```
# CLASS:- MCA1                  CA LAB-VII(A) LAB on Machine Learning

# Write a program to implement Simple Linear Regression Using Python
```

In [1]:

```
import pandas as pd
import numpy as np
```

In [2]:

```
dataset = pd.read_csv('student_scores.csv')
```

In [3]:

```
dataset.describe()
```

Out[3]:

	Hours	Scores
count	25.000000	25.000000
mean	5.012000	51.480000
std	2.525094	25.286887
min	1.100000	17.000000
25%	2.700000	30.000000
50%	4.800000	47.000000
75%	7.400000	75.000000
max	9.200000	95.000000

In [4]:

```
X = dataset.iloc[:, :-1].values
y = dataset.iloc[:, 1].values
```

In [5]:

```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=0)
```

In [6]:

```
from sklearn.linear_model import LinearRegression
regressor = LinearRegression()
regressor.fit(X_train, y_train)
```

Out[6]:

```
LinearRegression()
```

In [7]:

```
X_train.shape
```

Out[7]:

```
(20, 1)
```

In [8]:

```
X_test
```

Out[8]:

```
array([[1.5],
       [3.2],
       [7.4],
       [2.5],
       [5.9]])
```

In [9]:

```
y_pred = regressor.predict(X_test)
```

In [10]:

```
y_pred
```

Out[10]:

```
array([16.88414476, 33.73226078, 75.357018  , 26.79480124, 60.49103328])
```

In [11]:

```
from sklearn import metrics
print('Mean Absolute Error:', metrics.mean_absolute_error(y_test, y_pred))
print('Mean Squared Error:', metrics.mean_squared_error(y_test, y_pred))
print('Root Mean Squared Error:', np.sqrt(metrics.mean_squared_error(y_test, y_pred)))
```

```
Mean Absolute Error: 4.183859899002975
Mean Squared Error: 21.5987693072174
Root Mean Squared Error: 4.6474476121003665
```

In [12]:

```
regressor.score(X_test,y_test)
```

Out[12]:

```
0.9454906892105356
```

In [1]:

```
# CLASS:- MCA1                    CA LAB-VII(A) LAB on Machine Learning

# Write a program to implement Multiple Linear Regression Using Python
```

In [1]:

```
import pandas as pd
import numpy as np
```

In [2]:

```
dataset = pd.read_csv('house_data.csv')
```

In [3]:

```
dataset.shape
```

Out[3]:

```
(21613, 11)
```

In [4]:

```
X = dataset.iloc[:, [5]].values
```

In [5]:

```
y = dataset.iloc[:, -1].values
```

In [6]:

```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=0)
```

In [7]:

```
y
```

Out[7]:

```
array([221900., 538000., 180000., ..., 402101., 400000., 325000.])
```

In [8]:

```
from sklearn.linear_model import LinearRegression
regressor = LinearRegression()
regressor.fit(X_train, y_train)
```

Out[8]:

```
LinearRegression()
```

In [9]:

```
y_pred = regressor.predict(X_test)
```

In [10]:

```
y_pred
```

Out[10]:

```
array([ 445360.26445241, 1327321.62814597,  382751.89604207, ...,
        426305.54363187,  314699.321683  ,  377307.69009334])
```

In [11]:

```
from sklearn import metrics
print('Mean Absolute Error:', metrics.mean_absolute_error(y_test, y_pred))
print('Mean Squared Error:', metrics.mean_squared_error(y_test, y_pred))
print('Root Mean Squared Error:', np.sqrt(metrics.mean_squared_error(y_test, y_pred)))
```

```
Mean Absolute Error: 188654.74349853914
Mean Squared Error: 76981618783.81517
Root Mean Squared Error: 277455.6158808381
```

In [12]:

```
 regressor.score(X_test,y_test)
```

Out[12]:

```
0.35355693552757517
```

In [ ]:

```

```

In [ ]:
```
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# Write a program to implement Logistic Regression Using Python
```

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

In [3]:
```
dataset = pd.read_csv("User_Data.csv")
```

In [4]:
```
x = dataset.iloc[:, [2, 3]].values
y = dataset.iloc[:, 4].values
```

In [7]:
```
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 = 0)
```

In [10]:
```
from sklearn.preprocessing import StandardScaler
sc_x = StandardScaler()
xtrain = sc_x.fit_transform(X_train)
xtest = sc_x.transform(X_test)
```

In [12]:
```
from sklearn.linear_model import LogisticRegression
classifier = LogisticRegression(random_state = 0)
classifier.fit(xtrain, y_train)
```

Out[12]:
```
LogisticRegression(random_state=0)
```

In [13]:
```
y_pred = classifier.predict(xtest)
```

In [14]:
```
y_pred
```

Out[14]:
```
array([0, 0, 0, 1], dtype=int64)
```

In [16]:
```
from sklearn.metrics import accuracy_score
print ("Accuracy : ", accuracy_score(y_test, y_pred))
```

```
Accuracy :  1.0
```

In [ ]:
```
# CLASS:- MCA1                    CA LAB-VII(A) LAB on Machine Learning

# Write a program to implement Decision Tress Using Python
```

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

In [2]:
```
dataset = pd.read_csv("User_Data.csv")
```

In [3]:
```
x = dataset.iloc[:, [2, 3]].values
y = dataset.iloc[:, 4].values
```

In [4]:
```
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 = 0)
```

In [5]:
```
from sklearn.preprocessing import StandardScaler
sc_x = StandardScaler()
xtrain = sc_x.fit_transform(X_train)
xtest = sc_x.transform(X_test)
```

In [6]:
```
#Fitting Decision Tree classifier to the training set
from sklearn.tree import DecisionTreeClassifier
classifier= DecisionTreeClassifier(criterion='entropy', random_state=0)
classifier.fit(xtrain, y_train)
```

Out[6]:
```
DecisionTreeClassifier(criterion='entropy', random_state=0)
```

In [7]:
```
y_pred = classifier.predict(xtest)
```

In [8]:
```
y_pred
```

Out[8]:
```
array([0, 0, 0, 1], dtype=int64)
```

In [9]:
```
#Creating the Confusion matrix
from sklearn.metrics import confusion_matrix
cm= confusion_matrix(y_test, y_pred)
cm
```

Out[9]:
```
array([[3, 0],
       [0, 1]], dtype=int64)
```

In [10]:
```
from sklearn.metrics import accuracy_score
print ("Accuracy : ", accuracy_score(y_test, y_pred))
```

```
Accuracy :  1.0
```

In [ ]:
```

```

In [ ]:
```
# CLASS:- MCA1                    CA LAB-VII(A) LAB on Machine Learning

# Write a program to implement Support Vector Machine(SVM) Using Python
```

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

In [2]:
```
dataset = pd.read_csv("User_Data.csv")
```

In [3]:
```
x = dataset.iloc[:, [2, 3]].values
y = dataset.iloc[:, 4].values
```

In [4]:
```
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 = 0)
```

In [5]:
```
from sklearn.preprocessing import StandardScaler
sc_x = StandardScaler()
xtrain = sc_x.fit_transform(X_train)
xtest = sc_x.transform(X_test)
```

In [6]:
```
from sklearn.svm import SVC # "Support vector classifier"
classifier = SVC(kernel='linear', random_state=0)
classifier.fit(xtrain, y_train)
```

Out[6]:
```
SVC(kernel='linear', random_state=0)
```

In [7]:
```
y_pred = classifier.predict(xtest)
```

In [8]:
```
y_pred
```

Out[8]:
```
array([0, 0, 0, 1], dtype=int64)
```

In [9]:
```
#Creating the Confusion matrix
from sklearn.metrics import confusion_matrix
cm= confusion_matrix(y_test, y_pred)
cm
```

Out[9]:
```
array([[3, 0],
       [0, 1]], dtype=int64)
```

In [10]:
```
from sklearn.metrics import accuracy_score
print ("Accuracy : ", accuracy_score(y_test, y_pred))
```

```
Accuracy :  1.0
```

In [ ]:
```
# CLASS:- MCA1                    CA LAB-VII(A) LAB on Machine Learning

# Write a program to implement KNN Using Python
```

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

In [2]:
```
dataset = pd.read_csv("User_Data.csv")
```

In [3]:
```
x = dataset.iloc[:, [2, 3]].values
y = dataset.iloc[:, 4].values
```

In [4]:
```
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 = 0)
```

In [5]:
```
from sklearn.preprocessing import StandardScaler
sc_x = StandardScaler()
xtrain = sc_x.fit_transform(X_train)
xtest = sc_x.transform(X_test)
```

In [6]:
```
from sklearn.neighbors import KNeighborsClassifier
classifier = KNeighborsClassifier(n_neighbors=5)
classifier.fit(xtrain, y_train)
```

Out[6]:
```
KNeighborsClassifier()
```

In [7]:
```
y_pred = classifier.predict(xtest)
```

In [8]:
```
y_pred
```

Out[8]:
```
array([0, 0, 0, 0], dtype=int64)
```

In [9]:
```
#Creating the Confusion matrix
from sklearn.metrics import classification_report,confusion_matrix
cm= confusion_matrix(y_test, y_pred)
cm
```

Out[9]:
```
array([[3, 0],
       [1, 0]], dtype=int64)
```

In [10]:
```
print(classification_report(y_test, y_pred))
```

```
              precision    recall  f1-score   support

           0       0.75      1.00      0.86         3
           1       0.00      0.00      0.00         1

    accuracy                           0.75         4
   macro avg       0.38      0.50      0.43         4
weighted avg       0.56      0.75      0.64         4


C:\ProgramData\Anaconda3\lib\site-packages\sklearn\metrics\_classification.p
y:1245: UndefinedMetricWarning: Precision and F-score are ill-defined and bei
ng set to 0.0 in labels with no predicted samples. Use `zero_division` parame
ter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\metrics\_classification.p
y:1245: UndefinedMetricWarning: Precision and F-score are ill-defined and bei
ng set to 0.0 in labels with no predicted samples. Use `zero_division` parame
ter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\metrics\_classification.p
y:1245: UndefinedMetricWarning: Precision and F-score are ill-defined and bei
ng set to 0.0 in labels with no predicted samples. Use `zero_division` parame
ter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
```

In [ ]:
```
```

In [ ]:
```
# CLASS:- MCA1                    CA LAB-VII(A) LAB on Machine Learning

# Write a program to implement Naive Bayes Classifier Using Python
```

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

In [2]:
```
dataset = pd.read_csv("User_Data.csv")
```

In [3]:
```
x = dataset.iloc[:, [2, 3]].values
y = dataset.iloc[:, 4].values
```

In [4]:
```
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 = 0)
```

In [5]:
```
from sklearn.preprocessing import StandardScaler
sc_x = StandardScaler()
xtrain = sc_x.fit_transform(X_train)
xtest = sc_x.transform(X_test)
```

In [6]:
```
from sklearn.naive_bayes import GaussianNB
classifier = GaussianNB()
classifier.fit(xtrain, y_train)
```

Out[6]:
```
GaussianNB()
```

In [7]:
```
y_pred = classifier.predict(xtest)
```

In [8]:
```
y_pred
```

Out[8]:
```
array([0, 0, 0, 1], dtype=int64)
```

In [9]:
```
#Creating the Confusion matrix
from sklearn.metrics import confusion_matrix
cm= confusion_matrix(y_test, y_pred)
cm
```

Out[9]:
```
array([[3, 0],
       [0, 1]], dtype=int64)
```

In [10]:
```
from sklearn.metrics import accuracy_score
print ("Accuracy : ", accuracy_score(y_test, y_pred))
```

```
Accuracy :  1.0
```