In [1]:
```
import pandas as pd
import numpy as np
```

read a file

In [26]:
```
sai=pd.read_csv("/home/placement/Downloads/Titanic Dataset.csv")
```

In [3]:
```
sai.describe()
```

Out[3]:

	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

In [4]:
```
sai.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
```

In [5]:
```
sa1=sai.drop(['Name','Ticket','Cabin','PassengerId','SibSp','Parch'],axis=1
```

In [6]:
```
sa1
```

Out[6]:

	Survived	Pclass	Sex	Age	Fare	Embarked
0	0	3	male	22.0	7.2500	S
1	1	1	female	38.0	71.2833	C
2	1	3	female	26.0	7.9250	S
3	1	1	female	35.0	53.1000	S
4	0	3	male	35.0	8.0500	S
...	...	...	...	...	...	...
886	0	2	male	27.0	13.0000	S
887	1	1	female	19.0	30.0000	S
888	0	3	female	NaN	23.4500	S
889	1	1	male	26.0	30.0000	C
890	0	3	male	32.0	7.7500	Q

891 rows × 6 columns

In [7]:
```
sa1['Sex']=sa1["Sex"].map({'male':1,'female':2})
```

In [8]:
```
sa1
```

Out[8]:

	Survived	Pclass	Sex	Age	Fare	Embarked
0	0	3	1	22.0	7.2500	S
1	1	1	2	38.0	71.2833	C
2	1	3	2	26.0	7.9250	S
3	1	1	2	35.0	53.1000	S
4	0	3	1	35.0	8.0500	S
...	...	...	...	...	...	...
886	0	2	1	27.0	13.0000	S
887	1	1	2	19.0	30.0000	S
888	0	3	2	NaN	23.4500	S
889	1	1	1	26.0	30.0000	C
890	0	3	1	32.0	7.7500	Q

891 rows × 6 columns

In [9]:
```
sa1.isnull().sum()
```

Out[9]:
```
Survived      0
Pclass        0
Sex           0
Age         177
Fare          0
Embarked      2
dtype: int64
```

In [10]:

```
sa1['Age']=sa1['Age'].fillna(sa1['Age'].median())
sa1
```

Out[10]:

	Survived	Pclass	Sex	Age	Fare	Embarked
0	0	3	1	22.0	7.2500	S
1	1	1	2	38.0	71.2833	C
2	1	3	2	26.0	7.9250	S
3	1	1	2	35.0	53.1000	S
4	0	3	1	35.0	8.0500	S
...	...	...	...	...	...	...
886	0	2	1	27.0	13.0000	S
887	1	1	2	19.0	30.0000	S
888	0	3	2	28.0	23.4500	S
889	1	1	1	26.0	30.0000	C
890	0	3	1	32.0	7.7500	Q

891 rows × 6 columns

In [11]:

```
sa1=pd.get_dummies(sa1,dtype=int)
sa1
```

Out[11]:

	Survived	Pclass	Sex	Age	Fare	Embarked_C	Embarked_Q	Embarked_S
0	0	3	1	22.0	7.2500	0	0	1
1	1	1	2	38.0	71.2833	1	0	0
2	1	3	2	26.0	7.9250	0	0	1
3	1	1	2	35.0	53.1000	0	0	1
4	0	3	1	35.0	8.0500	0	0	1
...	...	...	...	...	...	...	...	...
886	0	2	1	27.0	13.0000	0	0	1
887	1	1	2	19.0	30.0000	0	0	1
888	0	3	2	28.0	23.4500	0	0	1
889	1	1	1	26.0	30.0000	1	0	0
890	0	3	1	32.0	7.7500	0	1	0

891 rows × 8 columns

In [12]:
```
sa1.isnull().sum()
```

Out[12]:
```
Survived      0
Pclass        0
Sex           0
Age           0
Fare          0
Embarked_C    0
Embarked_Q    0
Embarked_S    0
dtype: int64
```

In [13]:
```
y=sa1['Survived']
x=sa1.drop('Survived',axis=1)
```

split train and test

In [14]:
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.33,random_st
```

In [15]:
```
x_train.head()
```

Out[15]:

	Pclass	Sex	Age	Fare	Embarked_C	Embarked_Q	Embarked_S
6	1	1	54.0	51.8625	0	0	1
718	3	1	28.0	15.5000	0	1	0
685	2	1	25.0	41.5792	1	0	0
73	3	1	26.0	14.4542	1	0	0
882	3	2	22.0	10.5167	0	0	1

In [16]:
```
y_test.head()
```

Out[16]:
```
709    1
439    0
840    0
720    1
39     1
Name: Survived, dtype: int64
```

random forest

In [17]:

```
from sklearn.model_selection import GridSearchCV #GridSearchCV is for param
from sklearn.ensemble import RandomForestClassifier
cls=RandomForestClassifier()
n_estimators=[25,50,75,100,125,150,175,200] #number of decision trees in th
criterion=['gini','entropy'] #criteria for choosing nodes default = 'gini'
max_depth=[3,5,10] #maximum number of nodes in a tree default = None (it wi
parameters={'n_estimators': n_estimators,'criterion':criterion,'max_depth':
RFC_cls = GridSearchCV(cls, parameters)
RFC_cls.fit(x_train,y_train)
```

Out[17]:

```
GridSearchCV(estimator=RandomForestClassifier(),
             param_grid={'criterion': ['gini', 'entropy'],
                         'max_depth': [3, 5, 10],
                         'n_estimators': [25, 50, 75, 100, 125, 150, 175,
200]})
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.

On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

In [18]:

```
RFC_cls.best_params_
```

Out[18]:

```
{'criterion': 'entropy', 'max_depth': 5, 'n_estimators': 150}
```

In [19]:

```
cls=RandomForestClassifier(n_estimators=25,criterion='entropy',max_depth=10
```

In [20]:

```
cls.fit(x_train,y_train)
```

Out[20]:

```
RandomForestClassifier(criterion='entropy', max_depth=10, n_estimators=25)
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.

On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

In [21]:

```
rfy_pred=cls.predict(x_test)
```

In [22]:

```
rfy_pred
```

Out[22]:

```
array([0, 0, 0, 1, 0, 1, 1, 0, 1, 1, 1, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 1,
       0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 1, 0, 1, 1, 0, 0, 1, 1, 0, 0, 1,
       0, 0, 0, 1, 1, 1, 1, 1, 0, 0, 1, 1, 1, 0, 0, 1, 1, 0, 0, 1, 1, 1,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0,
       1, 0, 1, 1, 0, 0, 1, 0, 1, 0, 0, 1, 1, 1, 0, 0, 1, 1, 0, 0, 1, 0,
       0, 1, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 1, 0, 1, 1, 0, 0, 0, 0, 1,
       0, 0, 0, 1, 1, 1, 0, 0, 0, 1, 0, 1, 0, 1, 0, 0, 0, 1, 1, 1, 0, 0,
       0, 1, 1, 1, 0, 0, 0, 0, 1, 1, 0, 0, 0, 1, 0, 0, 0, 0, 1, 1, 1, 0,
       1, 0, 0, 0, 1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 0, 1, 1, 1, 1, 0,
       0, 1, 0, 1, 0, 1, 0, 1, 1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 0, 1,
       0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0,
       0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 1, 0, 0, 1, 1, 0, 0, 0, 1, 0, 1, 0,
       1, 0, 1, 1, 0, 0, 1, 1, 0])
```

```
In [23]: from sklearn.metrics import confusion_matrix
         confusion_matrix(y_test,rfy_pred)
```

```
Out[23]: array([[148,  27],
                [ 35,  85]])
```

EFFICENCY OF THE CONFUSION MATRIX

```
In [24]: from sklearn.metrics import accuracy_score
         accuracy_score(y_test,rfy_pred)
```

```
Out[24]: 0.7898305084745763
```