.append('Mr')
    elif('Mrs.' in titanic_dataset['Name'][i]):
        title.append('Mrs')
    elif('Master' in titanic_dataset['Name'][i]):
        title.append('Master')
    elif('Miss.' in titanic_dataset['Name'][i]):
        title.append('Miss')
    elif('Dr.' in titanic_dataset['Name'][i]):
        title.append('Dr')
    elif('Rev.' in titanic_dataset['Name'][i]):
        title.append('Rev')
    else:
        title.append('Mr')
title = pd.DataFrame({'Title': title})
```

In [47]:
```
# splitting the data into feature and target variable
X = titanic_dataset.iloc[:,[2, 4, 5]]
Y = titanic_dataset.iloc[:,1].values
```

In [48]:
```
X= pd.concat([X,family_member, title], axis=1)
X = pd.get_dummies(X).values
```

In [49]:
```
# splitting the dataset into train and test set
X_train, X_test, Y_train, Y_test = train_test_split(X, Y , train_size=0.3, random_state=11)
```

Train the model

In [50]:
```
# training the model
model = LogisticRegression()
model.fit(X_train, Y_train)
```

Out[50]:
```
LogisticRegression(C=1.0, class_weight=None, dual=False, fit_intercept=True,
                   intercept_scaling=1, l1_ratio=None, max_iter=100,
                   multi_class='auto', n_jobs=None, penalty='l2',
                   random_state=None, solver='lbfgs', tol=0.0001, verbose=0,
                   warm_start=False)
```

Test the model

In [51]:
```
# testing the model
Y_pred = model.predict(X_test)
```

In [52]:
```
accuracy_score(Y_test, Y_pred)
```

Out[52]:
```
0.8317307692307693
```

In [53]:
```
# confusion matrix
confusion_matrix(Y_test,Y_pred)
```

Out[53]:
```
array([[347,  39],
       [ 66, 172]], dtype=int64)
```

In [54]:
```
# classification report
print(classification_report(Y_test, Y_pred))
```

```
precision    recall  f1-score   support

           0       0.84      0.90      0.87       386
           1       0.82      0.72      0.77       238

    accuracy                           0.83       624
   macro avg       0.83      0.81      0.82       624
weighted avg       0.83      0.83      0.83       624
```

Use the model

In [55]:

```
# usning the model
Pclass = int(input("Enter Pclass"))
age = float(input("Enter age"))
family_member = int(input("Enter number of family members"))

sex_male=0
sex_female=0
sex = input("Enter sex")
if(sex=='male'):
    sex_male=1
elif(sex=='female'):
    sex_female=1

Title_Dr=0
Title_Master=0
Title_Miss=0
Title_Mr=0
Title_Mrs=0
Title_Rev=0
title = input("Enter title")
if(title == 'Dr'):
    Title_Dr=1
elif(title == 'Master'):
    Title_Master=1
elif(title == 'Miss'):
    Title_Miss=1
elif(title == 'Mr'):
    Title_Mr=1
elif(title == 'Mrs'):
    Title_Mrs=1
elif(title == 'Rev'):
    Title_Rev=1

X_input = [[Pclass,age,family_member, sex_female, sex_male,Title_Dr, Title_Master,Title_Miss,Title_Mr,Title_Mrs,Title_
Rev]]
output =  model.predict(X_input)
if(output == 1):
    print(X_input, ': Passenger Survived')
else:
    print(X_input, ': Passenger Not Survived')
```

```
[[1, 45.0, 2, 0, 0, 0, 0, 0, 0, 1, 0]] : Passenger Survived
```