```
#import necessary Libraries
import pandas as pd
import numpy as np
import pickle
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
import sklearn
from sklearn.preprocessing import LabelEncoder, OneHotEncoder
from sklearn.linear_model import LogisticRegression
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier
from sklearn.neighbors import KNeighborsClassifier
from sklearn.svm import SVC
from sklearn.model_selection import RandomizedSearchCV
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.metrics import accuracy_score, classification_report, confusion_matrix, f1_score
```

```
#read_csv is a pandas function to read csv files
data = pd.read_csv('Admission_Predict.csv')
```

```
data.head()
```

	Serial No.	GRE Score	TOEFL Score	University Rating	SOP	LOR	CGPA	Research	Chance of Admit
0	1	337	118	4	4.5	4.5	9.65	1	0.92
1	2	324	107	4	4.0	4.5	8.87	1	0.76
2	3	316	104	3	3.0	3.5	8.00	1	0.72
3	4	322	110	3	3.5	2.5	8.67	1	0.80
4	5	314	103	2	2.0	3.0	8.21	0	0.65

```
data.head
data.describe()
```

	Serial No.	GRE Score	TOEFL Score	University Rating	SOP	LOR	
count	400.000000	400.000000	400.000000	400.000000	400.000000	400.000000	400.0
mean	200.500000	316.807500	107.410000	3.087500	3.400000	3.452500	8.5
std	115.614301	11.473646	6.069514	1.143728	1.006869	0.898478	0.5
min	1.000000	290.000000	92.000000	1.000000	1.000000	1.000000	6.8
25%	100.750000	308.000000	103.000000	2.000000	2.500000	3.000000	8.1
50%	200.500000	317.000000	107.000000	3.000000	3.500000	3.500000	8.6
75%	300.250000	325.000000	112.000000	4.000000	4.000000	4.000000	9.0
max	400.000000	340.000000	120.000000	5.000000	5.000000	5.000000	9.9

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 400 entries, 0 to 399
Data columns (total 9 columns):
 #   Column             Non-Null Count  Dtype  
---  ------             --------------  -----  
 0   Serial No.         400 non-null    int64  
 1   GRE Score          400 non-null    int64  
 2   TOEFL Score        400 non-null    int64  
 3   University Rating  400 non-null    int64  
 4   SOP                400 non-null    float64
 5   LOR                400 non-null    float64
 6   CGPA               400 non-null    float64
 7   Research           400 non-null    int64  
 8   Chance of Admit    400 non-null    float64
dtypes: float64(4), int64(5)
memory usage: 28.2 KB
```

```
data=data.rename(columns = {'chance od Admit': 'Chance of Admit'})
```

```
data.isnull().any()
```

```
Serial No.           False
GRE Score            False
TOEFL Score          False
University Rating    False
SOP                  False
LOR                  False
CGPA                 False
Research             False
Chance of Admit      False
dtype: bool
```

```
data.corr()
```

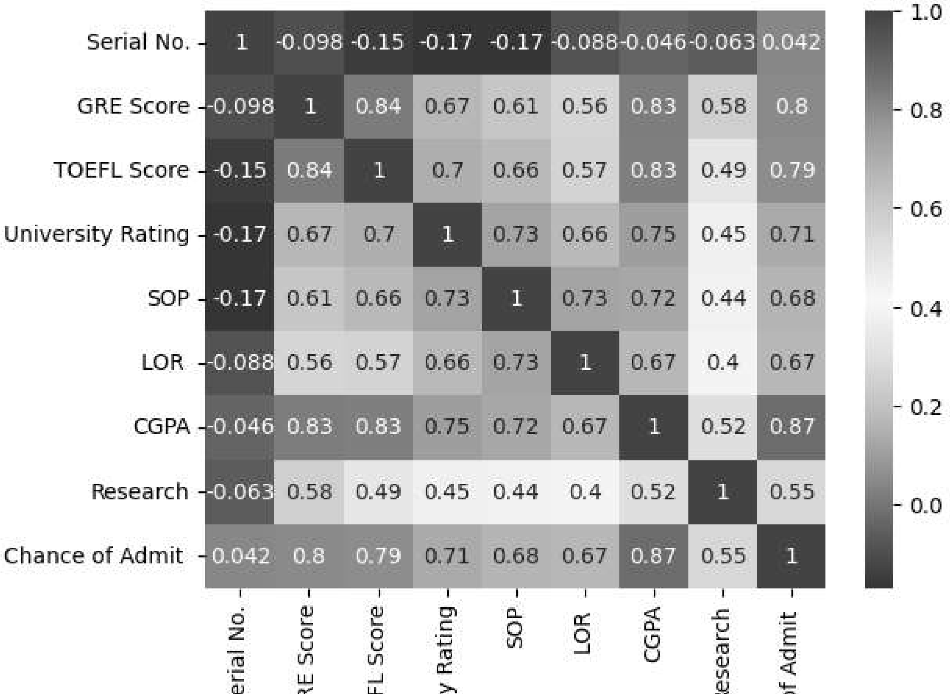
	Serial No.	GRE Score	TOEFL Score	University Rating	SOP	LOR	CGPA
Serial No.	1.000000	-0.097526	-0.147932	-0.169948	-0.166932	-0.088221	-0.045608
GRE Score	-0.097526	1.000000	0.835977	0.668976	0.612831	0.557555	0.833060
TOEFL Score	-0.147932	0.835977	1.000000	0.695590	0.657981	0.567721	0.828417
University Rating	-0.169948	0.668976	0.695590	1.000000	0.734523	0.660123	0.746479
SOP	-0.166932	0.612831	0.657981	0.734523	1.000000	0.729593	0.718144
LOR	-0.088221	0.557555	0.567721	0.660123	0.729593	1.000000	0.670211
CGPA	-0.045608	0.833060	0.828417	0.746479	0.718144	0.670211	1.000000
Research	-0.063138	0.580391	0.489858	0.447783	0.444029	0.396859	0.521654
Chance of Admit	0.042336	0.802610	0.791594	0.711250	0.675732	0.669889	0.873289

```
plt.figure(figsize=(10,7))
```

```
<Figure size 1000x700 with 0 Axes>
<Figure size 1000x700 with 0 Axes>
```

```
sns.heatmap(data.corr(),annot=True,cmap="RdYlGn")
```

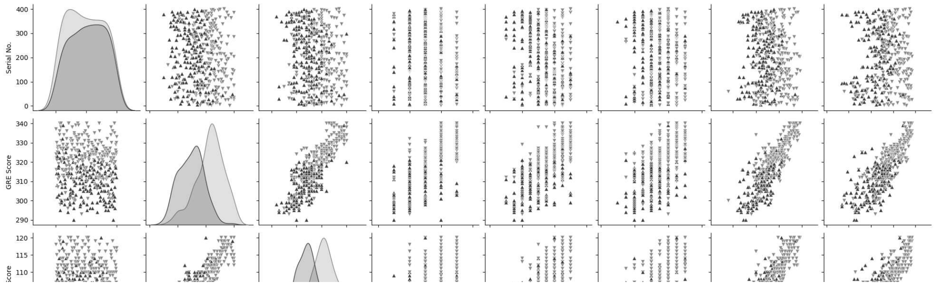
```
<Axes: >
```



	erial No.	RE Score	FL Score	y Rating	SOP	LOR	CGPA	esearch	f Admit
Serial No.	1	-0.098	-0.15	-0.17	-0.17	-0.088	-0.046	-0.063	0.042
GRE Score	-0.098	1	0.84	0.67	0.61	0.56	0.83	0.58	0.8
TOEFL Score	-0.15	0.84	1	0.7	0.66	0.57	0.83	0.49	0.79
University Rating	-0.17	0.67	0.7	1	0.73	0.66	0.75	0.45	0.71
SOP	-0.17	0.61	0.66	0.73	1	0.73	0.72	0.44	0.68
LOR	-0.088	0.56	0.57	0.66	0.73	1	0.67	0.4	0.67
CGPA	-0.046	0.83	0.83	0.75	0.72	0.67	1	0.52	0.87
Research	-0.063	0.58	0.49	0.45	0.44	0.4	0.52	1	0.55
Chance of Admit	0.042	0.8	0.79	0.71	0.68	0.67	0.87	0.55	1

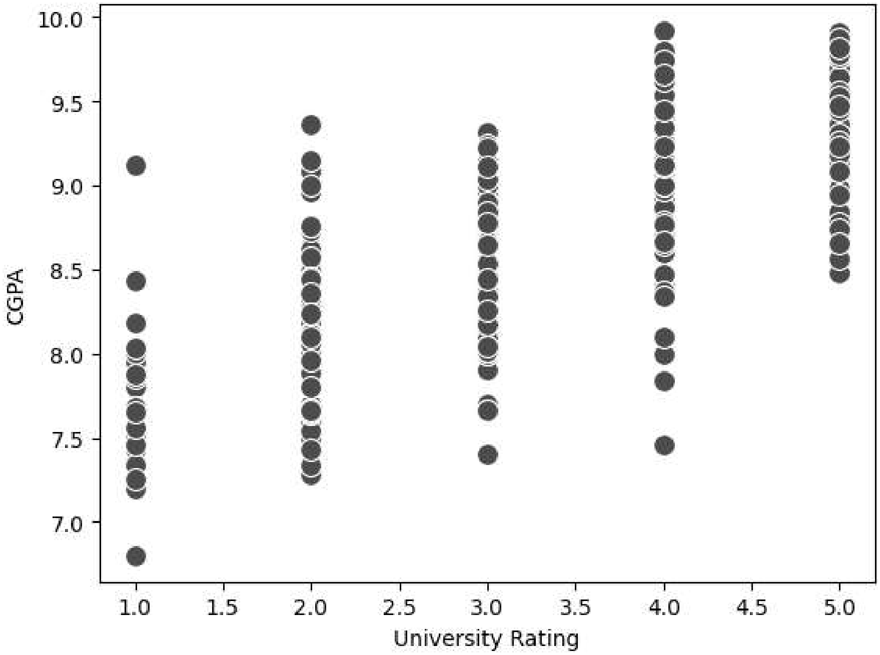
```
sns.pairplot(data=data,hue='Research',markers=["^","v"],palette='inferno')
```

```
<seaborn.axisgrid.PairGrid at 0x7fe97566ee80>
```



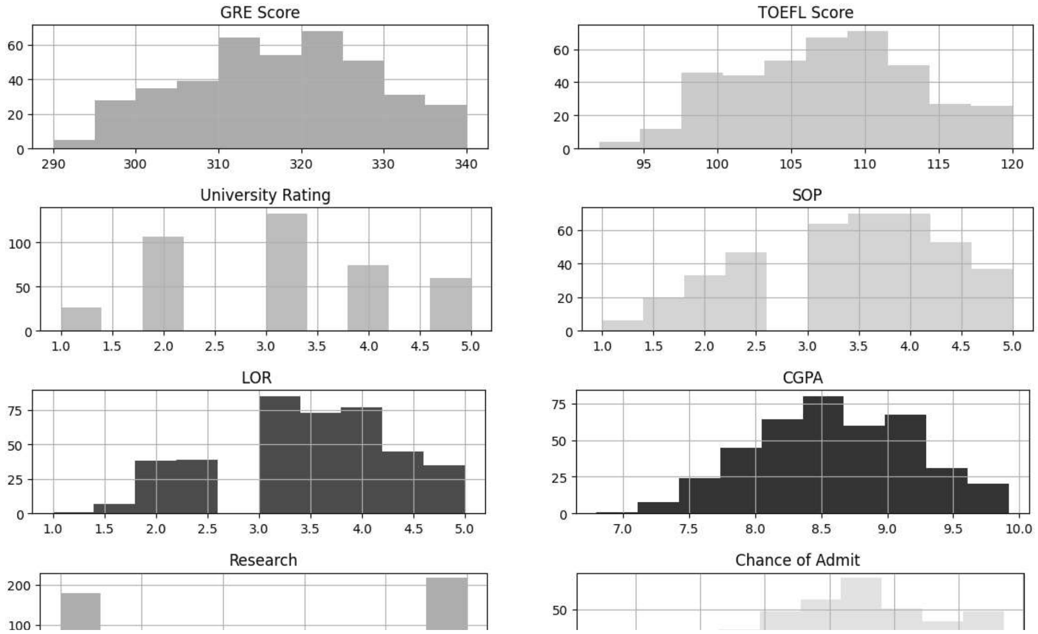
```
sns.scatterplot(x='University Rating',y='CGPA',data=data,color='Red', s=100)
```

```
<Axes: xlabel='University Rating', ylabel='CGPA'>
```



```
category=['GRE Score','TOEFL Score','University Rating','SOP','LOR ','CGPA','Research','Chance of Admit ']
color=['yellowgreen','gold','lightskyblue','pink','red','purple','orange','yellow']
start=True
for i in np.arange(4):
  fig=plt.figure(figsize=(14,8))
  plt.subplot2grid((4,2),(i,0))
  data[category[2*i]].hist(color=color[2*i],bins=10)
  plt.title(category[2*i])
  plt.subplot2grid((4,2),(i,1))
  data[category[2*i+1]].hist(color=color[2*i+1],bins=10)
  plt.title(category[2*i+1])

plt.subplots_adjust(hspace=0.7, wspace= 0.2)
plt.show()
```



```
data.head()
```

	Serial No.	GRE Score	TOEFL Score	University Rating	SOP	LOR	CGPA	Research	Chance of Admit
0	1	337	118	4	4.5	4.5	9.65	1	0.92
1	2	324	107	4	4.0	4.5	8.87	1	0.76
2	3	316	104	3	3.0	3.5	8.00	1	0.72
3	4	322	110	3	3.5	2.5	8.67	1	0.80
4	5	314	103	2	2.0	3.0	8.21	0	0.65

```
print('Mean CGPA Score is :' ,int(data['CGPA'].mean()))
print('Mean GRE Score is :' , int(data['GRE Score'].mean()))
print('Mean TOEFL Score is :',int(data['TOEFL Score'].mean()))
```

```
Mean CGPA Score is : 8
Mean GRE Score is : 316
Mean TOEFL Score is : 107
```

```
data.head()
```

	Serial No.	GRE Score	TOEFL Score	University Rating	SOP	LOR	CGPA	Research	Chance of Admit
0	1	337	118	4	4.5	4.5	9.65	1	0.92
1	2	324	107	4	4.0	4.5	8.87	1	0.76
2	3	316	104	3	3.0	3.5	8.00	1	0.72
3	4	322	110	3	3.5	2.5	8.67	1	0.80
4	5	314	103	2	2.0	3.0	8.21	0	0.65

```
x=data.iloc[:,0:-1].values
x
```

```
array([[  1.  , 337.  , 118.  , ...,   4.5 ,   9.65,   1.  ],
       [  2.  , 324.  , 107.  , ...,   4.5 ,   8.87,   1.  ],
       [  3.  , 316.  , 104.  , ...,   3.5 ,   8.  ,   1.  ],
            ...,
            [398.  , 330.  , 116.  , ...,   4.5 ,   9.45,   1.  ],
            [399.  , 312.  , 103.  , ...,   4.  ,   8.78,   0.  ],
            [400.  , 333.  , 117.  , ...,   4.  ,   9.66,   1.  ]])
```

```
y=data['Chance of Admit '].values
y
```

```
     array([0.92, 0.76, 0.72, 0.8 , 0.65, 0.9 , 0.75, 0.68, 0.5 , 0.45, 0.52,
            0.84, 0.78, 0.62, 0.61, 0.54, 0.66, 0.65, 0.63, 0.62, 0.64, 0.7 ,
            0.94, 0.95, 0.97, 0.94, 0.76, 0.44, 0.46, 0.54, 0.65, 0.74, 0.91,
            0.9 , 0.94, 0.88, 0.64, 0.58, 0.52, 0.48, 0.46, 0.49, 0.53, 0.87,
            0.91, 0.88, 0.86, 0.89, 0.82, 0.78, 0.76, 0.56, 0.78, 0.72, 0.7 ,
            0.64, 0.64, 0.46, 0.36, 0.42, 0.48, 0.47, 0.54, 0.56, 0.52, 0.55,
            0.61, 0.57, 0.68, 0.78, 0.94, 0.96, 0.93, 0.84, 0.74, 0.72, 0.74,
            0.64, 0.44, 0.46, 0.5 , 0.96, 0.92, 0.92, 0.94, 0.76, 0.72, 0.66,
            0.64, 0.74, 0.64, 0.38, 0.34, 0.44, 0.36, 0.42, 0.48, 0.86, 0.9 ,
            0.79, 0.71, 0.64, 0.62, 0.57, 0.74, 0.69, 0.87, 0.91, 0.93, 0.68,
            0.61, 0.69, 0.62, 0.72, 0.59, 0.66, 0.56, 0.45, 0.47, 0.71, 0.94,
            0.94, 0.57, 0.61, 0.57, 0.64, 0.85, 0.78, 0.84, 0.92, 0.96, 0.77,
            0.71, 0.79, 0.89, 0.82, 0.76, 0.71, 0.8 , 0.78, 0.84, 0.9 , 0.92,
            0.97, 0.8 , 0.81, 0.75, 0.83, 0.96, 0.79, 0.93, 0.94, 0.86, 0.79,
            0.8 , 0.77, 0.7 , 0.65, 0.61, 0.52, 0.57, 0.53, 0.67, 0.68, 0.81,
            0.78, 0.65, 0.64, 0.64, 0.65, 0.68, 0.89, 0.86, 0.89, 0.87, 0.85,
            0.9 , 0.82, 0.72, 0.73, 0.71, 0.71, 0.68, 0.75, 0.72, 0.89, 0.84,
            0.93, 0.93, 0.88, 0.9 , 0.87, 0.86, 0.94, 0.77, 0.78, 0.73, 0.73,
            0.7 , 0.72, 0.73, 0.72, 0.97, 0.97, 0.69, 0.57, 0.63, 0.66, 0.64,
            0.68, 0.79, 0.82, 0.95, 0.96, 0.94, 0.93, 0.91, 0.85, 0.84, 0.74,
            0.76, 0.75, 0.76, 0.71, 0.67, 0.61, 0.63, 0.64, 0.71, 0.82, 0.73,
            0.74, 0.69, 0.64, 0.91, 0.88, 0.85, 0.86, 0.7 , 0.59, 0.6 , 0.65,
            0.7 , 0.76, 0.63, 0.81, 0.72, 0.71, 0.8 , 0.77, 0.74, 0.7 , 0.71,
            0.93, 0.85, 0.79, 0.76, 0.78, 0.77, 0.9 , 0.87, 0.71, 0.7 , 0.7 ,
            0.75, 0.71, 0.72, 0.73, 0.83, 0.77, 0.72, 0.54, 0.49, 0.52, 0.58,
            0.78, 0.89, 0.7 , 0.66, 0.67, 0.68, 0.8 , 0.81, 0.8 , 0.94, 0.93,
            0.92, 0.89, 0.82, 0.79, 0.58, 0.56, 0.56, 0.64, 0.61, 0.68, 0.76,
            0.86, 0.9 , 0.71, 0.62, 0.66, 0.65, 0.73, 0.62, 0.74, 0.79, 0.8 ,
            0.69, 0.7 , 0.76, 0.84, 0.78, 0.67, 0.66, 0.65, 0.54, 0.58, 0.79,
            0.8 , 0.75, 0.73, 0.72, 0.62, 0.67, 0.81, 0.63, 0.69, 0.8 , 0.43,
            0.8 , 0.73, 0.75, 0.71, 0.73, 0.83, 0.72, 0.94, 0.81, 0.81, 0.75,
            0.79, 0.58, 0.59, 0.47, 0.49, 0.47, 0.42, 0.57, 0.62, 0.74, 0.73,
            0.64, 0.63, 0.59, 0.73, 0.79, 0.68, 0.7 , 0.81, 0.85, 0.93, 0.91,
            0.69, 0.77, 0.86, 0.74, 0.57, 0.51, 0.67, 0.72, 0.89, 0.95, 0.79,
            0.39, 0.38, 0.34, 0.47, 0.56, 0.71, 0.78, 0.73, 0.82, 0.62, 0.96,
            0.96, 0.46, 0.53, 0.49, 0.76, 0.64, 0.71, 0.84, 0.77, 0.89, 0.82,
            0.84, 0.91, 0.67, 0.95])
```

```
from sklearn.preprocessing import MinMaxScaler
sc = MinMaxScaler()
x=sc.fit_transform(x)
x
```

```
     array([[0.        , 0.94      , 0.92857143, ..., 0.875     , 0.91346154,
             1.        ],
            [0.00250627, 0.68      , 0.53571429, ..., 0.875     , 0.66346154,
             1.        ],
            [0.00501253, 0.52      , 0.42857143, ..., 0.625     , 0.38461538,
             1.        ],
            ...,
            [0.99498747, 0.8       , 0.85714286, ..., 0.875     , 0.84935897,
             1.        ],
            [0.99749373, 0.44      , 0.39285714, ..., 0.75      , 0.63461538,
             0.        ],
            [1.        , 0.86      , 0.89285714, ..., 0.75      , 0.91666667,
             1.        ]])
```

```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x,y, test_size=0.20,random_state=42)
```

```
#random_state actsas the seed for the random number generator during the split
y_train.shape
x_train
y_train=(y_train>0.5)
y_train
y_test=(y_test>0.5)
y_test
```

```
array([ True,  True,  True,  True, False,  True, False, False,  True,
        True, False,  True,  True,  True,  True,  True,  True, False,
        True,  True,  True,  True,  True,  True,  True,  True,  True,
        True,  True,  True,  True,  True,  True, False,  True,  True,
        True,  True,  True,  True,  True,  True,  True,  True,  True,
        True,  True,  True,  True,  True,  True,  True,  True,  True,
       False, False,  True,  True,  True,  True,  True,  True,  True,
       False,  True,  True,  True,  True,  True,  True,  True,  True,
        True,  True, False,  True,  True,  True,  True,  True])
```

```
#model building - Logistic Regression
def logreg(x_train,x_test,y_train,y_test):
    lr = LogisticRegression(random_state=0)
    lr.fit(x_train,y_train)
    y_lr_tr = lr.predict(x_train)
    print(accuracy_score(y_lr_tr,y_train))
    ypred_lr = lr.predict(x_test)
    print(accuracy_score(ypred_lr,y_test))
    print("***Logistic Regression***")
    print("Confusion_Matrix")
    print(confusion_matrix(y_test,ypred_lr))
    print("Classification Report")
    print(classification_report(y_test,ypred_lr))
```

```
#printing the train accuracy and test accuracy respectively
logreg(x_train,x_test,y_train,y_test)
```

```
0.928125
0.875
***Logistic Regression***
Confusion_Matrix
[[ 0 10]
 [ 0 70]]
Classification Report
              precision    recall  f1-score   support

       False       0.00      0.00      0.00        10
        True       0.88      1.00      0.93        70

    accuracy                           0.88        80
   macro avg       0.44      0.50      0.47        80
weighted avg       0.77      0.88      0.82        80

/usr/local/lib/python3.9/dist-packages/sklearn/metrics/_classification.py:1344: UndefinedMetricWarning: Precision
  _warn_prf(average, modifier, msg_start, len(result))
/usr/local/lib/python3.9/dist-packages/sklearn/metrics/_classification.py:1344: UndefinedMetricWarning: Precision
  _warn_prf(average, modifier, msg_start, len(result))
/usr/local/lib/python3.9/dist-packages/sklearn/metrics/_classification.py:1344: UndefinedMetricWarning: Precision
  _warn_prf(average, modifier, msg_start, len(result))
```

```
#testing on test & random input values
lr = LogisticRegression(random_state=0)
lr.fit(x_train,y_train)
print("Predicting on the test values")
lr_Pred = lr.predict(x_test)
print("Output is: ",lr_Pred)
print("Prediction on random input")
```

```
lr_pred_own = lr.predict(sc.transform([[337, 118, 4, 4.5, 4.5, 9.65, 1,0.92]]))
print("Output is: ",lr_pred_own)
```

```
Predicting on the test values
Output is:  [ True  True  True  True  True  True  True  True  True  True  True  True
  True  True  True  True  True  True  True  True  True  True  True  True
  True  True  True  True  True  True  True  True  True  True  True  True
  True  True  True  True  True  True  True  True  True  True  True  True
  True  True  True  True  True  True  True  True  True  True  True  True
  True  True  True  True  True  True  True  True  True  True  True  True
  True  True  True  True  True  True  True  True]
Prediction on random input
Output is:  [False]
```

```
#model building - Decision Tree classifier
def decisionTree(x_train,x_test,y_train,y_test):
    dtc = DecisionTreeClassifier(criterion="entropy",random_state=0)
    dtc.fit(x_train,y_train)
    y_dt_tr = dtc.predict(x_train)
    print(accuracy_score(y_dt_tr,y_train))
    yPred_dt = dtc.predict(x_test)
    print(accuracy_score(yPred_dt,y_test))
    print("***Decision Tree***")
    print("confusion_matrix")
    print(confusion_matrix(y_test,yPred_dt))
    print("classification Report")
    print(classification_report(y_test,yPred_dt))
```

```
#printing the train accuracy and test accuracy respectively
decisionTree(x_train,x_test,y_train,y_test)
```

```
1.0
0.8875
***Decision Tree***
confusion_matrix
[[ 7  3]
 [ 6 64]]
classification Report
              precision    recall  f1-score   support

       False       0.54      0.70      0.61        10
        True       0.96      0.91      0.93        70

    accuracy                           0.89        80
   macro avg       0.75      0.81      0.77        80
weighted avg       0.90      0.89      0.89        80
```

```
#testing on test & random inputvalues
dtc = DecisionTreeClassifier(criterion="entropy",random_state=0)
dtc.fit(x_train,y_train)
print("Prediction on test values")
dtc_Pred =dtc.predict(x_test)
print("output is: ",dtc_Pred)
print("Predicting on random input")
dtc_pred_own = dtc.predict(sc.transform([[337,118,4,5,4.5,4.5,9.65,1]]))
print("Output is: ",dtc_pred_own)
```

```
Prediction on test values
output is:  [ True  True  True  True False  True  True False  True  True  True  True
 False  True  True  True  True False  True  True False  True  True  True
  True  True  True  True  True  True  True  True  True False  True  True
  True  True  True  True  True False  True  True  True  True  True  True
  True  True  True  True  True  True False  True  True  True False  True
  True False  True False False  True  True  True  True  True  True  True
  True  True False  True  True  True  True  True]
```

```
Predicting on random input
Output is:  [ True]
```

```
#modelbuilding - Random Forest Classifier
def RandomForest(x_train,x_test,y_train,y_test):
          rf = RandomForestClassifier(criterion="entropy",n_estimators=10,random_state=0)
          rf.fit(x_train,y_train)
          y_rf_tr = rf.predict(x_train)
          print(accuracy_score(y_rf_tr,y_train))
          ypred_rf = rf.predict(x_test)
          print(accuracy_score(ypred_rf,y_test))
          print("***Random Forest***")
          print("Confusion_Mtrix")
          print(confusion_matrix(y_test,ypred_rf))
          print("Classification Report")
          print(classification_report(y_test,ypred_rf))
```

```
RandomForest(x_train,x_test,y_train,y_test)
```

```
0.996875
0.925
***Random Forest***
Confusion_Mtrix
[[ 6  4]
 [ 2 68]]
Classification Report
              precision    recall  f1-score   support

       False       0.75      0.60      0.67        10
        True       0.94      0.97      0.96        70

    accuracy                           0.93        80
   macro avg       0.85      0.79      0.81        80
weighted avg       0.92      0.93      0.92        80
```

```
rf = RandomForestClassifier(criterion="entropy",n_estimators=10,random_state=0)
rf.fit(x_train,y_train)
print("Predicting on test values")
rf_pred =rf.predict(x_test)
print("output is: ",rf_pred)
print("Predicting on random input")
rf_pred_own = rf.predict(sc.transform([[337,118,4,5,4.5,4.5,9.65,1]]))
print("output is: ",rf_pred_own)
```

```
Predicting on test values
output is:  [ True  True  True  True False  True  True False  True  True  True  True
  True  True  True  True  True False  True  True False  True  True  True
  True  True  True  True  True  True  True  True  True False  True  True
  True  True  True  True  True  True  True  True  True  True  True  True
  True  True  True  True  True  True  True  True  True  True False  True
  True  True  True False  True  True  True  True  True  True  True  True
  True  True False  True  True  True  True  True]
Predicting on random input
output is:  [ True]
```

```
import keras
from keras.models import Sequential
from keras.layers import Dense
```

```
classifier = Sequential()
```

```
classifier.add(Dense(units=6, activation='relu', input_dim=6))


classifier.add(Dense(units=1, activation='relu'))


classifier.add(Dense(units=1, activation='linear'))


classifier.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accuracy'])


model = classifier.fit(x_train, y_train, batch_size=10, validation_split=0.33, epochs=20)
```

```
    Epoch 1/20
    22/22 [==============================] - 1s 16ms/step - loss: 14.2089 - accuracy: 0.0748 - val_loss: 13.9959 - val_
    Epoch 2/20
    22/22 [==============================] - 0s 6ms/step - loss: 14.1603 - accuracy: 0.0748 - val_loss: 13.9954 - val_
    Epoch 3/20
    22/22 [==============================] - 0s 5ms/step - loss: 14.0457 - accuracy: 0.0748 - val_loss: 13.9915 - val_
    Epoch 4/20
    22/22 [==============================] - 0s 10ms/step - loss: 14.0336 - accuracy: 0.0748 - val_loss: 13.9905 - val_
    Epoch 5/20
    22/22 [==============================] - 0s 8ms/step - loss: 14.0306 - accuracy: 0.0748 - val_loss: 13.9901 - val_
    Epoch 6/20
    22/22 [==============================] - 0s 9ms/step - loss: 14.0290 - accuracy: 0.0748 - val_loss: 13.8908 - val_
    Epoch 7/20
    22/22 [==============================] - 0s 11ms/step - loss: 14.0272 - accuracy: 0.0748 - val_loss: 13.7890 - val_
    Epoch 8/20
    22/22 [==============================] - 0s 7ms/step - loss: 14.0259 - accuracy: 0.0748 - val_loss: 13.7737 - val_
    Epoch 9/20
    22/22 [==============================] - 0s 10ms/step - loss: 14.0248 - accuracy: 0.0748 - val_loss: 13.7644 - val_
    Epoch 10/20
    22/22 [==============================] - 0s 10ms/step - loss: 14.0236 - accuracy: 0.0748 - val_loss: 13.7586 - val_
    Epoch 11/20
    22/22 [==============================] - 0s 9ms/step - loss: 13.9770 - accuracy: 0.0748 - val_loss: 13.7519 - val_
    Epoch 12/20
    22/22 [==============================] - 0s 8ms/step - loss: 13.5865 - accuracy: 0.0748 - val_loss: 13.4954 - val_
    Epoch 13/20
    22/22 [==============================] - 0s 10ms/step - loss: 12.3245 - accuracy: 0.0748 - val_loss: 10.3179 - val_
    Epoch 14/20
    22/22 [==============================] - 0s 11ms/step - loss: 7.8795 - accuracy: 0.0748 - val_loss: 5.5260 - val_a
    Epoch 15/20
    22/22 [==============================] - 0s 11ms/step - loss: 4.2757 - accuracy: 0.0888 - val_loss: 3.7752 - val_a
    Epoch 16/20
    22/22 [==============================] - 0s 9ms/step - loss: 2.8176 - accuracy: 0.1075 - val_loss: 2.8214 - val_ac
    Epoch 17/20
    22/22 [==============================] - 0s 10ms/step - loss: 2.1487 - accuracy: 0.1636 - val_loss: 1.9566 - val_a
    Epoch 18/20
    22/22 [==============================] - 0s 6ms/step - loss: 1.6750 - accuracy: 0.2196 - val_loss: 1.4711 - val_ac
    Epoch 19/20
    22/22 [==============================] - 0s 5ms/step - loss: 1.4900 - accuracy: 0.2523 - val_loss: 1.3268 - val_ac
    Epoch 20/20
    22/22 [==============================] - 0s 4ms/step - loss: 1.3316 - accuracy: 0.3084 - val_loss: 1.0133 - val_ac
```

```
ann_pred = classifier.predict(x_test)
ann_pred = (ann_pred>0.5)
print(accuracy_score(ann_pred,y_test))
print("***ANN MODEL***")
print("Confusion_Matrix")
print(confusion_matrix(y_test,ann_pred))
print("Classification Report")
print(classification_report(y_test,ann_pred))
```

```
    3/3 [==============================] - 0s 3ms/step
    0.3625
    ***ANN MODEL***
    Confusion_Matrix
    [[10  0]
```

```
 [51 19]]
Classification Report
              precision    recall  f1-score   support

       False       0.16      1.00      0.28        10
        True       1.00      0.27      0.43        70

    accuracy                           0.36        80
   macro avg       0.58      0.64      0.35        80
weighted avg       0.90      0.36      0.41        80
```

```
print("Predicting on test input")
ann_pred = classifier.predict(x_test)
ann_pred = (ann_pred>0.5)
print("output is: ",ann_pred)
print("Predicting on random input")
ann_pred_own = classifier.predict(sc.transform([[337,118,4,4.5,4.5,9.65,1,0.92]]))
ann_pred_own = (ann_pred_own>0.5)
print("output is: ",ann_pred_own)
```

```
 [False]
 [False]
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 [False]]
Predicting on random input
1/1 [==============================] - 0s 50ms/step
output is:  [[False]]
```

```
pickle.dump(lr,open('university.pkl','wb'))
```

✓ 0s completed at 9:13 PM