20MCA241 DATA SCIENCE LAB

Lab Report SubmittedBy

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In Partial fulfillment for the Award of the Degree Of

MASTER OF COMPUTER APPLICATIONS (2 Year)
(MCA)
APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

AMAL JYOTHI COLLEGE OF ENGINEERING
KANJIRAPPALLY

[Affiliated to APJ Abdul Kalam Technological University, Kerala. Approved by AICTE,
Accredited by NAAC with ‘A’ grade. Koovappally, Kanjirappally, Kottayam, Kerala – 686518]

2020-2022

DEPARTMENT OF COMPUTER APPLICATIONS

AMAL JYOTHI COLLEGE OF ENGINEERING

KANJIRAPPALLY

CERTIFICATE

This is to certify that the Lab report, "**20MCA241 DATA SCIENCE LAB"** is the bonafide work of **FARSANA JASMIN (Reg.No:AJC20MCA-2037)** in partial fulfillment of the requirements for the award of the Degree of Master of Computer Applications under APJ Abdul Kalam Technological University during the year 2021-22.

Ms. Nimmy Francis

Lab In-Charge

CONTENT

PROGRAM NO : 01 **Date:24/11/2021**

AIM : Perform all matrix operation using python.

PROGRAM CODE

```
import numpy as np
import random
def PrintMatrix(matrix_in):
    for x in range(0, matrix_in.shape[0]):
        for y in range(0, matrix_in.shape[1]):
            print("%d \t" % (matrix_in[x][y]), end='')
            if (y % 3 > 1):
                print("\n")
def FillMatrix(matrix_in):
    for x in range(0, matrix_in.shape[0]):
        for y in range(0, matrix_in.shape[1]):
            matrix_in[x][y] = random.randrange(2, 10) + 2
matrix1 = np.ndarray((3,3))
matrix2 = np.ndarray((3,3))
FillMatrix(matrix1)
FillMatrix(matrix2)
add_results = np.add(matrix1,matrix2)
sub_results=np.subtract(matrix1,matrix2)
mult_results=np.multiply(matrix1,matrix2)
div_results=np.divide(matrix1,matrix2)
dot_results=np.dot(matrix1,matrix2)
sqrt1_results=np.sqrt(matrix1)
sqrt2_results=np.sqrt(matrix2)
trans_results=add_results.T
print("Matrix1:")
PrintMatrix(matrix1)
print("Matrix2:")
PrintMatrix(matrix2)
```

```
print("Adding")
PrintMatrix(add_results)
print("Subtraction")
PrintMatrix(sub_results)
print("Multiplication")
PrintMatrix(mult_results)
print("Dot Operation")
PrintMatrix(dot_results)
print("squareroot Operation")
print("matrix 1")
PrintMatrix(sqrt1_results)
print("matrix 2")
PrintMatrix(sqrt2_results)
print("Transpose")
PrintMatrix(trans_results)
```

OUTPUT

```
 Matrix1:

4       4       11
6       4       6
9       11      5

Matrix2:

8       10      10
11      9       8

8       11      10

Adding

12      14      21
17      13      14
17      22      15

Subtraction

-4      -6      1
-5      -5      -2

1       0       -5
```

```
Multiplication


32      40      110
66      36      48
72      121     50
Dot Operation
164     197     182
140     162     152
233     244     228
Squareroot Operation matrix 1
2       2       3
2       2       2
3       3       2
matrix 2
2       3       3
3       3       2
2       3       3
Transpose
12      17      17
14      13      22
21      14      15
Process finished with exit code 0
```

PROGRAM NO : 02 **Date :01/12/2021**

AIM: Program to perform SVD (Singular value Decomposition) using Python.

PROGRAM CODE

```
from scipy. linalg import svd
from numpy import array
A= ([[1,2,5], [2,0,1], [1,4,4]])
print(A)
X, B, T=svd(A)
print("decomposition")
print(X)
print("inverse")
print(B)
print("transpose")
print(T)
```

OUTPUT

```
 [[1, 2, 5], [2, 0, 1], [1, 4, 4]]
decomposition
[[-0.68168247 -0.26872313 -0.68051223]
 [-0.15885378 -0.85356116  0.49618427]
 [-0.71419499  0.44634205  0.53916999]]
inverse
[7.87492    2.01650097 1.38540929]
transpose
[[-0.21760031 -0.53589686 -0.81576017]
 [-0.75849376  0.61885512 -0.20421939]
 [ 0.61427789  0.5743108  -0.54113749]]
Process finished with exit code 0
```

PROGRAM NO : 03 **Date :01/12/2021**

AIM :Program to implement k-NN Classification using any standard dataset available in the public domain and find the accuracy of the algorithm using in build function.

PROGRAM CODE

```
from sklearn.neighbors import KNeighborsClassifier
from sklearn.model_selection import train_test_split
from sklearn.datasets import load_iris
from sklearn.metrics import accuracy_score
iris = load_iris()
x=iris.data
y=iris.target
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=42)
knn=KNeighborsClassifier(n_neighbors=7)
knn.fit(x_train,y_train)
print(knn.predict(x_test))
V=knn.predict(x_test)
result=accuracy_score (y_test, V)
print ("accuracy:", result)
```

OUTPUT

```
[1 0 2 1 1 0 1 2 2 1 2 0 0 0 0 1 2 1 1 2 0 2 0 2 2 2 2 2 0 0]
accuracy: 0.9666666666666667
Process finished with exit code 0
```

PROGRAM NO : 04 **Date :01/12/2021**

AIM : Program to implement k-NN Classification using any random dataset without using in-build functions.

PROGRAM CODE

```
from math import sqrt
def euclidean_distance(row1, row2):
    distance = 0.0
    for i in range(len(row1) - 1):
        distance += (row1[i] - row2[i]) ** 2
    return sqrt(distance)
# Locate the most similar neighbors
def get_neighbors(train, test_row, num_neighbors):
    distances = list()
    for train_row in train:
        dist = euclidean_distance(test_row, train_row)
        distances.append((train_row, dist))
    distances.sort(key=lambda tup: tup[1])
    neighbors = list()
    for i in range(num_neighbors):
        neighbors.append(distances[i][0])
    return neighbors
# Make a classification prediction with neighbors
def predict_classification(train, test_row, num_neighbors):
    neighbors = get_neighbors(train, test_row, num_neighbors)
    output_values = [row[-1] for row in neighbors]
    prediction = max(set(output_values), key=output_values.count)
    return prediction
```

```
# Test distance function
dataset = [[2.781, 2.550,0],
        [1.465, 2.326,3],
        [3.398, 4.429,5],


        [1.388, 1.857,11],
        [3.064, 3.393,3],
        [7.624, 2.235,4],
        [5.338, 2.775,8]]
prediction = predict_classification(dataset, dataset[0], 3)

print('Expected %d, Got %d.' % (dataset[0][-1], prediction))
```

OUTPUT

```
Expected 2, Got 3.
Process finished with exit code 0
```

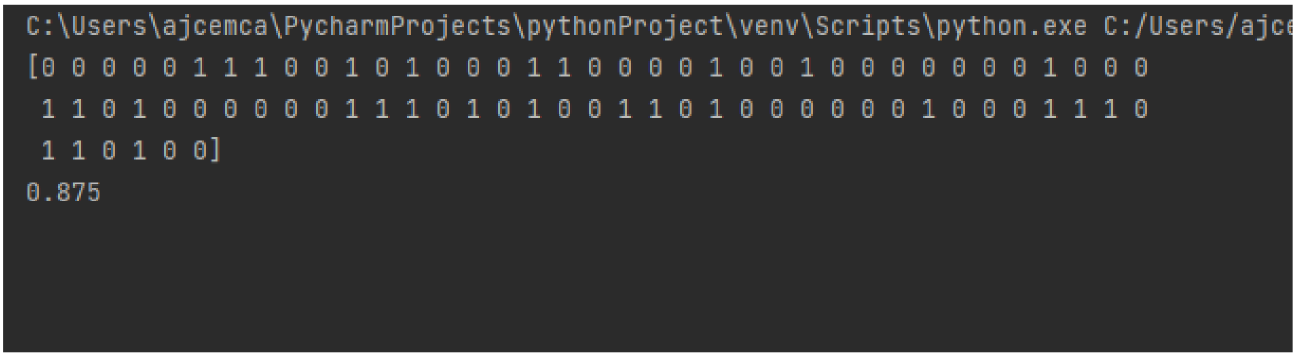
PROGRAM NO : 05 **Date :08/12/2021**

AIM : Program to implement Naïve Bayes Algorithm using any standard dataset available in the public domain and find the accuracy of the algorithm.

PROGRAM CODE

```
import pandas as pd
from sklearn.model_selection import train_test_split from sklearn.preprocessing import
StandardScaler from sklearn.naive_bayes import GaussianNB
from sklearn.metrics import confusion_matrix,accuracy_score
dataset=pd.read_csv('Social_Network_Ads.csv')
x=dataset.iloc[:,[2,3]].values
y=dataset.iloc[:,-1].values x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.30)
sc=StandardScaler()
x_train=sc.fit_transform(x_train)
x_test=sc.transform(x_test)
classifier=GaussianNB()
classifier.fit(x_train,y_train)
y_pred=classifier.predict(x_test) print(y_pred)
ac = accuracy_score(y_test,y_pred)
print(ac)
```

OUTPUT



```
C:\Users\ajcemca\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/ajce
[0 0 0 0 0 1 1 1 0 0 1 0 1 0 0 0 1 1 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 1 0 0 0
 1 1 0 1 0 0 0 0 0 0 1 1 1 0 1 0 1 0 0 1 1 0 1 0 0 0 0 0 0 1 0 0 0 1 1 1 0
 1 1 0 1 0 0]
0.875
```

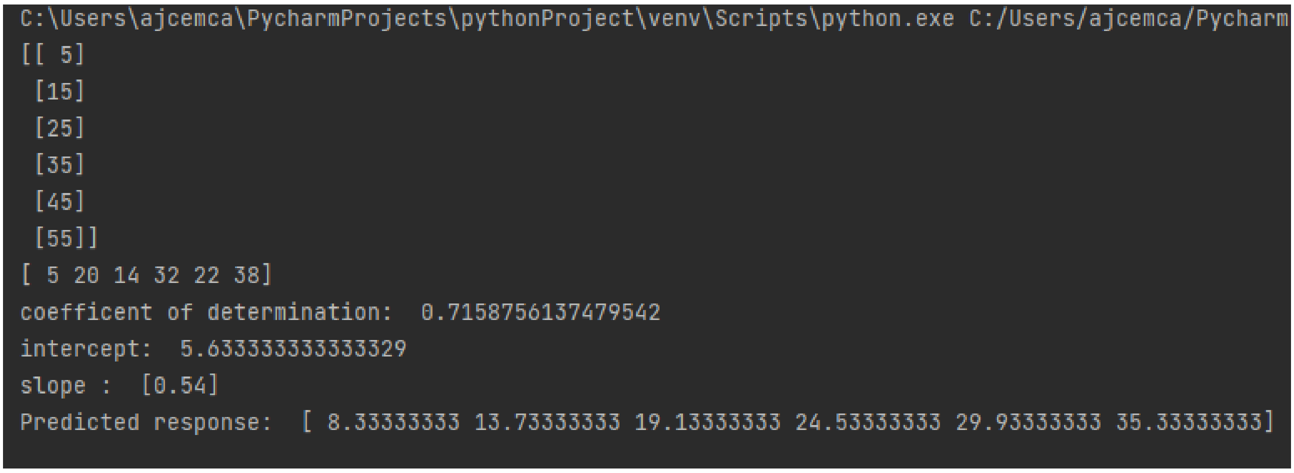
PROGRAM NO : 06 **Date :08/12/2021**

AIM : Program to implement linear and multiple regression techniques using any standard dataset available in the public domain.

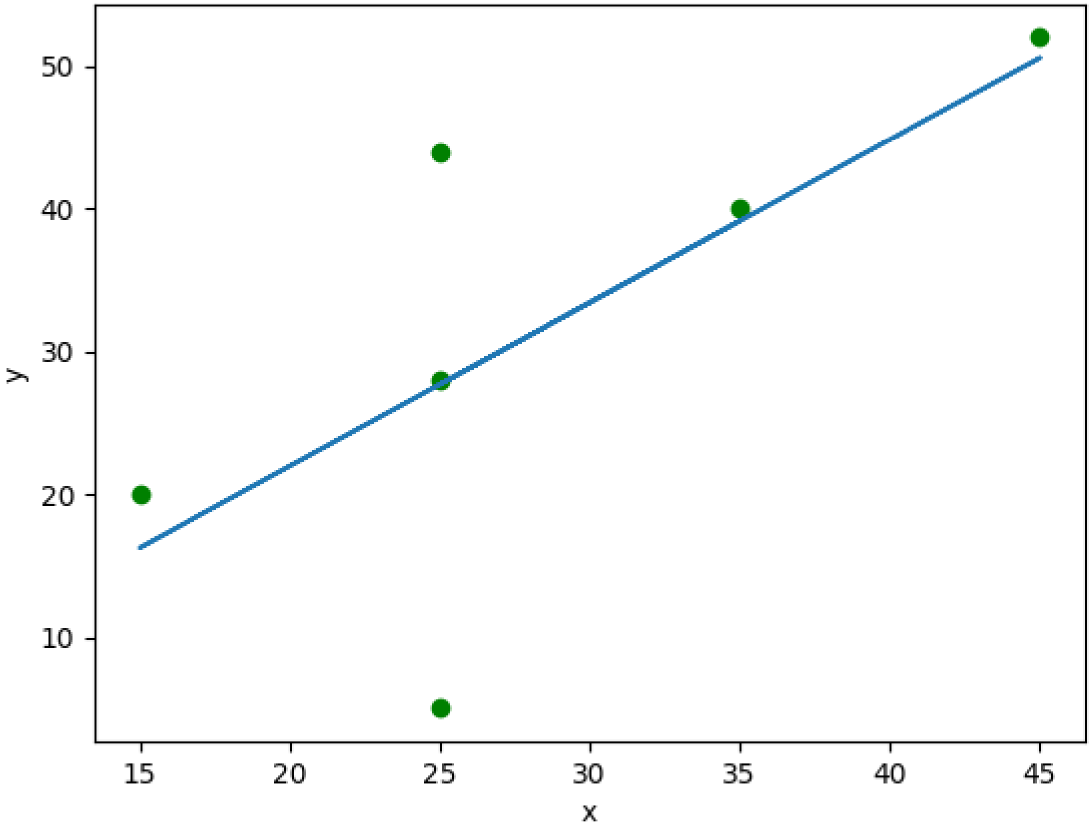
PROGRAM CODE

```
import numpy as np
import matplotlib.pyplot as plt
from sklearn.linear_model import LinearRegression x=np.array([5,15,25,35,45,55]).reshape((-1,1))
y=np.array([5,20,14,32,22,38])
print(x)
print(y)
model=LinearRegression() model.fit(x,y) r_sq=model.score(x,y)
print('coefficent of determination: ',r_sq)
print('intercept: ',model.intercept_)
print('slope : ',model.coef_)
y_pred=model.predict(x)
print('Predicted response: ',y_pred) plt.scatter(x,y,color="g")
plt.plot(x,y_pred) plt.xlabel('x')
plt.ylabel('y')
plt.show()
```

OUTPUT



```
C:\Users\ajcemca\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/ajcemca/Pycharm
[[ 5]
 [15]
 [25]
 [35]
 [45]
 [55]]
[ 5 20 14 32 22 38]
coefficent of determination:  0.7158756137479542
intercept:  5.633333333333329
slope :  [0.54]
Predicted response:  [ 8.33333333 13.73333333 19.13333333 24.53333333 29.93333333 35.33333333]
```



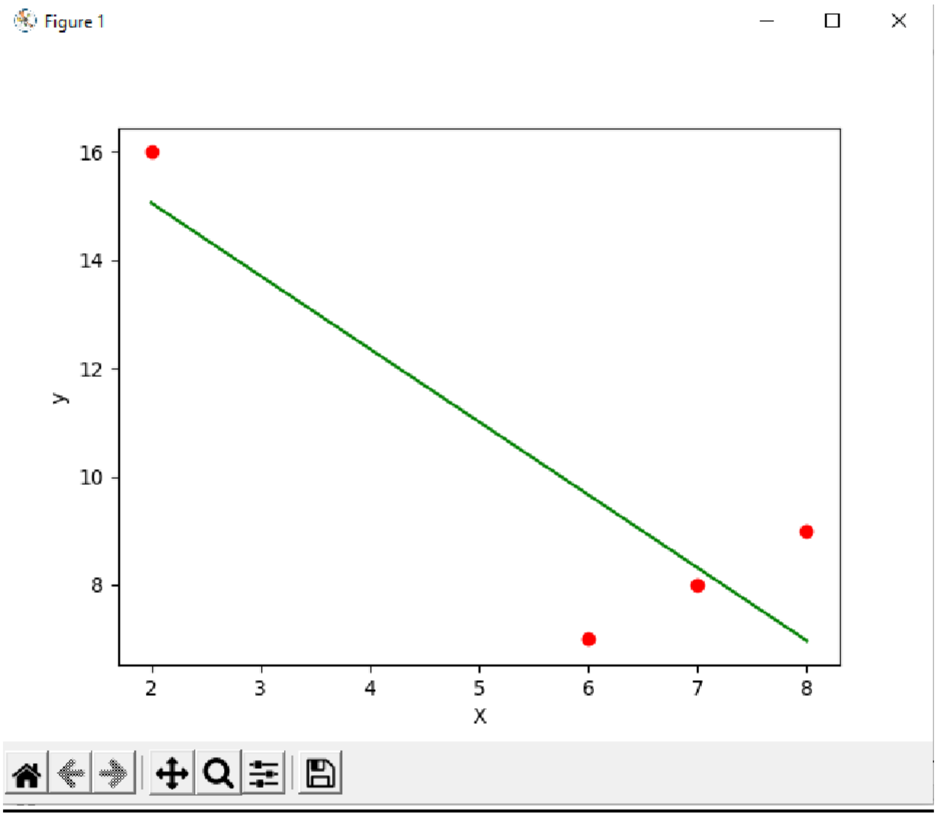
PROGRAM NO : 07 **Date :08/12/2021**

AIM : Program to implement Linear and Multiple regression techniques using any standard dataset available in public domain and evaluate its performance.

PROGRAM CODE

```
import numpy as np

import matplotlib.pyplot as plt

x  = np.array([2,6,7,8])

y = np.array([16,7,8,9])

n = np.size(x)

n_x = np.mean(x)

n_y = np.mean(y)

SS__xy = np.sum(y*x)-n* n_y*n_x

SS__xx = np.sum(x*x)-n* n_x*n_x

b_1 = SS__xy/SS__xx

b_0 = n_y - b_1*n_x

y_pred = b_1 * x + b_0

print(y_pred)

plt.scatter(x, y, color='red')

plt.plot(x, y_pred, color='green')

plt.xlabel('X')

plt.ylabel('y')

plt.show()
```

OUTPUT



```
[15.06024096  9.6626506  8.31325301  6.96385542]
```

PROGRAM NO : 08 **Date :15/12/2021**

AIM : Program to implement Linear and Multiple regression techniques using cars dataset available in public domain and evaluate its performance

PROGRAM CODE

```
import pandas

from sklearn import linear_model

df = pandas.read_csv("cars.csv")

X = df[['Weight', 'Volume']]

y = df['CO2']

regr = linear_model.LinearRegression()

regr.fit(X, y)

#predict the CO2

predictedCO2 = regr.predict([[2300, 1300]])

print(predictedCO2)
```

OUTPUT

```
 [107.2087328]

Process finished with exit code 0
```

PROGRAM NO : 09 **Date :15/12/2021**

AIM : Program to implement multiple linear regression techniques using Boston dataset available in the public domain and evaluate its performance and plotting graph.

PROGRAM CODE

```
import matplotlib.pyplot as plt
import numpy as np
from sklearn import datasets, linear_model, metrics
from sklearn.metrics import r2_score
boston = datasets.load_boston(return_X_y=False)
X = boston.data
y = boston.target
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.4,random_state=1)
reg = linear_model.LinearRegression()
reg.fit(X_train, y_train)
V=reg.predict(X_test)
result=r2_score(y_test, V)
print("accuracy :", result)
print('Coefficients: ', reg.coef_)
print('Variance score:{}'.format(reg.score(X_test, y_test)))
```

OUTPUT

```
accuracy : 0.7209056672661767

Coefficients:  [-8.95714048e-02  6.73132853e-02  5.04649248e-02  2.18579583e+00

 -1.72053975e+01 3.63606995e+00 2.05579939e-03 -1.36602886e+00

  2.89576718e-01 -1.22700072e-02 -8.34881849e-01  9.40360790e-03

 -5.04008320e-01]

Variance score:0.720905667266176

Process finished with exit code 0
```

PROGRAM NO : 10 **Date :22/12/2021**

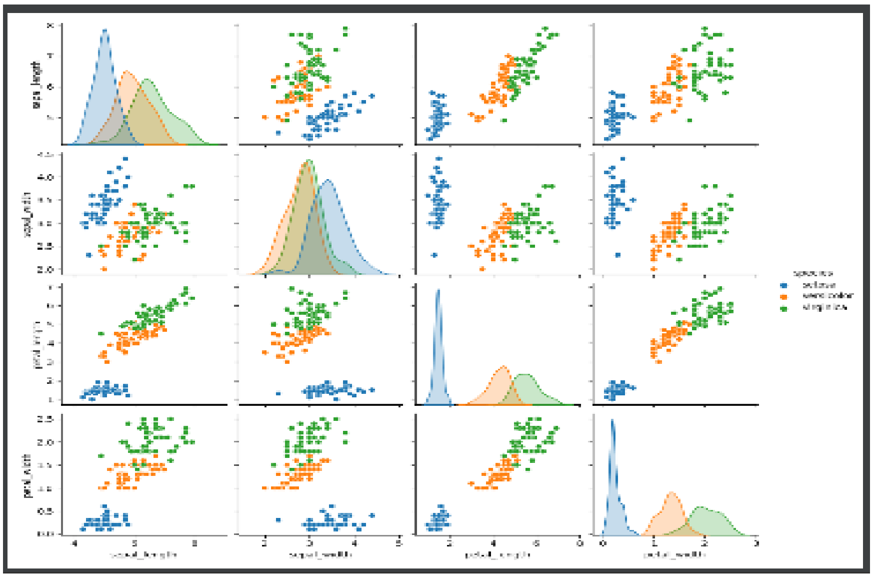
AIM : Program to implement decision tree using any standard dataset available in the public domain and find the accuracy of the algorithm

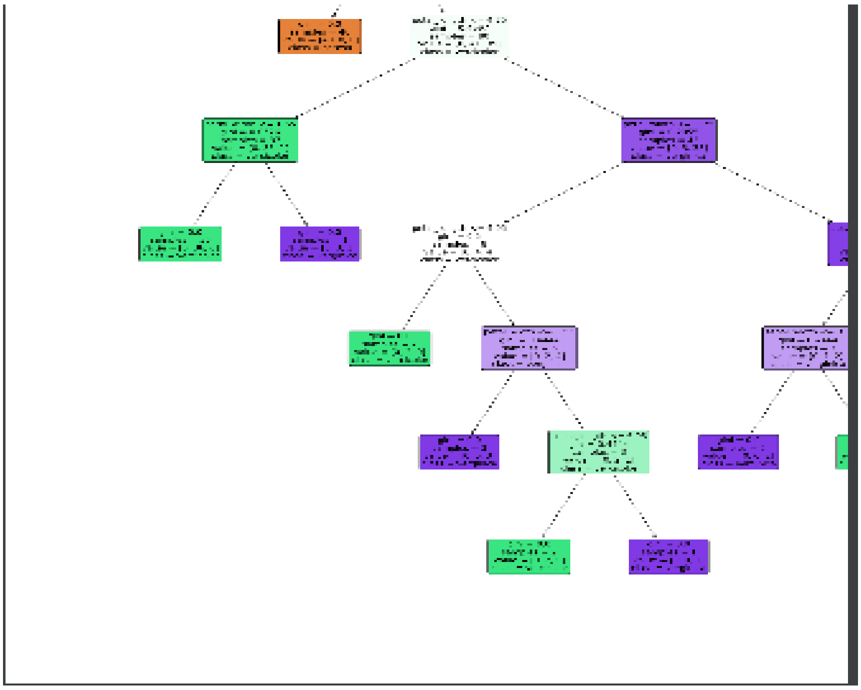
PROGRAM CODE

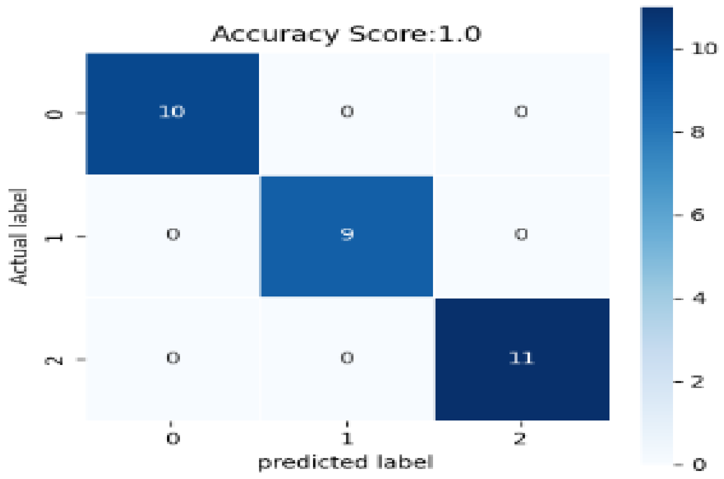
```
Import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from  sklearn.preprocessing import LabelEncoder
from sklearn.model_selection import train_test_split
from  sklearn.tree import DecisionTreeClassifier
from  sklearn.metrics import classification_report, confusion_matrix
from  sklearn.tree import  plot_tree
df=sns.load_dataset('iris')
print(df.head())
print(df.info())
df.isnull().any()
print(df.shape)
sns.pairplot(data=df, hue ='species')
plt.savefig("pne.png")
sns.heatmap(df.corr())
plt.savefig("next.png")
target =df['species']
df1 = df.copy()
df1 = df1.drop('species', axis=1)
print(df1.shape)
print(df1.head())
x=df1
print(target)
le = LabelEncoder()
target = le.fit_transform(target)
```

```
print(target)

y= target
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.2, random_state= 42)
print("training split input" , x_train.shape)
print("test split input",x_test.shape)
dtree=DecisionTreeClassifier()
dtree.fit(x_train, y_train)
print("decision tree classifer created")
y_pred = dtree.predict(x_test)
print("classification report-\n",classification_report(y_test,y_pred))
cm = confusion_matrix(y_test,y_pred)
plt.figure(figsize=(5,5))
sns.heatmap(data=cm,linewidths=.5,annot=True,square=True,cmap='Blues')
plt.ylabel('Actual label')
plt.xlabel('predicted label')
all_sample_title = 'Accuracy Score:{0}'.format(dtree.score(x_test,y_test))
plt.title(all_sample_title,size=12)
plt.savefig("two.png")
plt.figure(figsize=(20,20))
dec_tree=plot_tree(decision_tree=dtree,feature_names=df1.columns,class_names=["setosa","vercic
olor","verginica"],filled=True ,precision=4,rounded=True)
plt.savefig("three.png")
```

OUTPUT


sepal_length
sepal_width
petal_length
petal_width
species
setosa
versicolor
virginica




Accuracy Score:1.0
Actual label
predicted label
0
1
2
0
1
2
10
0
0
0
9
0
0
0
11
10
8
6
4
2
0

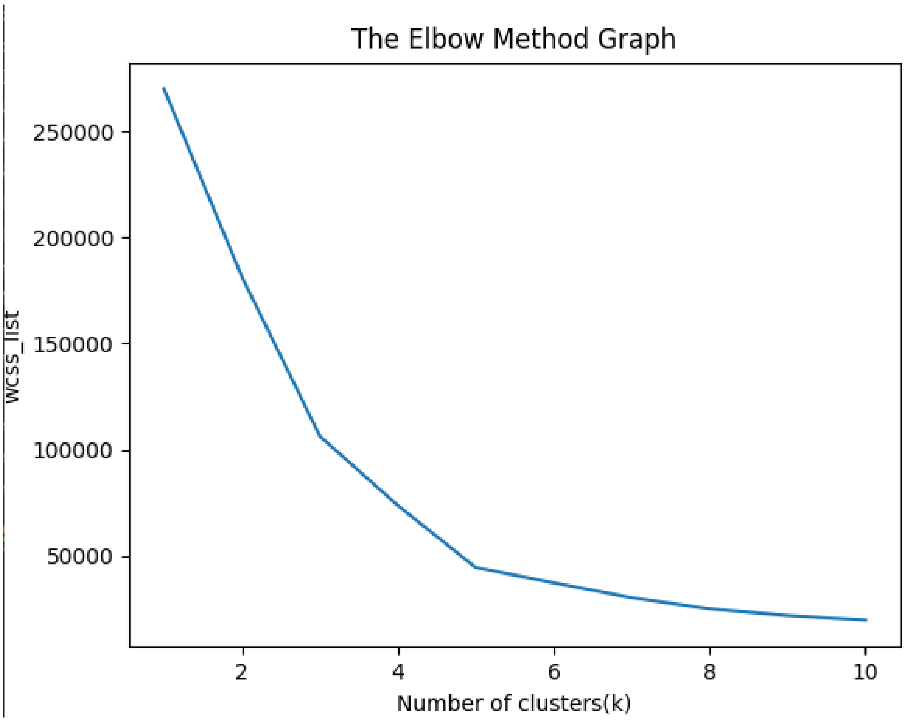
PROGRAM NO : 11 **Date :05/01/2022**

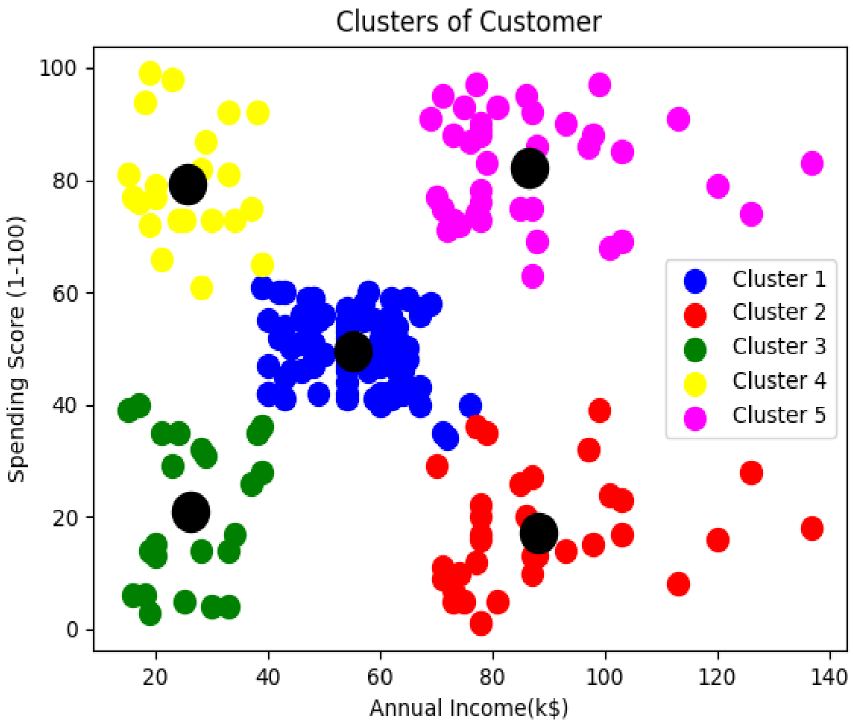
AIM : Program to implement K-Means clustering technique using any standard dataset available in the public domain

PROGRAM CODE

```
import numpy as nm
import matplotlib.pyplot as mtp
import pandas as pd
dataset=pd.read_csv('Mall_Customers.csv')
x=dataset.iloc[:,[3,4]].values
print(x)
from sklearn.cluster import KMeans
wcss_list=[]
for i in range(1,11):
    kmeans=KMeans(n_clusters=i,init='k-means++',random_state=42)
    kmeans.fit(x)
wcss_list.append(kmeans.inertia_)
mtp.plot(range(1,11), wcss_list)
mtp.title('The Elbow Method Graph')
mtp.xlabel('Number of clusters(k)')
mtp.ylabel('wcss_list')
mtp.show()

kmeans=KMeans(n_clusters=5,init='k-means++',random_state=42)

y_predict=kmeans.fit_predict(x)

print('predict=',y_predict)

mtp.scatter(x[y_predict==0,0],x[y_predict==0,1],s=100,c='blue',label='Cluster 1')

mtp.scatter(x[y_predict==1,0],x[y_predict==1,1],s=100,c='red',label='Cluster 2')

mtp.scatter(x[y_predict==2,0],x[y_predict==2,1],s=100,c='green',label='Cluster 3')

mtp.scatter(x[y_predict==3,0],x[y_predict==3,1],s=100,c='yellow',label='Cluster 4')

mtp.scatter(x[y_predict==4,0],x[y_predict==4,1],s=100,c='magenta',label='Cluster 5')

mtp.scatter(kmeans.cluster_centers_[:,0],kmeans.cluster_centers_[:,1],s=300,c='black')

mtp.title('Clusters of Customer')

mtp.xlabel('Annual Income(k$)')

mtp.ylabel('Spending Score (1-100)')

mtp.legend();

mtp.show()
```

OUTPUT


The Elbow Method Graph
wcss_list
250000
200000
150000
100000
50000
2
4
6
8
10
Number of clusters(k)


Clusters of Customer
Spending Score (1-100)
100
80
60
40
20
0
20
40
60
80
100
120
140
Annual Income(k$)
Cluster 1
Cluster 2
Cluster 3
Cluster 4
Cluster 5

PROGRAM NO : 12 **Date :05/01/2022**

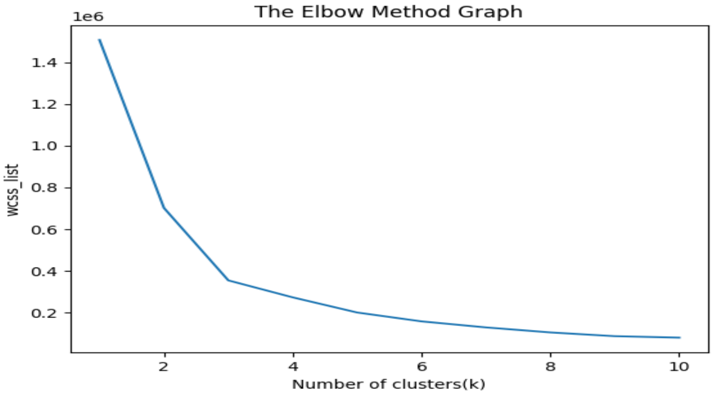
AIM : Program to implement K-Means clustering technique using any standard dataset available in the public domain.

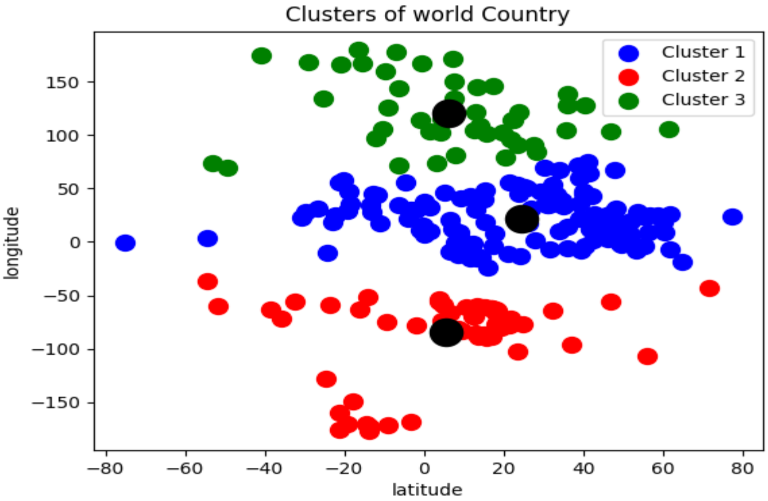
PROGRAM CODE

```
import numpy as nm

import matplotlib.pyplot as mtp

import pandas as pd

dataset=pd.read_csv('world_country_and_usa_states_latitude_and_longitude_values.csv')

x=dataset.iloc[:,[1,2]].values

print(x)

from sklearn.cluster import KMeans

wcss_list=[]

for i in range(1,11):

   kmeans=KMeans(n_clusters=i,init='k-means++',random_state=42)

   kmeans.fit(x)

   wcss_list.append(kmeans.inertia_)

mtp.plot(range(1,11), wcss_list)

mtp.title('The Elbow Method Graph')

mtp.xlabel('Number of clusters(k)')

mtp.ylabel('wcss_list')

mtp.show()

kmeans=KMeans(n_clusters=3,init='k-means++',random_state=42)

y_predict=kmeans.fit_predict(x)
```

```
print('predict=',y_predict)

mtp.scatter(x[y_predict==0,0],x[y_predict==0,1],s=100,c='blue',label='Cluster 1')

mtp.scatter(x[y_predict==1,0],x[y_predict==1,1],s=100,c='red',label='Cluster 2')

mtp.scatter(x[y_predict==2,0],x[y_predict==2,1],s=100,c='green',label='Cluster 3')

mtp.scatter(kmeans.cluster_centers_[:,0],kmeans.cluster_centers_[:,1],s=300,c='black')

mtp.title('Clusters of world Country')

mtp.xlabel('latitude')

mtp.ylabel('longitude')

mtp.legend();

mtp.show()
```

OUTPUT


The Elbow Method Graph
1e6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
wcss_list
2
4
6
8
10
Number of clusters(k)


Clusters of world Country
Cluster 1
Cluster 2
Cluster 3
150
100
50
0
−50
−100
−150
longitude
−80
−60
−40
−20
0
20
40
60
80
latitude

PROGRAM NO : 13 **Date :02/02/2022**

AIM : Programs on convolutional neural network to classify images from any standard dataset in the public domain.

PROGRAM CODE

```
import numpy as np

import pandas as pd

import matplotlib.pyplot as plt

import tensorflow as tf

from tensorflow import keras

np.random.seed(42)

# tf.set.random. seed(42)

fashion_mnist = keras.datasets.fashion_mnist

(X_train, y_train), (X_test, y_test) = fashion_mnist.load_data()

print(X_train.shape, X_test.shape)

X_train = X_train / 255.0

X_test = X_test / 255.0

plt.imshow(X_train[1], cmap='binary')

plt.show()

np.unique(y_test)

class_names = ['T-Shirt/Top', 'Trouser', 'Pullover', 'Dress', 'Coat', 'Sandal', 'Shirt', 'Sneaker', '8ag',
'Ankle Boot']

n_rows = 5

n_cols = 10

plt.figure(figsize=(n_cols * 1.4, n_rows * 1.6))

for row in range(n_rows):
   for col in range(n_cols):

       index = n_cols * row + col

       plt.subplot(n_rows, n_cols, index + 1)

       plt.imshow(X_train[index], cmap='binary', interpolation='nearest')

       plt.axis('off')

       plt.title(class_names[y_train[index]])

plt.show()

model_CNN = keras.models.Sequential()

model_CNN.add(keras.layers.Conv2D(filters=32, kernel_size=7, padding='same', activation='relu',
input_shape=[28, 28, 1]))

model_CNN.add(keras.layers.MaxPooling2D(pool_size=2))

model_CNN.add(keras.layers.Conv2D(filters=64, kernel_size=3, padding='same', activation='relu'))

model_CNN.add(keras.layers.MaxPooling2D(pool_size=2))

model_CNN.add(keras.layers.Conv2D(filters=32, kernel_size=3, padding='same', activation='relu'))

model_CNN.add(keras.layers.MaxPooling2D(pool_size=2))


model_CNN.summary()

model_CNN.add(keras.layers.Flatten())

model_CNN.add(keras.layers.Dense(units=128, activation='relu'))

model_CNN.add(keras.layers.Dense(units=64, activation='relu'))

model_CNN.add(keras.layers.Dense(units=10, activation='softmax'))

model_CNN.summary()

 model_CNN.compile(loss='sparse_categorical_crossentropy', optimizer='adam',
metrics=['accuracy'])

 X_train = X_train[..., np.newaxis]
```

```
X_test = X_test[..., np.newaxis]

history_CNN = model_CNN.fit(X_train, y_train, epochs=2, validation_split=0.1)

pd.DataFrame(history_CNN.history).plot()

plt.grid(True)

plt.xlabel('epochs')

plt.ylabel('loss/accuracy')

plt.title('Training and validation plot')

plt.show()

test_loss, test_accuracy = model_CNN.evaluate(X_test, y_test)

print(' Test Loss :{}, Test Accuracy : {}'.format(test_loss, test_accuracy))
```

OUTPUT

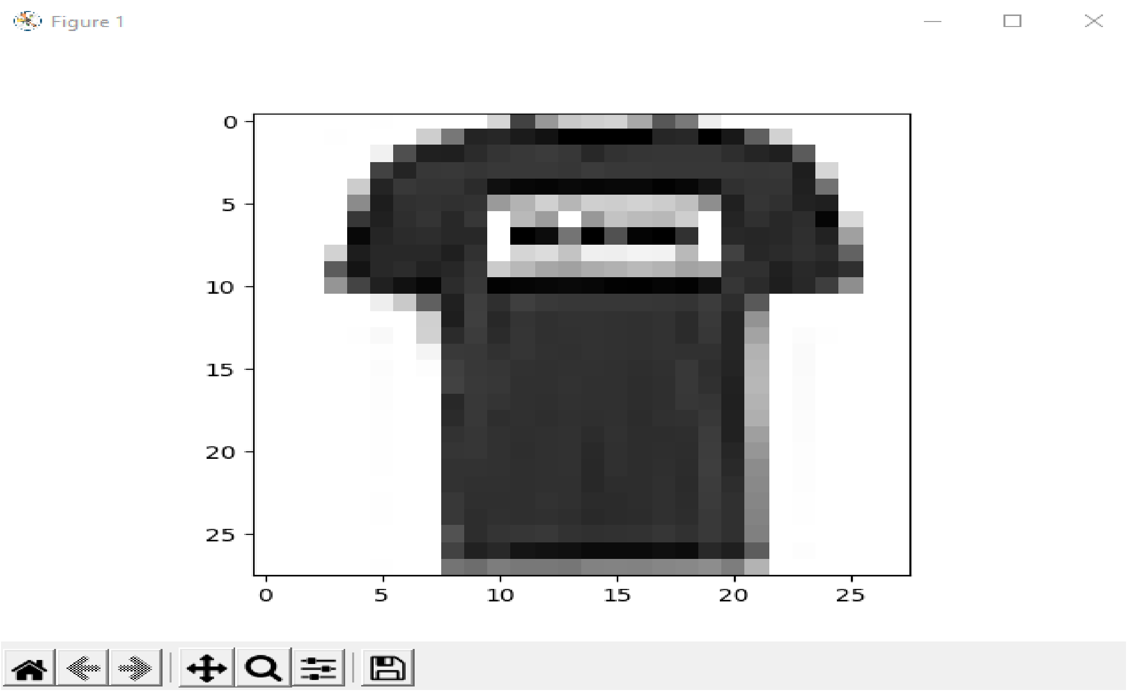


Figure 1
0
5
10
15
20
25
0
5
10
15
20
25

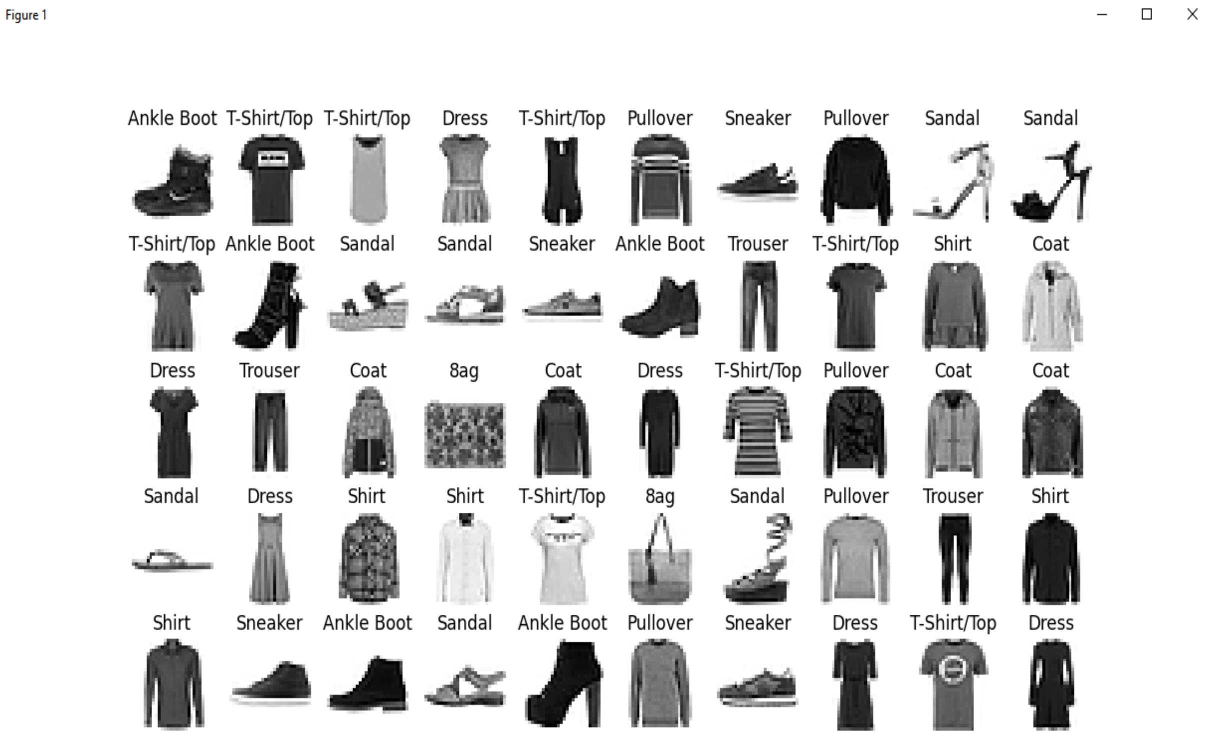
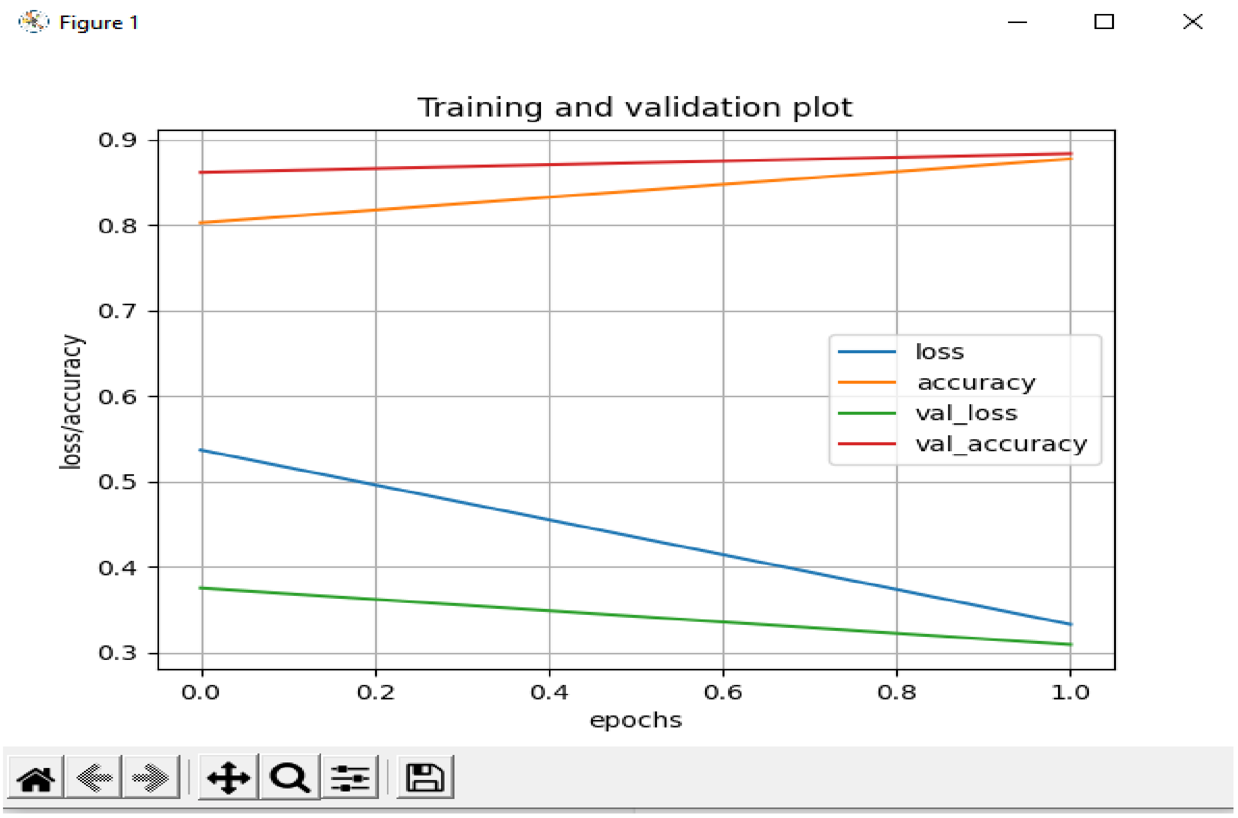
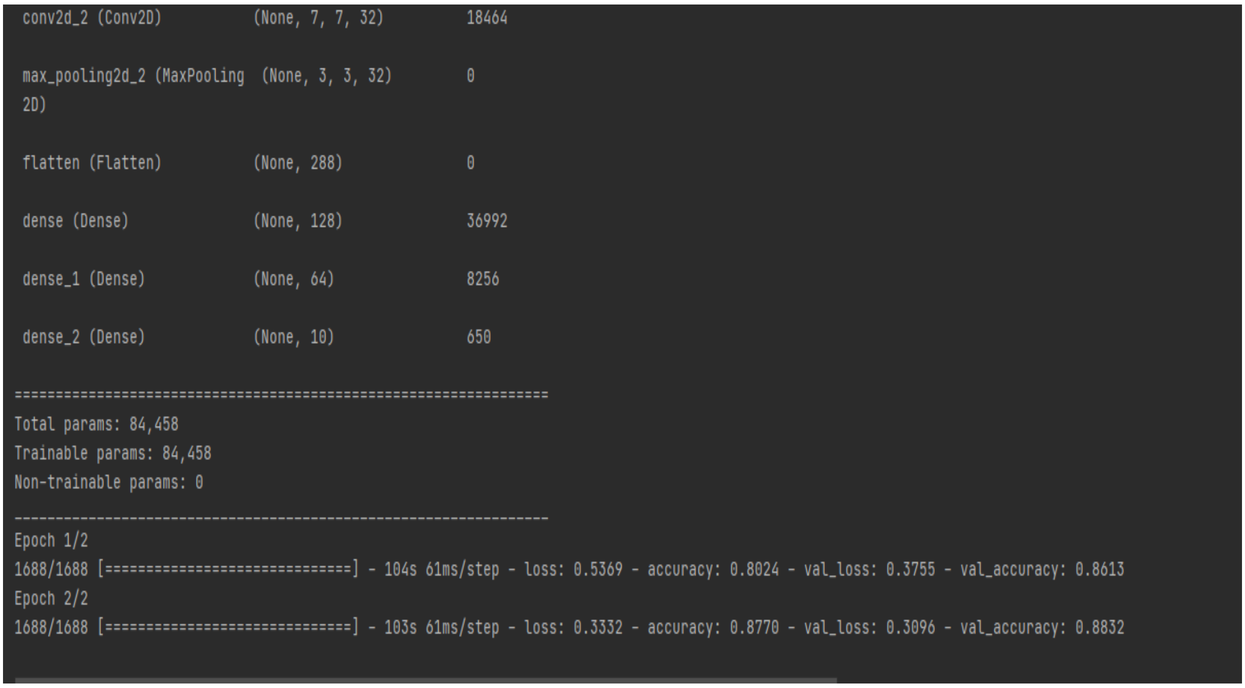


Figure 1
Ankle Boot
T-Shirt/Top
T-Shirt/Top
Dress
T-Shirt/Top
Pullover
Sneaker
Pullover
Sandal
Sandal
T-Shirt/Top
Ankle Boot
Sandal
Sandal
Sneaker
Ankle Boot
Trouser
T-Shirt/Top
Shirt
Coat
Dress
Trouser
Coat
8ag
Coat
Dress
T-Shirt/Top
Pullover
Coat
Coat
Sandal
Dress
Shirt
Shirt
T-Shirt/Top
8ag
Sandal
Pullover
Trouser
Shirt
Shirt
Sneaker
Ankle Boot
Sandal
Ankle Boot
Pullover
Sneaker
Dress
T-Shirt/Top
Dress




```
 conv2d_2 (Conv2D)           (None, 7, 7, 32)          18464

 max_pooling2d_2 (MaxPooling  (None, 3, 3, 32)         0
 2D)

 flatten (Flatten)           (None, 288)               0

 dense (Dense)               (None, 128)               36992

 dense_1 (Dense)             (None, 64)                8256

 dense_2 (Dense)             (None, 10)                650

=================================================================
Total params: 84,458
Trainable params: 84,458
Non-trainable params: 0
_________________________________________________________________
Epoch 1/2
1688/1688 [==============================] - 104s 61ms/step - loss: 0.5369 - accuracy: 0.8024 - val_loss: 0.3755 - val_accuracy: 0.8613
Epoch 2/2
1688/1688 [==============================] - 103s 61ms/step - loss: 0.3332 - accuracy: 0.8770 - val_loss: 0.3096 - val_accuracy: 0.8832
```

PROGRAM NO : 14 **Date :16/02/2022**

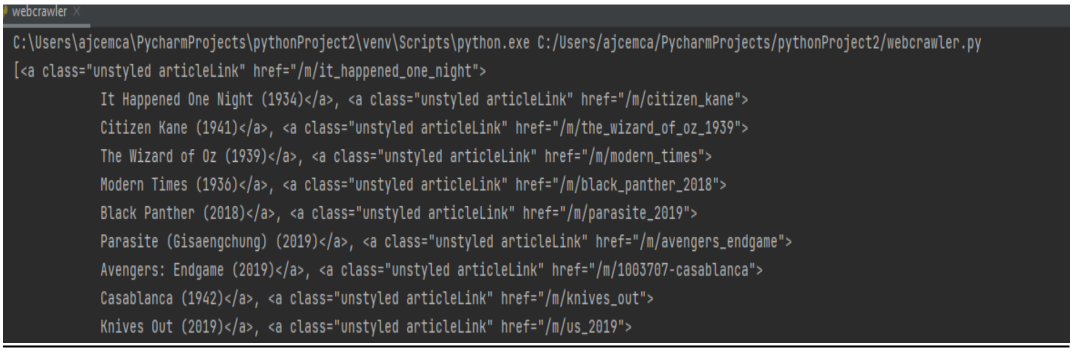
AIM : Program to implement a simple web crawler using python.

PROGRAM CODE

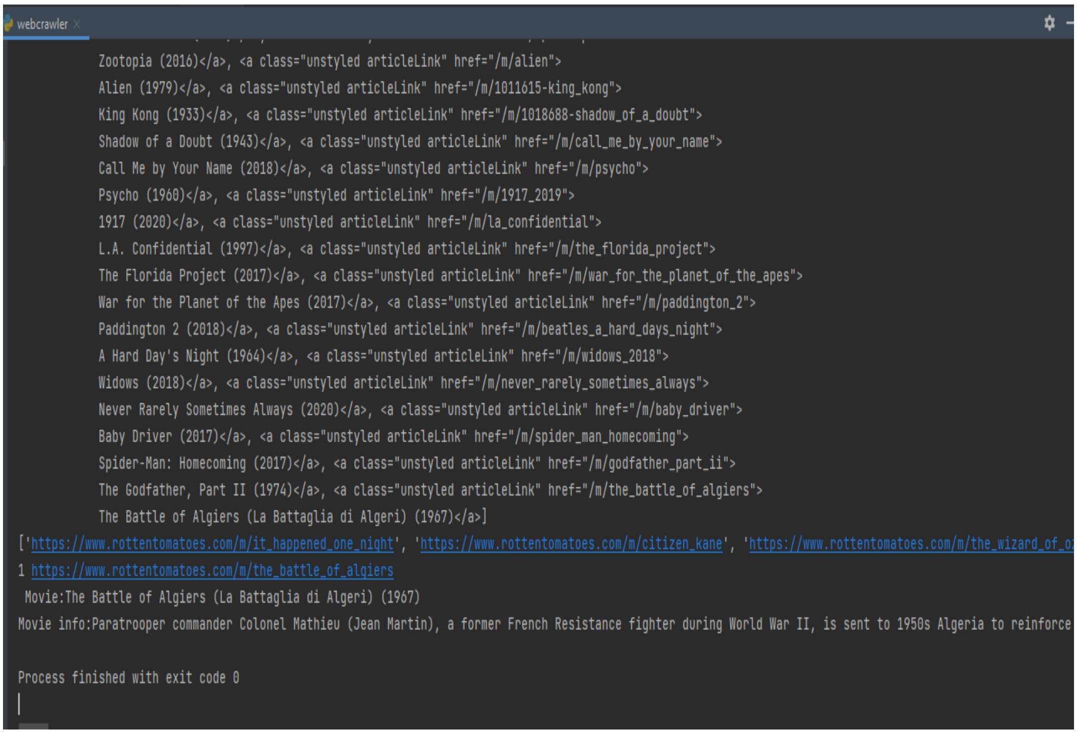
```
import requests

import lxml

from bs4 import BeautifulSoup

#import beautifulsoup4

url = "https://www.rottentomatoes.com/top/bestofrt/"

headers = { 'User-Agents' : 'Mozilla/5.0 (Windows NT 6.1; WOW64) AppleWebKit/537.36
(KHTML, like Gecko) Chrome/63.0.3239.132 Safari/537.36 QIHU 36OSE'}

f = requests.get(url, headers = headers)

movies_list = []

soup = BeautifulSoup(f.content, 'html.parser')

movies = soup.find('table', {'class' : 'table'}) .find_all('a')

print(movies)

num = 0

for anchor in movies:

urls = 'https://www.rottentomatoes.com' + anchor['href']

   movies_list.append(urls)

print(movies_list)

num +=1

movie_url=urls

#movie_url=movies_lst

movie_f=requests.get(movie_url,headers=headers)
```

```
movie_soup=BeautifulSoup(movie_f.content,'lxml')

movie_content=movie_soup.find('div',{

    'class':'movie_synopsis clamp clamp-6 js-clamp'

})

print(num,urls,'\n','Movie:' + anchor.string.strip())

print('Movie info:' + movie_content.string.strip())
```

OUTPUT



```
C:\Users\ajcemca\PycharmProjects\pythonProject2\venv\Scripts\python.exe C:/Users/ajcemca/PycharmProjects/pythonProject2/webcrawler.py
[<a class="unstyled articleLink" href="/m/it_happened_one_night">
            It Happened One Night (1934)</a>, <a class="unstyled articleLink" href="/m/citizen_kane">
            Citizen Kane (1941)</a>, <a class="unstyled articleLink" href="/m/the_wizard_of_oz_1939">
            The Wizard of Oz (1939)</a>, <a class="unstyled articleLink" href="/m/modern_times">
            Modern Times (1936)</a>, <a class="unstyled articleLink" href="/m/black_panther_2018">
            Black Panther (2018)</a>, <a class="unstyled articleLink" href="/m/parasite_2019">
            Parasite (Gisaengchung) (2019)</a>, <a class="unstyled articleLink" href="/m/avengers_endgame">
            Avengers: Endgame (2019)</a>, <a class="unstyled articleLink" href="/m/1003707-casablanca">
            Casablanca (1942)</a>, <a class="unstyled articleLink" href="/m/knives_out">
            Knives Out (2019)</a>, <a class="unstyled articleLink" href="/m/us_2019">
```



```
            Zootopia (2016)</a>, <a class="unstyled articleLink" href="/m/alien">
            Alien (1979)</a>, <a class="unstyled articleLink" href="/m/1011615-king_kong">
            King Kong (1933)</a>, <a class="unstyled articleLink" href="/m/1018688-shadow_of_a_doubt">
            Shadow of a Doubt (1943)</a>, <a class="unstyled articleLink" href="/m/call_me_by_your_name">
            Call Me by Your Name (2018)</a>, <a class="unstyled articleLink" href="/m/psycho">
            Psycho (1960)</a>, <a class="unstyled articleLink" href="/m/1917_2019">
            1917 (2020)</a>, <a class="unstyled articleLink" href="/m/la_confidential">
            L.A. Confidential (1997)</a>, <a class="unstyled articleLink" href="/m/the_florida_project">
            The Florida Project (2017)</a>, <a class="unstyled articleLink" href="/m/war_for_the_planet_of_the_apes">
            War for the Planet of the Apes (2017)</a>, <a class="unstyled articleLink" href="/m/paddington_2">
            Paddington 2 (2018)</a>, <a class="unstyled articleLink" href="/m/beatles_a_hard_days_night">
            A Hard Day's Night (1964)</a>, <a class="unstyled articleLink" href="/m/widows_2018">
            Widows (2018)</a>, <a class="unstyled articleLink" href="/m/never_rarely_sometimes_always">
            Never Rarely Sometimes Always (2020)</a>, <a class="unstyled articleLink" href="/m/baby_driver">
            Baby Driver (2017)</a>, <a class="unstyled articleLink" href="/m/spider_man_homecoming">
            Spider-Man: Homecoming (2017)</a>, <a class="unstyled articleLink" href="/m/godfather_part_ii">
            The Godfather, Part II (1974)</a>, <a class="unstyled articleLink" href="/m/the_battle_of_algiers">
            The Battle of Algiers (La Battaglia di Algeri) (1967)</a>]
['https://www.rottentomatoes.com/m/it_happened_one_night', 'https://www.rottentomatoes.com/m/citizen_kane', 'https://www.rottentomatoes.com/m/the_wizard_of_o
1 https://www.rottentomatoes.com/m/the_battle_of_algiers
 Movie:The Battle of Algiers (La Battaglia di Algeri) (1967)
Movie info:Paratrooper commander Colonel Mathieu (Jean Martin), a former French Resistance fighter during World War II, is sent to 1950s Algeria to reinforce

Process finished with exit code 0
```

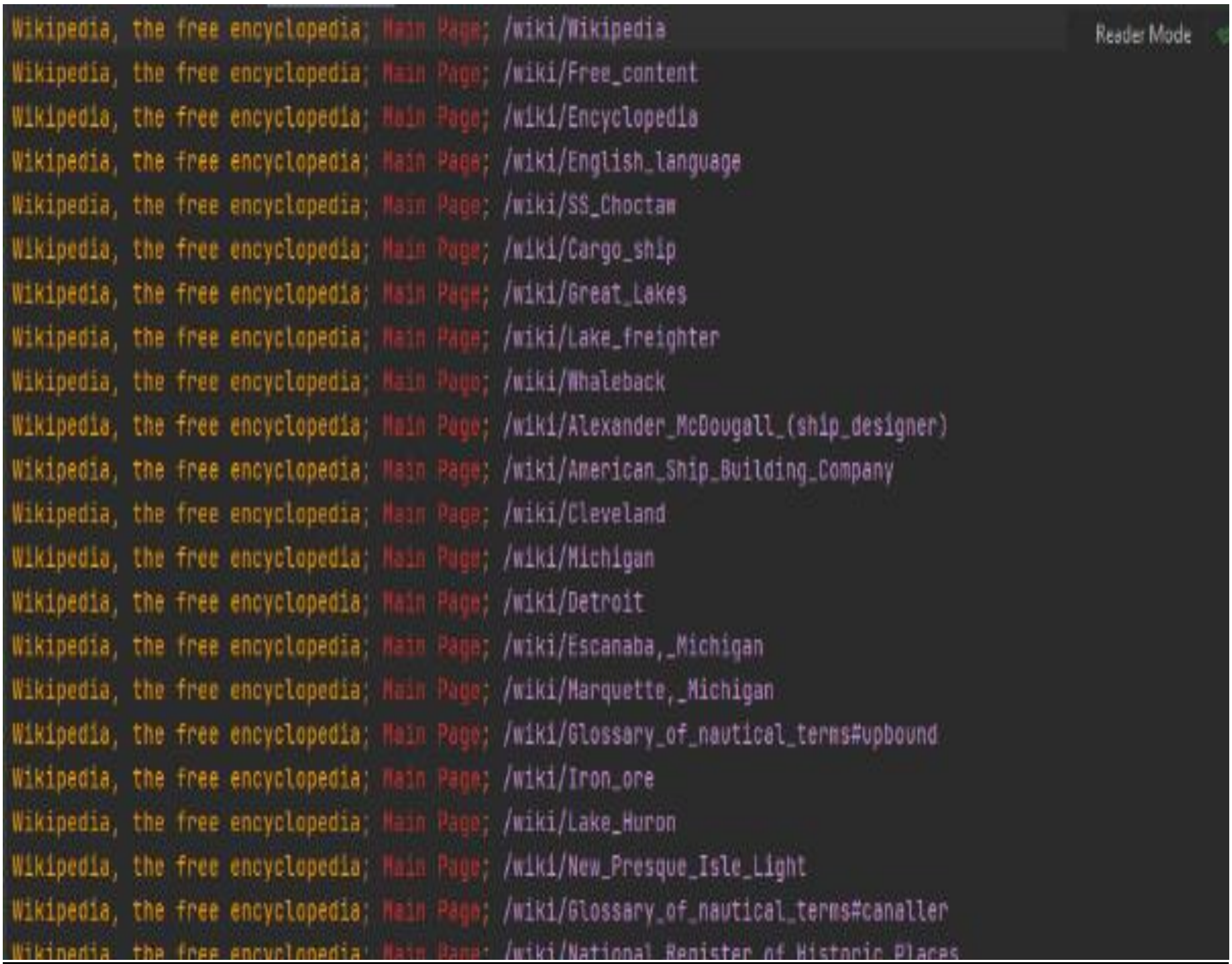
PROGRAM NO : 15 **Date :16/02/2022**

AIM : Program to implement a simple web crawler using python.

PROGRAM CODE

```
from bs4 import BeautifulSoup
import requests
pages_crawled =[ ]
def crawler(url):
      page =requests.get(url)
  soup=BeautifulSoup(page.text,'html.parser')
  links=soup.find_all('a')
      for link in links:
      if 'href' in link.attrs:
      if link['href'].startswith('/wiki') and ':' not in link['href']:
            if link['href'] not in pages_crawled:
          new_link = f"https://en.wikipedia.org{link['href']}"
          pages_crawled.append(link['href'])
          try:
            with open('data.csv','a') as file:
                file.write(f'{soup.title.text}:{link["href"]}\n')
              crawler(new_link)
          except:
            continue
 crawler('https://en.wikipedia.org')
```

OUTPUT



```
Wikipedia, the free encyclopedia; Main Page; /wiki/Wikipedia
Wikipedia, the free encyclopedia; Main Page; /wiki/Free_content
Wikipedia, the free encyclopedia; Main Page; /wiki/Encyclopedia
Wikipedia, the free encyclopedia; Main Page; /wiki/English_language
Wikipedia, the free encyclopedia; Main Page; /wiki/SS_Choctaw
Wikipedia, the free encyclopedia; Main Page; /wiki/Cargo_ship
Wikipedia, the free encyclopedia; Main Page; /wiki/Great_Lakes
Wikipedia, the free encyclopedia; Main Page; /wiki/Lake_freighter
Wikipedia, the free encyclopedia; Main Page; /wiki/Whaleback
Wikipedia, the free encyclopedia; Main Page; /wiki/Alexander_McDougall_(ship_designer)
Wikipedia, the free encyclopedia; Main Page; /wiki/American_Ship_Building_Company
Wikipedia, the free encyclopedia; Main Page; /wiki/Cleveland
Wikipedia, the free encyclopedia; Main Page; /wiki/Michigan
Wikipedia, the free encyclopedia; Main Page; /wiki/Detroit
Wikipedia, the free encyclopedia; Main Page; /wiki/Escanaba,_Michigan
Wikipedia, the free encyclopedia; Main Page; /wiki/Marquette,_Michigan
Wikipedia, the free encyclopedia; Main Page; /wiki/Glossary_of_nautical_terms#upbound
Wikipedia, the free encyclopedia; Main Page; /wiki/Iron_ore
Wikipedia, the free encyclopedia; Main Page; /wiki/Lake_Huron
Wikipedia, the free encyclopedia; Main Page; /wiki/New_Presque_Isle_Light
Wikipedia, the free encyclopedia; Main Page; /wiki/Glossary_of_nautical_terms#canaller
Wikipedia, the free encyclopedia; Main Page; /wiki/National_Register_of_Historic_Places
```

PROGRAM NO : 16 **Date :16/02/2022**

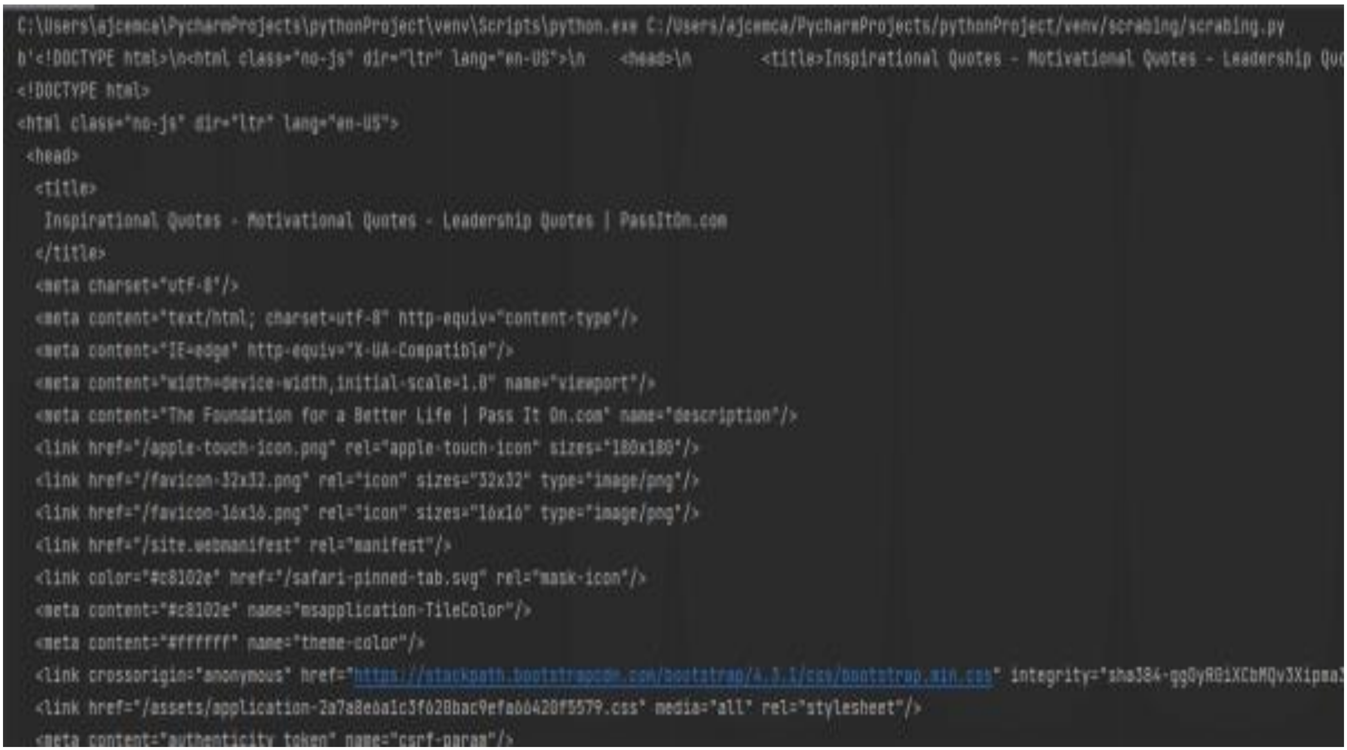
AIM : Program to implement scrap of any website.

PROGRAM CODE

```
import requests

from bs4 import BeautifulSoup

import csv

URL = "http://www.values.com/inspirational-quotes"

r = requests.get(URL)

print(r.content)

soup = BeautifulSoup(r.content, 'lxml')

print(soup.prettify())

quotes = []

table = soup.find('div', attrs={'id': 'all_quotes'})

for row in table.findAll('div'

   attrs={'class': 'col-6 col-lg-3 text-center margin-30px-bottom sm-margin-30px-top'}):

         quote = {}

         quote['theme'] = row.h5.text

         quote['url'] = row.a['href']

         quote['img'] = row.img['src']

         quote['lines'] = row.img['alt'].split(" #")[0]

         quote['author'] = row.img['alt'].split(" #")[1]

         quotes.append(quote)
```

```
filename = 'inspirational_quotes.csv'

with open(filename, 'w', newline='') as f:

        w = csv.DictWriter(f, ['theme', 'url', 'img', 'lines', 'author'])

        w.writeheader()

        for quote in quotes:

     w.writerow(quote)
```

OUTPUT



```
C:\Users\ajcemca\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/ajcemca/PycharmProjects/pythonProject/venv/scrabing/scrabing.py
b'<!DOCTYPE html>\n<html class="no-js" dir="ltr" lang="en-US">\n    <head>\n        <title>Inspirational Quotes - Motivational Quotes - Leadership Quo
<!DOCTYPE html>
<html class="no-js" dir="ltr" lang="en-US">
 <head>
  <title>
   Inspirational Quotes - Motivational Quotes - Leadership Quotes | PassItOn.com
  </title>
  <meta charset="utf-8"/>
  <meta content="text/html; charset=utf-8" http-equiv="content-type"/>
  <meta content="IE=edge" http-equiv="X-UA-Compatible"/>
  <meta content="width=device-width,initial-scale=1.0" name="viewport"/>
  <meta content="The Foundation for a Better Life | Pass It On.com" name="description"/>
  <link href="/apple-touch-icon.png" rel="apple-touch-icon" sizes="180x180"/>
  <link href="/favicon-32x32.png" rel="icon" sizes="32x32" type="image/png"/>
  <link href="/favicon-16x16.png" rel="icon" sizes="16x16" type="image/png"/>
  <link href="/site.webmanifest" rel="manifest"/>
  <link color="#c8102e" href="/safari-pinned-tab.svg" rel="mask-icon"/>
  <meta content="#c8102e" name="msapplication-TileColor"/>
  <meta content="#ffffff" name="theme-color"/>
  <link crossorigin="anonymous" href="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css" integrity="sha384-ggOyR0iXCbMQv3Xipma3
  <link href="/assets/application-2a7a8eba1c3f620bac9efab6420f5579.css" media="all" rel="stylesheet"/>
  <meta content="authenticity_token" name="csrf-param"/>
```

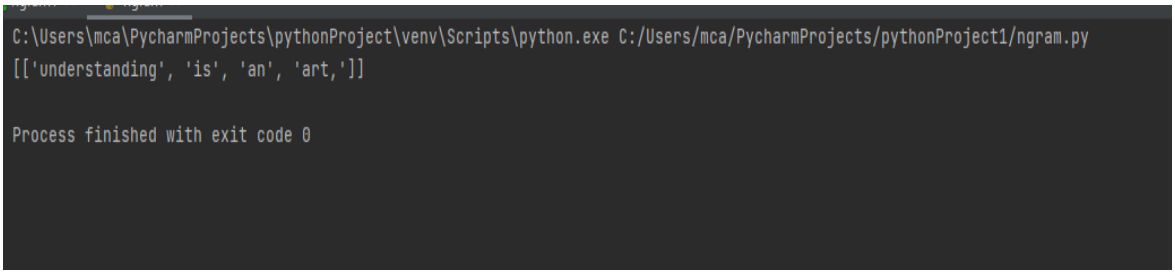
PROGRAM NO : 17 **Date :16/02/2022**

AIM : Program for Natural Language Processing which performs n-grams.

PROGRAM CODE

```
def generate_ngrams(text, WordsToCombine):

    words = text.split()

    output = []

    for i in range(len(words) - WordsToCombine + 1):

        output.append(words[i:i+1 + WordsToCombine])

        return output

x=generate_ngrams(text='understanding is an art, not everyone is an artist', WordsToCombine=3)

print(x)
```

OUTPUT



```
C:\Users\mca\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/mca/PycharmProjects/pythonProject1/ngram.py
[['understanding', 'is', 'an', 'art,']]

Process finished with exit code 0
```

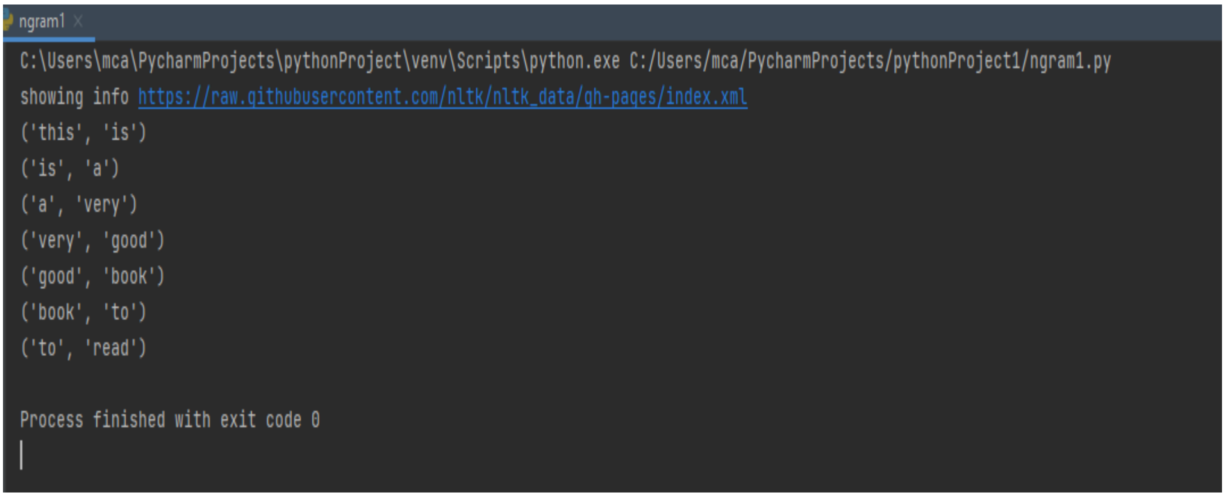
PROGRAM NO : 18 **Date :16/02/2022**

AIM : Program for Natural Language Processing which performs n-grams (Using in built functions).

PROGRAM CODE

```
import nltk

nltk.download('punkt')

from nltk.util import ngrams

sampleText='this is a very good book to study'

NGRAMS=ngrams(sequence=nltk.word_tokenize(sampleText),n=2)

for grams in NGRAMS:

        print(grams)
```

OUTPUT



```
C:\Users\mca\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/mca/PycharmProjects/pythonProject1/ngram1.py
showing info https://raw.githubusercontent.com/nltk/nltk_data/gh-pages/index.xml
('this', 'is')
('is', 'a')
('a', 'very')
('very', 'good')
('good', 'book')
('book', 'to')
('to', 'read')

Process finished with exit code 0
```

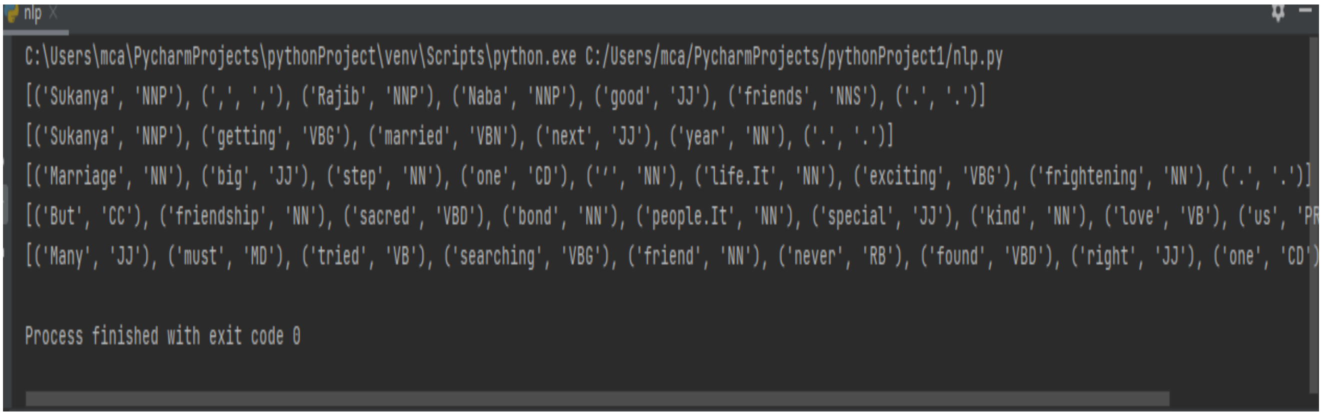
PROGRAM NO : 19 **Date :16/02/2022**

AIM : Program for Natural Language Processing which performs speech tagging.

PROGRAM CODE

```
import nltk
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize, sent_tokenize
stop_words = set(stopwords.words('english'))
txt = "Sukanya, Rajib and Naba are my good friends. " \
      "Sukanya is getting married next year. " \
      "Marriage is a big step in one’s life." \
      "It is both exciting and frightening. " \
      "But friendship is a sacred bond between people." \
      "It is a special kind of love between us. " \
      "Many of you must have tried searching for a friend " \
      "but never found the right one."
tokenized = sent_tokenize(txt)
for i in tokenized:
    wordsList = nltk.word_tokenize(i)
    wordsList = [w for w in wordsList if not w in stop_words]
    tagged = nltk.pos_tag(wordsList)
    print(tagged)
```

OUTPUT



```
C:\Users\mca\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/mca/PycharmProjects/pythonProject1/nlp.py
[('Sukanya', 'NNP'), (',', ','), ('Rajib', 'NNP'), ('Naba', 'NNP'), ('good', 'JJ'), ('friends', 'NNS'), ('.', '.')]
[('Sukanya', 'NNP'), ('getting', 'VBG'), ('married', 'VBN'), ('next', 'JJ'), ('year', 'NN'), ('.', '.')]
[('Marriage', 'NN'), ('big', 'JJ'), ('step', 'NN'), ('one', 'CD'), ('’', 'NN'), ('life.It', 'NN'), ('exciting', 'VBG'), ('frightening', 'NN'), ('.', '.')]
[('But', 'CC'), ('friendship', 'NN'), ('sacred', 'VBD'), ('bond', 'NN'), ('people.It', 'NN'), ('special', 'JJ'), ('kind', 'NN'), ('love', 'VB'), ('us', 'PR
[('Many', 'JJ'), ('must', 'MD'), ('tried', 'VB'), ('searching', 'VBG'), ('friend', 'NN'), ('never', 'RB'), ('found', 'VBD'), ('right', 'JJ'), ('one', 'CD')

Process finished with exit code 0
```

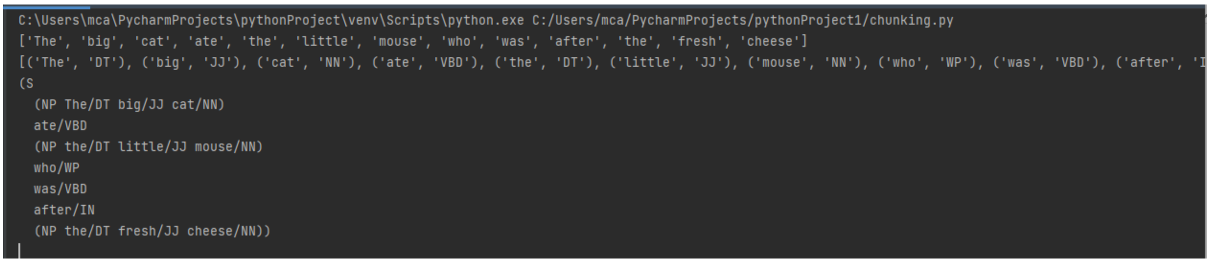
PROGRAM NO : 20 **Date :23/02/2022**

AIM : Python program which performs Natural language processing which perform Chunking.

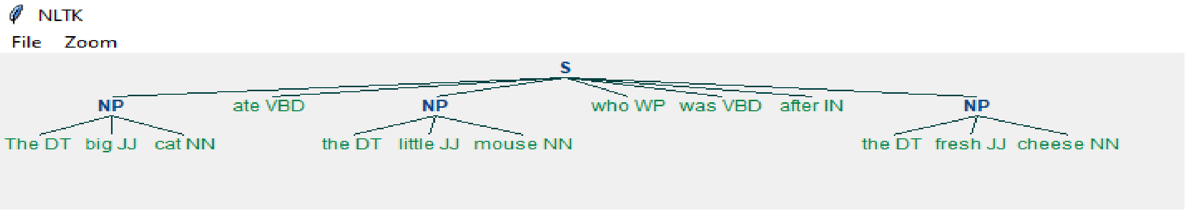
PROGRAM CODE

```
import nltk

new="The big cat ate the little mouse who was after the fresh cheese"

new_tokens=nltk.word_tokenize(new)

print(new_tokens)

new_tag=nltk.pos_tag(new_tokens)

print(new_tag)

grammer=r"NP: {<DT>?<JJ>*<NN>}"

chunkParser=nltk.RegexpParser(grammer)

chunked=chunkParser.parse(new_tag)

print(chunked)

chunked.draw()
```

OUTPUT



```
C:\Users\mca\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/mca/PycharmProjects/pythonProject1/chunking.py
['The', 'big', 'cat', 'ate', 'the', 'little', 'mouse', 'who', 'was', 'after', 'the', 'fresh', 'cheese']
[('The', 'DT'), ('big', 'JJ'), ('cat', 'NN'), ('ate', 'VBD'), ('the', 'DT'), ('little', 'JJ'), ('mouse', 'NN'), ('who', 'WP'), ('was', 'VBD'), ('after', 'I
(S
  (NP The/DT big/JJ cat/NN)
  ate/VBD
  (NP the/DT little/JJ mouse/NN)
  who/WP
  was/VBD
  after/IN
  (NP the/DT fresh/JJ cheese/NN))
```



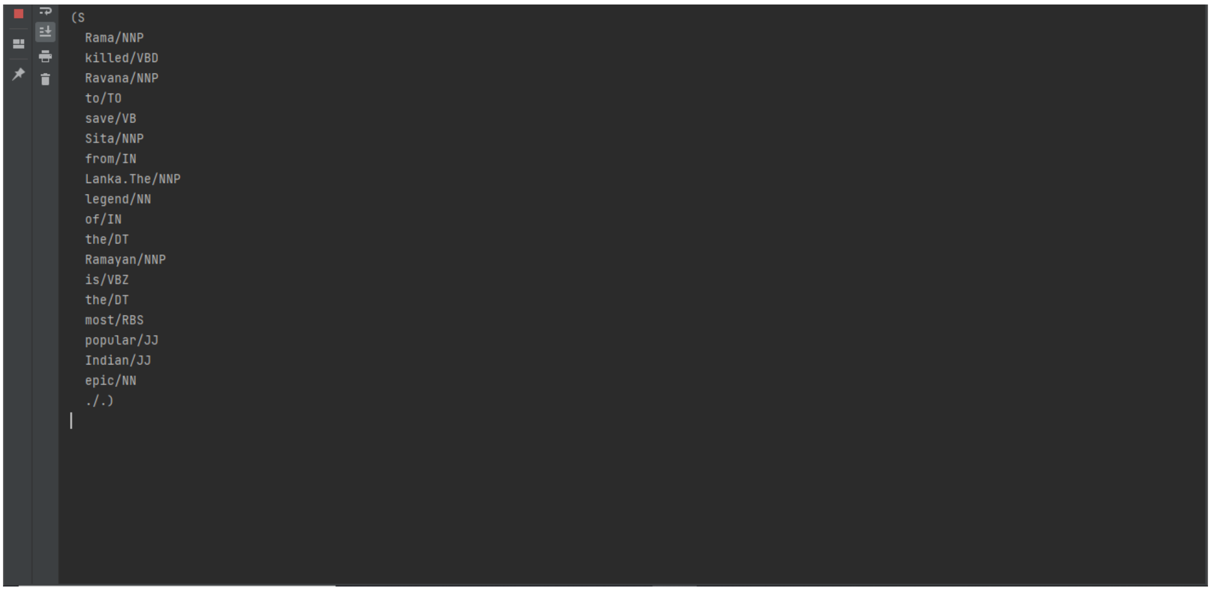
PROGRAM NO : 21 **Date :23/02/2022**

AIM : Program for natural language processing which performs chunking.

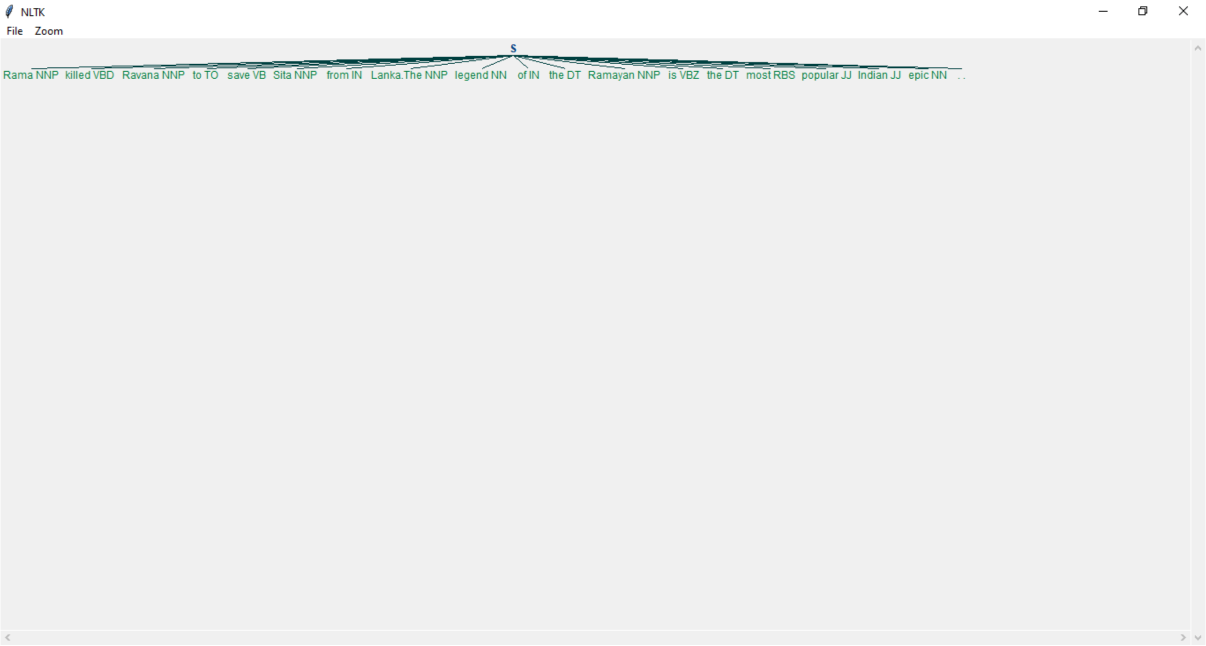
PROGRAM CODE

```
import nltk

nltk.download('averaged_perception_tagger')

sample_text="""

Rama killed Ravana to save Sita from Lanka.The legend of the Ramayan is the most popular Indian epic. A lot of Movies and

serials have have already been shot in several language here in India based on the Ramayana."""


tokenize= nltk.sent_tokenize(sample_text)

for i in tokenize:

   words = nltk.word_tokenize(i)

   tagged_words = nltk.pos_tag(words)

   chunkGram=r"""VB: {}"""

   chunkParser=nltk.RegexpParser(chunkGram)

   chunked=chunkParser.parse(tagged_words)

   print(chunked)

   chunked.draw()
```

OUTPUT



```
(S
  Rama/NNP
  killed/VBD
  Ravana/NNP
  to/TO
  save/VB
  Sita/NNP
  from/IN
  Lanka.The/NNP
  legend/NN
  of/IN
  the/DT
  Ramayan/NNP
  is/VBZ
  the/DT
  most/RBS
  popular/JJ
  Indian/JJ
  epic/NN
  ./.)
```


NLTK
File
Zoom
S
Rama NNP
killed VBD
Ravana NNP
to TO
save VB
Sita NNP
from IN
Lanka.The NNP
legend NN
of IN
the DT
Ramayan NNP
is VBZ
the DT
most RBS
popular JJ
Indian JJ
epic NN
. .