MOUNT ZION COLLEGE OF ENGINEERING

Kadammanitta – Pathanamthitta Kerala 689649

(Affiliated to APJ Abdul Kalam Technological University)

20MCA241 DATA SCIENCE LAB

LABORATORY RECORD

SECOND YEAR

Submitted by

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MZC21MCA-2021

Submitted in partial fulfillment of the requirement for the

Award of the Degree

of

MASTER OF COMPUTER APPLICATIONS

(2021-2023)

Department of Computer Applications

MOUNT ZION COLLEGE OF ENGINEERING, KADAMMANITTA

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CERTIFICATE

Certified that this is a bonafide record of practical work done in Data Science Lab (20MCA241) Laboratory by P J SREEDEEP Reg No:MZC21MCA-2021 of Mount Zion College of Engineering, Kadammanitta – Pathanamthitta during the academic year 2021-2023.

Head of the department **Staff member in-charge**

Internal Examiner

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PROGRAM NO. 1

Name: P J Sreedeep	**Roll No: 20**	**Name of Lab: Data Science Lab**	**Period:**
Class: S3, MCA	**Date:**	**Nature of Lab Work: Practical**	**Batch: 2021-2023**

Title: Matrix Operation :

Dot product,Transpose,Inverse,Trace,Rank,Eigen,Determinant,Sentimental Analysis.

Objectives: Review of the python programming, matrix operations.

DOT PRODUCT OF MATRIX:

Input:

```
import numpy as np

def create_matrix(mc):

print("ARRAY"+str(mc)+" Elements:")

array_1=map(int,input().split())

array_1=np.array(list(array_1))

print("ARRAY"+str(mc)+", ROW COLUMN:")

row,column=map(int,input().split())

if(len(array_1)!=(row*column)):

print("\nRow and Column size not match with total elements !! retry")

return create_matrix(mc)
```

```
array_1=array_1.reshape(row,column)

print("\nARRAY"+str(mc))

print(array_1)

return(array_1)

arr1=create_matrix(1)

arr2=create_matrix(2)

if(arr1.shape==arr2.shape):

print("\nDot product")

print(np.dot(arr1,arr2))

else:

print("\nDimensions not matching!")
```

Output:

```
ARRAY1 Elements:  1 2 3 4 5 6 7 8 9

ARRAY 1, ROW COLUMN:

3 3

ARRAY1

[[1 2 3]

 [4 5 6]

 [7 8 9]]

ARRAY2 Elements:

1 2 3 4 5 6 7 8 9

ARRAY 2, ROW COLUMN:

3 3

ARRAY2

[[1 2 3]

 [4 5 6]

 [7 8 9]]
```

```
Dot product
[[ 30  36  42]
 [ 66  81  96]
 [102 126 150]]
```

Result/Observation

Successfully completed the data science program and output is obtained.

Mark:

Viva(5)	Performance(5)	Total(10)

Assessor:

TRANSPOSE OF MATRIX:

Input:

```
import numpy as np

def create_matrix(mc):

print("\nARRAY"+str(mc)+" Elements:")

array_1=map(int,input().split())

array_1=np.array(list(array_1))

print("ARRAY"+str(mc)+", ROW COLUMN:")

row,column=map(int,input().split())

if(len(array_1)!=(row*column)):

print("\nRow and Column size not match with total elements !! retry")

return create_matrix(mc)

array_1=array_1.reshape(row,column)

print("\nARRAY"+str(mc))

print(array_1)

print("\nTranspose:")

return(array_1)

print(create_matrix(1).transpose())
```

Output:

```
ARRAY 1 Elements: 1 2 3 4 5 6 7 8 9

ARRAY 1, ROW COLUMN:  3 3

ARRAY 1 :  [[1 2 3]

             [4 5 6]

             [7 8 9]]

Transpose: [[1 4 7]

             [2 5 8]

            [3 6 9]]
```

Result/Observation

Successfully completed the data science program and output is obtained.

Mark:

Viva(5)	**Performance(5)**	**Total(10)**

Assessor:

RANK OF MATRIX:

Input:

```
import numpy as np

def create_matrix(mc):

print("\nARRAY"+str(mc)+"Elements:")

array=map(int,input().split())

array=np.array(list(array))

print("\n ARRAY"+str(mc)+"ROW COLUMN:")

row,column=map(int,input().split())

if(len(array)!=(row*column)):

print("\n Row and column size not match with total elements!!retry")

return create_matrix(mc)

array=array.reshape(row,column)

print("\n ARRAY"+str(mc))

print(array)

print("\n Rank:")

return array

print(np.linalg.matrix_rank(create_matrix(1)))
```

Output:

```
ARRAY 1 Elements: 1 2 3 4

ARRAY 1 ROW COLUMN :  2 2



ARRAY 1



[[1 2]



[3 4]]



Rank:2
```

Result/Observation

Successfully completed the data science program and output is obtained.

Mark:

Viva(5)	**Performance(5)**	**Total(10)**

Assessor:

INVERSE OF MATRIX:

Input:

```
import numpy as np

def create_matrix(mc):

print("\nARRAY"+str(mc)+" Elements:")

array_1=map(int,input().split())

array_1=np.array(list(array_1))

print("ARRAY"+str(mc)+", ROW COLUMN:")

row,column=map(int,input().split())

if(len(array_1)!=(row*column)):

print("\nRow and Column size not match with total elements !! retry")

return create_matrix(mc)

array_1=array_1.reshape(row,column)

print("\nARRAY"+str(mc))

print(array_1)

print("\nInverse:")

return(array_1)

print(np.linalg.inv(create_matrix(1)))
```

Output:

```
ARRAY 1 Elements:  1 2 3 4

ARRAY1, ROW COLUMN:   2 2

ARRAY 1        [[1 2]

                [3 4]]

Inverse:       [[-2.   1. ]

               [ 1.5 -0.5]]
```

Result/Observation

Successfully completed the data science program and output is obtained.

Mark:

Viva(5)	**Performance(5)**	**Total(10)**

Assessor:

DETERMINANT OF MATRIX:

Input:

```
import numpy as np

def create_matrix(mc):

print("\nARRAY"+str(mc)+" Elements:")

array_1=map(int,input().split())

array_1=np.array(list(array_1))

print("ARRAY"+str(mc)+", ROW COLUMN:")

row,column=map(int,input().split())

if(len(array_1)!=(row*column)):

print("\nRow and Column size not match with total elements !! retry")

return create_matrix(mc)

array_1=array_1.reshape(row,column)

print("\nARRAY"+str(mc))

print(array_1)

print("\nDeterminant:")

return(array_1)

print(np.linalg.det(create_matrix(1)))
```

Output:

```
ARRAY1 Elements:    1 2 3 4 5 6 7 8 9

ARRAY1, ROW COLUMN:   3 3

ARRAY 1:

[[1 2 3]

 [4 5 6]

 [7 8 9]]

Determinant:          6.66133814775094e-16
```

Result/Observation

Successfully completed the data science program and output is obtained.

Mark:

Viva(5)	**Performance(5)**	**Total(10)**

Assessor:

TRACE OF MATRIX:

Input:

```
import numpy as np

def create_matrix(mc):

print("\nARRAY"+str(mc)+" Elements:")

array_1=map(int,input().split())

array_1=np.array(list(array_1))

print("ARRAY"+str(mc)+", ROW COLUMN:")

row,column=map(int,input().split())

if(len(array_1)!=(row*column)):

print("\nRow and Column size not match with total elements !! retry")

return create_matrix(mc)

array_1=array_1.reshape(row,column)

print("\nARRAY"+str(mc))

print(array_1)

print("\nTrace:")

return(array_1)

print(create_matrix(1).trace())
```

Output:

```
ARRAY1 Elements: 1 2 3 4

ARRAY1, ROW COLUMN:  2  2

ARRAY1

                [[1 2]

                [3 4]]

Trace: 5
```

Result/Observation

Successfully completed the data science program and output is obtained.

Mark:

Viva(5)	Performance(5)	Total(10)

Assessor:

EIGEN VALUES AND EIGEN VECTORS OF MATRIX:

Input:

```
import numpy as np

def create_matrix(mc):

print("\nARRAY"+str(mc)+" Elements:")

array_1=map(int,input().split())

array_1=np.array(list(array_1))

print("ARRAY"+str(mc)+", ROW COLUMN:")

row,column=map(int,input().split())

if(len(array_1)!=(row*column)):

print("\nRow and Column size not match with total elements !! retry")

return create_matrix(mc)

array_1=array_1.reshape(row,column)

print("\nARRAY"+str(mc))

print(array_1)

return array_1

x,y=np.linalg.eig(create_matrix(1))

print("\nE-value : ")

print(x)
print("\nE-vector : ")

print(y)
```

Output:

```
ARRAY 1 Elements:   1 2 3 4 5 6 7 8 9

ARRAY1, ROW COLUMN:   3 3

ARRAY 1:      [[1 2 3]

               [4 5 6]

               [7 8 9]]

E-value :     [ 1.61168440e+01 -1.11684397e+00 -4.22209278e-16]

E-vector :    [[-0.23197069 -0.78583024  0.40824829]

              [-0.52532209 -0.08675134 -0.81649658]

              [-0.81867350.61232756  0.40824829]]
```

Result/Observation

Successfully completed the data science program and output is obtained.

Mark:

Viva(5)	**Performance(5)**	**Total(10)**

Assessor:

SENTIMENTAL ANALYSIS :

Input:

```
l1=['good','fine','nice','happy','positive','well']

l2=['bad','sad','tired','frustrated','not']

str1=input('Enter your response')

flag=0

ncount=0

pcount=0

t=str1.split()

for i in range(len(t)):

for j in range(len(l1)):

if t[i]==l1[j]:

flag=1

pcount+=1

for k in range(len(l2)):

if t[i]==l2[k]:

flag=1

ncount+=1

if flag==0:
```

```
print('you are in another mood')

elif ncount%2==0:

print('positive response')

else:

print('negative response')
```

Output:

```
Enter your response:  bad

negative response



"c:/Users/sree/AppData/Local/Programs/Python/Python38/ML/matrix_analysis":

Enter your response: good

positive response
```

<u>Result/Observation</u>

Successfully completed the data science program and output is obtained.

Mark:

Viva(5)	**Performance(5)**	**Total(10)**

Assessor:

PROGRAM NO. 2

Name: P J Sreedeep	**Roll No: 20**	**Name of Lab: Data Science Lab**	**Period:**
Class: S3, MCA	**Date:**	**Nature of Lab Work: Practical**	**Batch: 2021-2023**

Title: KNN classification

Objectives: Program to implement a K-NN classification using any dataset.

Dataset: Iris.csv

Input:

```
from sklearn.neighbors import KNeighborsClassifier

from sklearn.model_selection import train_test_split

from sklearn.datasets import load_iris

irisdata=load_iris()

print(irisdata.data)

x=irisdata.data

y=irisdata.target

x_train,x_test,y_train,y_test=train_test_split(x,y,random_state=42)

knn=KNeighborsClassifier(n_neighbors=3)

knn.fit(x_train,y_train)

print(knn.predict(x_test))

 print(knn.score(x_test,y_test))
```

Output:

```
[[5.1 3.5 1.4 0.2]      [5.4 3.4 1.7 0.2]      [4.4 3.2 1.3 0.2]
 [4.9 3.  1.4 0.2]      [5.1 3.7 1.5 0.4]      [5.  3.5 1.6 0.6]
 [4.7 3.2 1.3 0.2]      [4.6 3.6 1.  0.2]      [5.1 3.8 1.9 0.4]
 [4.6 3.1 1.5 0.2]      [5.1 3.3 1.7 0.5]      [4.8 3.  1.4 0.3]
 [5.  3.6 1.4 0.2]      [4.8 3.4 1.9 0.2]      [5.1 3.8 1.6 0.2]
 [5.4 3.9 1.7 0.4]      [5.  3.  1.6 0.2]      [4.6 3.2 1.4 0.2]
 [4.6 3.4 1.4 0.3]      [5.  3.4 1.6 0.4]      [5.3 3.7 1.5 0.2]
 [5.  3.4 1.5 0.2]      [5.2 3.5 1.5 0.2]      [5.  3.3 1.4 0.2]
 [4.4 2.9 1.4 0.2]      [5.2 3.4 1.4 0.2]      [7.  3.2 4.7 1.4]
 [4.9 3.1 1.5 0.1]      [4.7 3.2 1.6 0.2]      [6.4 3.2 4.5 1.5]
 [5.4 3.7 1.5 0.2]      [4.8 3.1 1.6 0.2]      [6.9 3.1 4.9 1.5]
 [4.8 3.4 1.6 0.2]      [5.4 3.4 1.5 0.4]      [5.5 2.3 4.  1.3]
 [4.8 3.  1.4 0.1]      [5.2 4.1 1.5 0.1]      [6.5 2.8 4.6 1.5]
 [4.3 3.  1.1 0.1]      [5.5 4.2 1.4 0.2]      [5.7 2.8 4.5 1.3]
 [5.8 4.  1.2 0.2]      [4.9 3.1 1.5 0.2]      [6.3 3.3 4.7 1.6]
 [5.7 4.4 1.5 0.4]      [5.  3.2 1.2 0.2]      [4.9 2.4 3.3 1. ]
 [5.4 3.9 1.3 0.4]      [5.5 3.5 1.3 0.2]      [6.6 2.9 4.6 1.3]
 [5.1 3.5 1.4 0.3]      [4.9 3.6 1.4 0.1]      [5.2 2.7 3.9 1.4]
 [5.7 3.8 1.7 0.3]      [4.4 3.1.3 2.0.2]      [5.  2.  3.5 1. ]
 [5.1 3.8 1.5 0.3]      [5.1 3.4 1.5 0.2]      [5.9 3.  4.2 1.5]
```

```
[5.6 2.9 3.6 1.3]
[6.7 3.1 4.4 1.4]
[5.6 3.  4.5 1.5]
[5.8 2.7 4.1 1. ]
[6.2 2.2 4.5 1.5]
[5.6 2.5 3.9 1.1]
[5.9 3.2 4.8 1.8]
[6.1 2.8 4.  1.3]
[6.3 2.5 4.9 1.5]
[6.1 2.8 4.7 1.2]
[6.4 2.9 4.3 1.3]
[6.6 3.  4.4 1.4]
[6.8 2.8 4.8 1.4]
[6.7 3.  5.  1.7]
[6.  2.9 4.5 1.5]
[5.7 2.6 3.5 1. ]
[5.5 2.4 3.8 1.1]
[5.5 2.4 3.7 1. ]
[5.8 2.7 3.9 1.2]
[6.  2.7 5.1 1.6]
[5.4 3.  4.5 1.5]
[6.  3.4 4.5 1.6]
[6.7 3.1 4.7 1.5]
[6.3 2.3 4.4 1.3]
[5.6 3.  4.1 1.3]
[5.5 2.5 4.  1.3]
[5.5 2.6 4.4 1.2]
[6.1 3.  4.6 1.4]
[5.8 2.6 4.  1.2]
[5.  2.3 3.3 1. ]
[5.6 2.7 4.2 1.3]
[5.7 3.  4.2 1.2]
[5.7 2.9 4.2 1.3]
[6.2 2.9 4.3 1.3]
[5.1 2.5 3.  1.1]
[5.7 2.8 4.1 1.3]
[6.3 3.3 6.  2.5]
[5.8 2.7 5.1 1.9]
[7.1 3.  5.9 2.1]
[6.3 2.9 5.6 1.8]
[6.5 3.  5.8 2.2]
[7.6 3.  6.6 2.1]
[7.3 2.9 6.3 1.8]
[6.7 2.5 5.8 1.8]
[7.2 3.6 6.1 2.5]
[6.5 3.2 5.1 2. ]
[6.4 2.7 5.3 1.9]
[6.8 3.  5.5 2.1]
[5.7 2.5 5.  2. ]
[5.8 2.8 5.1 2.4]
[6.4 3.2 5.3 2.3]
[6.5 3.  5.5 1.8]
[7.7 3.8 6.7 2.2]
[7.7 2.6 6.9 2.3]
[6.  2.2 5.  1.5]
[6.9 3.2 5.7 2.3]
[5.6 2.8 4.9 2. ]
[7.7 2.8 6.7 2. ]
[6.3 2.7 4.9 1.8]
[6.7 3.3 5.7 2.1]
[7.2 3.2 6.  1.8]
[6.2 2.8 4.8 1.8]
[6.1 3.  4.9 1.8]
```

```
[7.2 3.  5.8 1.6]
 [7.4 2.8 6.1 1.9]
 [7.9 3.8 6.4 2. ]
 [6.4 2.8 5.6 2.2]
 [6.3 2.8 5.1 1.5]
 [6.1 2.6 5.6 1.4]
 [7.7 3.  6.1 2.3]
 [6.3 3.4 5.6 2.4]
 [6.4 3.1 5.5 1.8]
 [6.  3.  4.8 1.8]
 [6.9 3.1 5.4 2.1]
 [6.7 3.1 5.6 2.4]
 [6.9 3.1 5.1 2.3]
 [5.8 2.7 5.1 1.9]
 [6.8 3.2 5.9 2.3]
 [6.7 3.3 5.7 2.5]
 [6.7 3.  5.2 2.3]
 [6.3 2.5 5.  1.9]
 [6.5 3.  5.2 2. ]
 [6.2 3.4 5.4 2.3]
 [5.9 3.  5.1 1.8]]
```

```
[1 0 2 1 1 0 1 2 1 1 2 0 0 0 0 1 2 1 1 2 0 2 0 2 2 2 2 2 0 0 0 0 1 0 0 2 1 0]

1.0
```

Result/Observation

Successfully completed the data science program and output is obtained.

Viva(5)	**Performance(5)**	**Total(10)**

Assessor:

PROGRAM NO:3

Name: P J Sreedeep	**Roll No: 20**	**Name of Lab: Data Science Lab**	**Period:**
Class: S3, MCA	**Date:**	**Nature of Lab Work: Practical**	**Batch: 2021-2023**

Title: Naive Bayes Algorithm

Objectives: Program to implement Naive Bayes classification using any dataset

Input:

```
weather=['sunny','sunny','overcast','rainy','rainy','rainy','overcast','sunny','sunny','rainy','sunny',
'overcast','overcast','rainy']

temp=['hot','hot','hot','mild','cool','cool','cool','mild','cool','mild','mild','mild','hot','mild']

play=['no','no','yes','yes','yes','no','yes','no','yes','yes','yes','yes','yes','no']

from cProfile import label

from cgi import MiniFieldStorage

from heapq import merge

from sklearn import preprocessing

le=preprocessing.LabelEncoder()

weather_encoded=le.fit_transform(weather)

print("Weather",weather_encoded)

temp_encoded=le.fit_transform(temp)

label=le.fit_transform(play)

print("Temp",temp_encoded)

print("Play",label)

features=list(zip(weather_encoded,temp_encoded))

print(features)

from sklearn.naive_bayes import GaussianNB

model=GaussianNB()

model.fit(features,label)
```

```
predicted=model.predict([[0,2]])
print("Predicted value",predicted)
```

Output:

```
Weather [2 2 0 1 1 1 0 2 2 1 2 0 0 1]
Temp [1 1 1 2 0 0 0 2 0 2 2 2 1 2]
Play [0 0 1 1 1 0 1 0 1 1 1 1 1 0]
[(2, 1), (2, 1), (0, 1), (1, 2), (1, 0), (1, 0), (0, 0), (2, 2), (2, 0), (1, 2), (2, 2), (0, 2), (0, 1), (1, 2)]
Predicted value [1]
```

Result/Observation

Successfully completed the data science program and output is obtained.

Viva(5)	**Performance(5)**	**Total(10)**

Assessor:

PROGRAM NO:4

Name: P J Sreedeep	**Roll No: 20**	**Name of Lab: Data Science Lab**	**Period:**
Class: S3, MCA	**Date:**	**Nature of Lab Work: Practical**	**Batch: 2021-2023**

Title: Regression Technique

Objectives: Program to implement linear and multiple regression techniques using any standard dataset available in the public domain and evaluate its performance

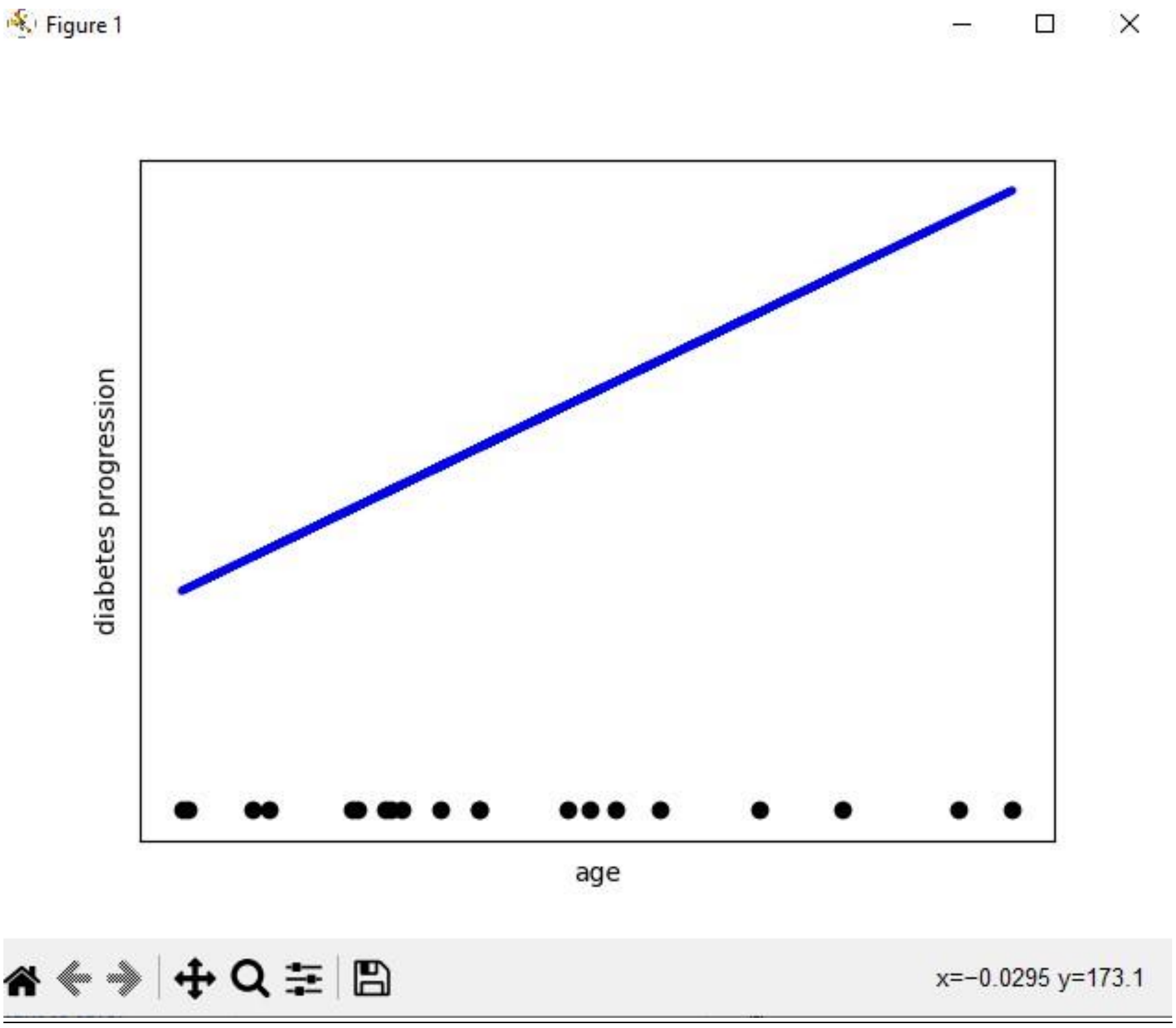
LINEAR REGRESSION:

Input:

```
Input: import matplotlib.pyplot as plt
import numpy as np
from sklearn import datasets,linear_model
from sklearn.metrics import mean_squared_error,r2_score
df=datasets.load_diabetes()
df=['feature_names']
diabetes_x,diabetes_y=datasets.load_diabetes(return_X_y=True)
diabetes_x.shape
diabetes_y.shape
diabetes_x=diabetes_x[:,np.newaxis,2]
diabetes_x.shape
diabetes_x_train=diabetes_x[:-20]
diabetes_x_test=diabetes_x[-20:]
diabetes_y_train=diabetes_y[:-20]
diabetes_y_test=diabetes_x[-20:]
regr=linear_model.LinearRegression()
```

```
regr.fit(diabetes_x_train,diabetes_y_train)

diabetes_y_pred=regr.predict(diabetes_x_test)

print("coefficients:\n",regr.coef_)

print("Mean squared error:%.2f"%mean_squared_error(diabetes_y_test,diabetes_y_pred))

print("coefficient ofc determination:%2f"%r2_score(diabetes_y_test,diabetes_y_pred))

plt.scatter(diabetes_x_test,diabetes_y_test,color="black")

plt.plot(diabetes_x_test,diabetes_y_pred,color="blue",linewidth=3)

plt.xlabel("age")

plt.ylabel("diabetes progression")

plt.xticks(())

plt.yticks(())

plt.show()
```

Output:



<u>Result/Observation</u>

Successfully completed the data science program and output is obtained.

Viva(5)	Performance(5)	Total(10)

Assessor:

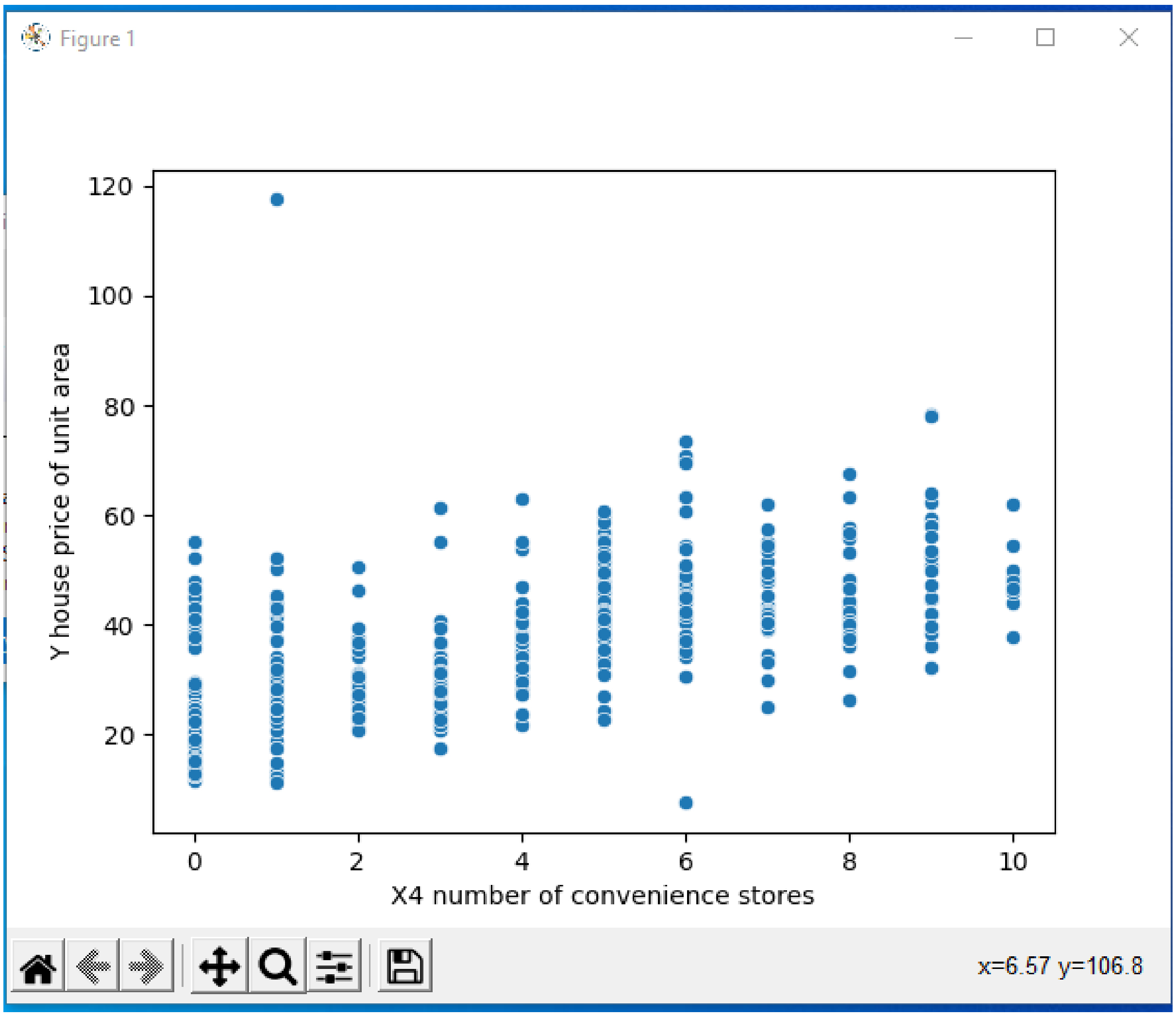
MULTIPLE   REGRESSION:

Dataset:Real Estate.csv

Input:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, mean_absolute_error
from sklearn import preprocessing
df = pd.read_csv('Real-estate1.csv')
df.drop('No', inplace=True, axis=1)
print(df.head())
print(df.columns)
sns.scatterplot(x='X4 number of convenience stores',y='Y house price of unit area', data=df)
plt.show()
X = df.drop('Y house price of unit area', axis=1)
y = df['Y house price of unit area']
print(X)
print(y)
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=101)
model = LinearRegression()
model.fit(X_train, y_train)
predictions = model.predict(X_test)
print('mean_squared_error : ', mean_squared_error(y_test, predictions))
print('mean_absolute_error : ', mean_absolute_error(y_test, predictions))
```

Output:



Result/Observation

Successfully completed the data science program and output is obtained.

Viva(5)	Performance(5)	Total(10)

Assessor:

PROGRAM NO:5

Name: P J Sreedeep	**Roll No: 20**	**Name of Lab:Data Science Lab**	**Period:**
Class: S3, MCA	**Date:**	**Nature of Lab Work: Practical**	**Batch: 2021-2023**

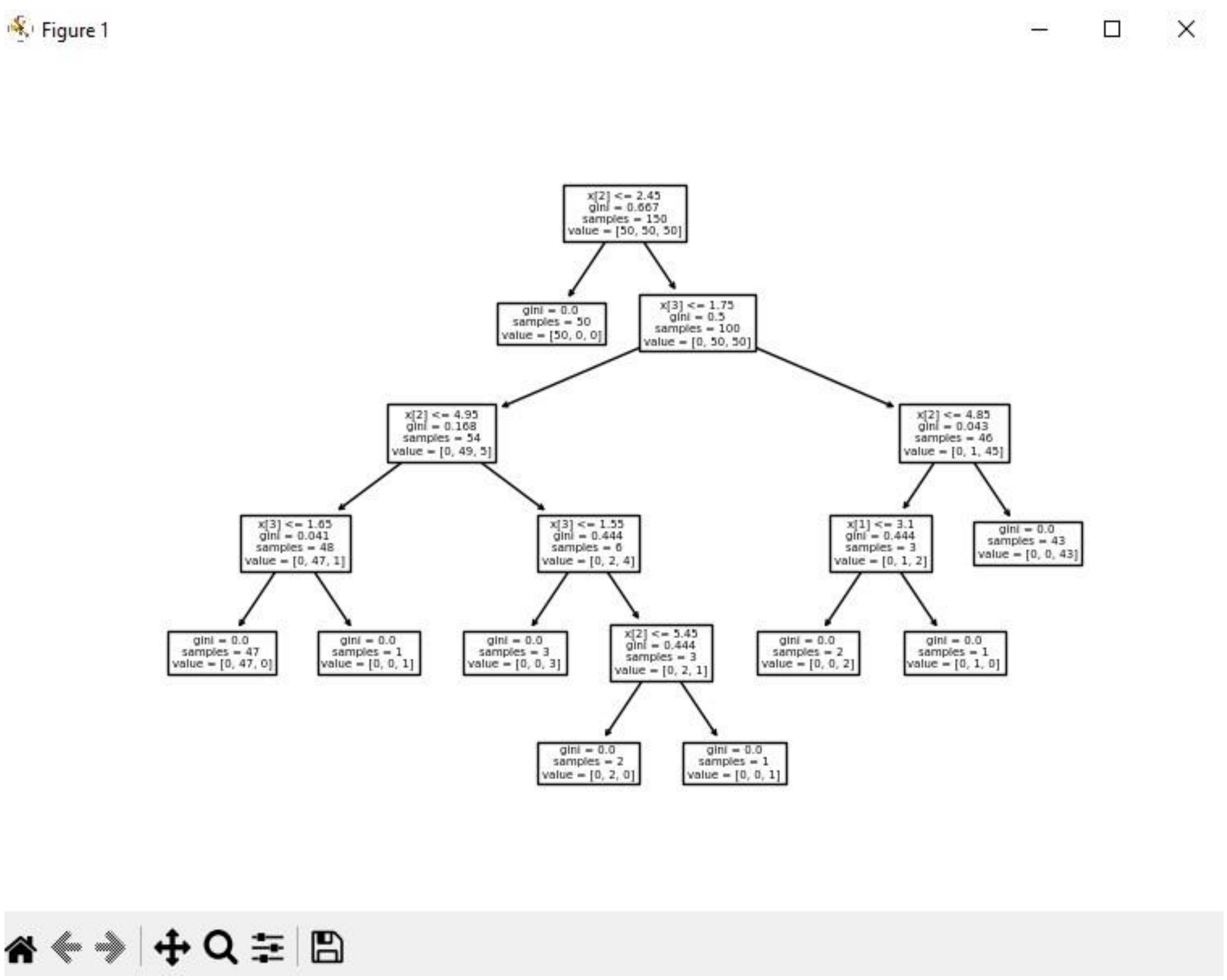
Title: Decision Tree

Objectives: Program to implement decision trees using any standard dataset available in the public domain and find the accuracy of the algorithm.

Input:

```
import matplotlib.pyplot as plt

from sklearn.datasets import load_iris

from sklearn import tree

iris=load_iris()

X,y=iris.data,iris.target

clf=tree.DecisionTreeClassifier()

clf=clf.fit(X,y)

print(tree.plot_tree(clf))

plt.show()
```

Output:



Result/Observation

Successfully completed the data science program and output is obtained.

Viva(5)	Performance(5)	Total(10)

Assessor:

PROGRAM NO:6

Name: P J Sreedeep	**Roll No: 20**	**Name of Lab:Data Science Lab**	**Period:**
Class: S3, MCA	**Date:**	**Nature of Lab Work: Practical**	**Batch: 2021-2023**

Title: Linear Regression

Objectives: Program to implement linear regression for stock market prediction using stock price dataset of any stock.

Dataset: price.xlsx

Input:

```
from sklearn.linear_model import LinearRegression

from email import header

import matplotlib.pyplot as pit

import numpy as np

from sklearn.model_selection import train_test_split

from sklearn import datasets, linear_model

from sklearn.metrics import mean_squared_error, r2_score

import pandas as pd

data = pd.read_excel('price.xlsx',index_col=None,na_values=['NA'],usecols="B,E")

df_binary = pd.DataFrame(data)

x=np.array(df_binary['OPEN']).reshape(-1,1)

y=np.array(df_binary['CLOSE']).reshape(-1,1)

df_binary.dropna(inplace=True)

x_train, x_test, y_train, y_test = train_test_split(x,y,test_size=0.2,random_state=0)

reg=LinearRegression().fit(x_train,y_train.reshape((-1,1)))

newvalue=float(input('enter todays opening '))

y_pred = reg.intercept_ + reg.coef_ *newvalue

print(y_pred)
```

Output:

```
PS G:\ML exam> & C:/Users/sree/AppData/Local/Programs/Python/Python311/python.exe
"g:/ML exam/Dataset/nahar.py"


enter todays opening : 100
[[99.37377025]]
```

Result/Observation

Successfully completed the data science program and output is obtained.

Viva(5)	**Performance(5)**	**Total(10)**

Assessor:

PROGRAM NO:7

Name: P J Sreedeep	**Roll No: 20**	**Name of Lab:Data Science Lab**	**Period:**
Class: S3, MCA	**Date:**	**Nature of Lab Work: Practical**	**Batch: 2021-2023**

Title: NLTK

Objectives: Program on Natural Language Toolkit

Input:

```
import nltk
nltk.download('punkt')
nltk.download('stopwords')
nltk.download('wordnet')
from nltk.tokenize import sent_tokenize,word_tokenize
from nltk.corpus import stopwords
from nltk.stem import PorterStemmer
from nltk.stem.wordnet import WordNetLemmatizer
text="""Hello Mr. Smith, how are you doing today? The weather is great, and city is
awesome.
The sky is pinkish-blue. You shouldn't eat cardboard"""
tokenized_word=word_tokenize(text)
print(tokenized_word)
stop_words=set(stopwords.words("english"))
print(stop_words)
filtered_word=[]
for w in tokenized_word:
    if w not in stop_words:
        filtered_word.append(w)
```

```
print("Tokenized Sentence:",tokenized_word)
print("Filterd Sentence:",filtered_word)
ps = PorterStemmer()
stemmed_words=[]
for w in filtered_word:
   stemmed_words.append(ps.stem(w))
print("Filtered Sentence:",filtered_word)
print("Stemmed Sentence:",stemmed_words)
lem = WordNetLemmatizer()
stem = PorterStemmer()
word = "flying"
print("Lemmatized Word:",lem.lemmatize(word,"v"))
print("Stemmed Word:",stem.stem(word))
```

Output:

```
PS C:\Users\Technosoft> &
C:/Users/Technosoft/AppData/Local/Programs/Python/Python311/python.exe
d:/MCA/DS/lab/nlp.py

        [nltk_data] Downloading package stopwords to
        [nltk_data]     C:\Users\Technosoft\AppData\Roaming\nltk_data...
        [nltk_data]   Package stopwords is already up-to-date!
        [nltk_data] Downloading package punkt to
        [nltk_data]     C:\Users\Technosoft\AppData\Roaming\nltk_data...
        [nltk_data]   Package punkt is already up-to-date!
        [nltk_data] Downloading package averaged_perceptron_tagger to
        [nltk_data]     C:\Users\Technosoft\AppData\Roaming\nltk_data...
        [nltk_data]   Package averaged_perceptron_tagger is already up-to-
        [nltk_data]       date!
        [('Hello', 'NNP'), ('.', '.')]
        [('MCA', 'NNP'), ('S3', 'NNP'), ('fantastic', 'JJ'), ('.', '.')]
        [('We', 'PRP'), ('learn', 'VBP'), ('many', 'JJ'), ('new', 'JJ'), ('concepts', 'NNS'),
        ('implement', 'JJ'), ('practical', 'JJ'), ('exams', 'NN'), ('.', '.')][('1st', 'CD'), ('data', 'NNS'),
        ('science', 'NN'), ('new', 'JJ'), ('paper', 'NN'), ('.', '.')]
```

Result/Observation

Successfully completed the data science program and output is obtained.

Viva(5)	Performance(5)	Total(10)

Assessor:

PROGRAM NO:8

Name: P J Sreedeep	**Roll No: 20**	**Name of Lab:Data Science Lab**	**Period:**
Class: S3, MCA	**Date:**	**Nature of Lab Work: Practical**	**Batch: 2021-2023**

Title: Support Vector Machine

Objectives: Program to implement text classification using support vector machine

Input:

```
from sklearn import datasets
from sklearn.model_selection import train_test_split
from sklearn import metrics
from sklearn import svm
cancer=datasets.load_breast_cancer()
x_train,x_test,y_train,y_test=train_test_split(cancer.data,cancer.target,test_size=0.3,random_
state=109)
clf=svm.SVC(kernel='linear')
clf.fit(x_train,y_train)
y_pred=clf.predict(x_test)
print("Actual values",y_test)
print("Predicted values",y_pred)
print("Accuracy:",metrics.accuracy_score(y_test,y_pred))
print("Precision:",metrics.precision_score(y_test,y_pred))
print("Recall:",metrics.recall_score(y_test,y_pred))
```

Output:

```
Actual values:
                [1 1 0 0 1 0 1 1 1 0 0 0 1 0 1 1 0 0 1 0 1 1 0 0 1 1 0 1 1 1 1 0 1 1 1 1 1
                0 1 1 0 1 0 1 1 1 0 1 0 0 1 1 0 1 1 0 1 1 1 0 0 1 0 1 0 0 1 1 1 1 0 1 1 1
                0 1 0 1 1 1 1 1 1 1 0 1 1 1 1 1 0 0 1 0 1 1 1 1 1 0 0 1 1 0 1 1 0 1 0 1 1
                0 1 1 0 0 0 1 0 1 1 1 1 1 0 1 0 1 0 1 0 0 0 0 0 1 1 0 1 1 1 0 1 1 0 0 1 0
                0 0 1 1 1 1 1 0 0 1 0 1 1 1 1 1 1 1 1 0 1 1 1]

Predicted values :
                [1 1 0 0 1 0 1 1 1 0 0 0 1 0 0 1 0 0 1 0 1 1 0 0 1 1 0 1 1 1 1 0 1 1 1 1 1
                0 1 1 0 1 0 1 1 1 1 1 0 0 1 1 0 1 1 0 1 1 1 0 0 1 0 1 0 0 1 1 1 1 0 1 1 1
                0 1 0 1 1 1 1 1 1 1 0 0 1 1 1 1 0 0 0 0 1 1 1 1 1 0 0 1 0 0 1 1 0 1 0 1 1
                0 1 1 0 0 0 1 0 1 1 1 1 1 0 1 0 1 0 1 0 0 0 1 0 1 1 0 1 1 1 0 1 1 0 0 1 0
                0 0 1 1 1 1 1 0 0 1 0 1 1 1 1 1 1 1 1 0 1 1 1]

Accuracy:       0.9649122807017544
Precision:      0.9811320754716981
Recall:         0.9629629629629629
```

<u>Result/Observation</u>

Successfully completed the data science program and output is obtained.

Viva(5)	Performance(5)	Total(10)

Assessor:

PROGRAM NO:9

Name: P J Sreedeep	**Roll No: 20**	**Name of Lab:Data Science Lab**	**Period:**
Class: S3, MCA	**Date:**	**Nature of Lab Work: Practical**	**Batch: 2021-2023**

Title: Web Crawler

Objectives: Program to implement a simple web crawler and scrapping web pages

Input:

```
import requests
from bs4 import BeautifulSoup
from xlwt import *
Workbook= Workbook(encoding='utf-8')
table=Workbook.add_sheet('data')
table.write(0,0,'Number')
table.write(0,1,'Title')
table.write(0,2,'Company')
table.write(0,3,'Location')
line=1
URL = "https://realpython.github.io/fake-jobs/"
page = requests.get(URL)
soup = BeautifulSoup(page.content, "html.parser")
results = soup.find(id="ResultsContainer")
print(results.prettify())
num=0
job_elements = results.find_all("div", class_="card-content")
for job_element in job_elements:
print(job_element, end="\n"*2)
for job_element in job_elements:
title_element = job_element.find("h2", class_="title")
```

```
company_element = job_element.find("h3", class_="company")
location_element = job_element.find("p", class_="location")
print(title_element.text.strip())
print(company_element.text.strip())
print(location_element.text.strip())
num+=1
print()
table.write(line,0,num)
table.write(line,1,title_element.text.strip())
table.write(line,2,company_element.text.strip())
table.write(line,3,location_element.text.strip())
```

Output:

```
Senior Python Developer

Payne, Roberts and Davis
Stewartbury, AA

Energy engineer
Vasquez-Davidson
Christopherville, AA

Legal executive
Jackson, Chambers and
Port Ericaburgh, AA

Fitness centre manager
Savage-Bradley
East Seanview, AP

Product manager
Ramirez Inc
North Jamieview, AP

Medical technical officer
Rogers-Yates
Davidville, AP

Physiological scientist
Kramer-Klein
South Christopher, AE

Meyers-Johnson
Port Jonathan, AE

Television floor manager
Hughes-Williams
Osbornetown, AE

Waste management officer
Jones, Williams and Villa
Scotttown, AP

Software Engineer
(Python)
Garcia PLC
Ericberg, AE

Interpreter
Gregory and Sons
Ramireztown, AE

Architect
Clark, Garcia and Sosa
Figueroaview, AA

Meteorologist
Bush PLC
Kelseystad, AA

Audiological scientist

Textile designer

English as a second language
teacher
Parker, Murphy and Brooks
Mitchellburgh, AE

Surgeon
Cruz-Brown
West Jessicabury, AA

Equities trader
Macdonald-Ferguson
Maloneshire, AE

Newspaper journalist
Williams, Peterson and Rojas
Johnsonton, AA

Materials engineer
Smith and Sons
South Davidtown, AP

Python Programmer (Entry-
Level)
Moss, Duncan and Allen
Port Sara, AE
```

Radiographer, diagnostic

Holder LLC

Jacobshire, AP

Database administrator

Yates-Ferguson

Port Susan, AE

Result/Observation

Successfully completed the data science program and output is obtained.

Viva(5)	Performance(5)	Total(10)

Assessor:

PROGRAM NO:10

Name: P J Sreedeep	Roll No: 20	Name of Lab:Data Science Lab	Period:
Class: S3, MCA	Date:	Nature of Lab Work: Practical	Batch: 2021-2023

Title: k-means clustering technique

Objectives: Program to implement k-means clustering technique using any standard dataset available in the public domain.

Dataset: Mall_Customer.csv

Input:

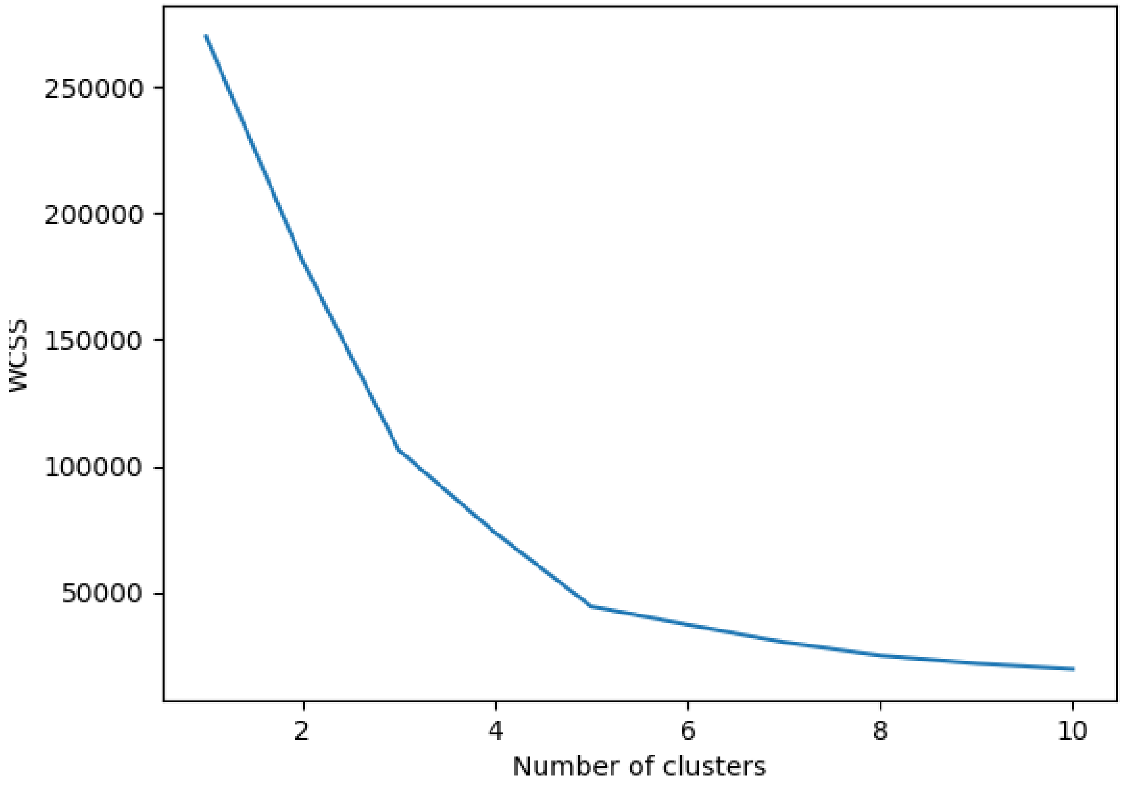
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import sklearn
dataset = pd.read_csv('Mall_Customers.csv')
X = dataset.iloc[:, [3, 4]].values
from sklearn.cluster import KMeans
wcss = []
for i in range(1, 11):
kmeans = KMeans(n_clusters = i, init = 'k-means++', random_state = 42)
kmeans.fit(X)
wcss.append(kmeans.inertia_)
plt.plot(range(1, 11), wcss)
plt.xlabel('Number of clusters')
plt.ylabel('WCSS')
plt.show()
```

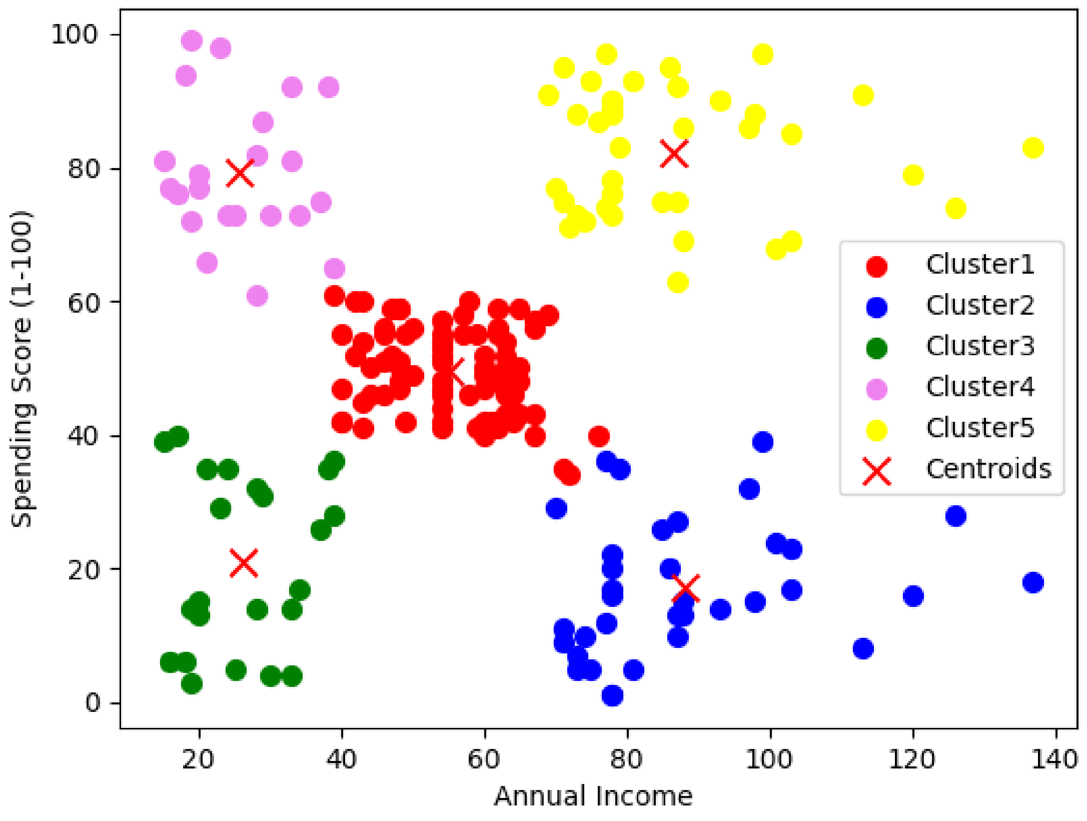
```
kmeans = KMeans(n_clusters = 5, init = "k-means++", random_state = 42)
y_kmeans = kmeans.fit_predict(X)
print(y_kmeans)



plt.scatter(X[y_kmeans == 0, 0], X[y_kmeans == 0, 1], s = 50, c = 'red', label = 'Cluster1')
plt.scatter(X[y_kmeans == 1, 0], X[y_kmeans == 1, 1], s = 50, c = 'blue', label = 'Cluster2')
plt.scatter(X[y_kmeans == 2, 0], X[y_kmeans == 2, 1], s = 50, c = 'green', label = 'Cluster3')
plt.scatter(X[y_kmeans == 3, 0], X[y_kmeans == 3, 1], s = 50, c = 'violet', label = 'Cluster4')
plt.scatter(X[y_kmeans == 4, 0], X[y_kmeans == 4, 1], s = 50, c = 'yellow', label = 'Cluster5')
plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:, 1], s = 100,marker='x', c
= 'red', label = 'Centroids')
plt.xlabel('Annual Income ')
plt.ylabel('Spending Score (1-100)')
plt.legend()
plt.show()
```

Output:

```
PS G:\ML exam> & C:/Users/sree/AppData/Local/Programs/Python/Python311/python.exe
"g:/ML exam/kmeans.py"
```

```
[2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2
 3 2 3 2 3 2 0 2 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 4 1 4 0 4 1 4 1 4 0 4 1 4 1 4 1 4 1 4 0 4 1 4 1 4
 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1
 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4]
```





Result/Observation

Successfully completed the data science program and output is obtained.

Viva(5)	Performance(5)	Total(10)

Assessor: