CSE 3024

Web Mining

LAB ASSESSMENT - 6

NAME: Vibhu Kumar Singh
REG. NO: 19BCE0215
TEACHER: Mr. Hiteshwar Kumar Azad

1. Create a Python programme to implement the decision tree and prints the accuracy percentage, pression, recall and the predicted values.

Ans 1.

HANDWRITTEN CODE:

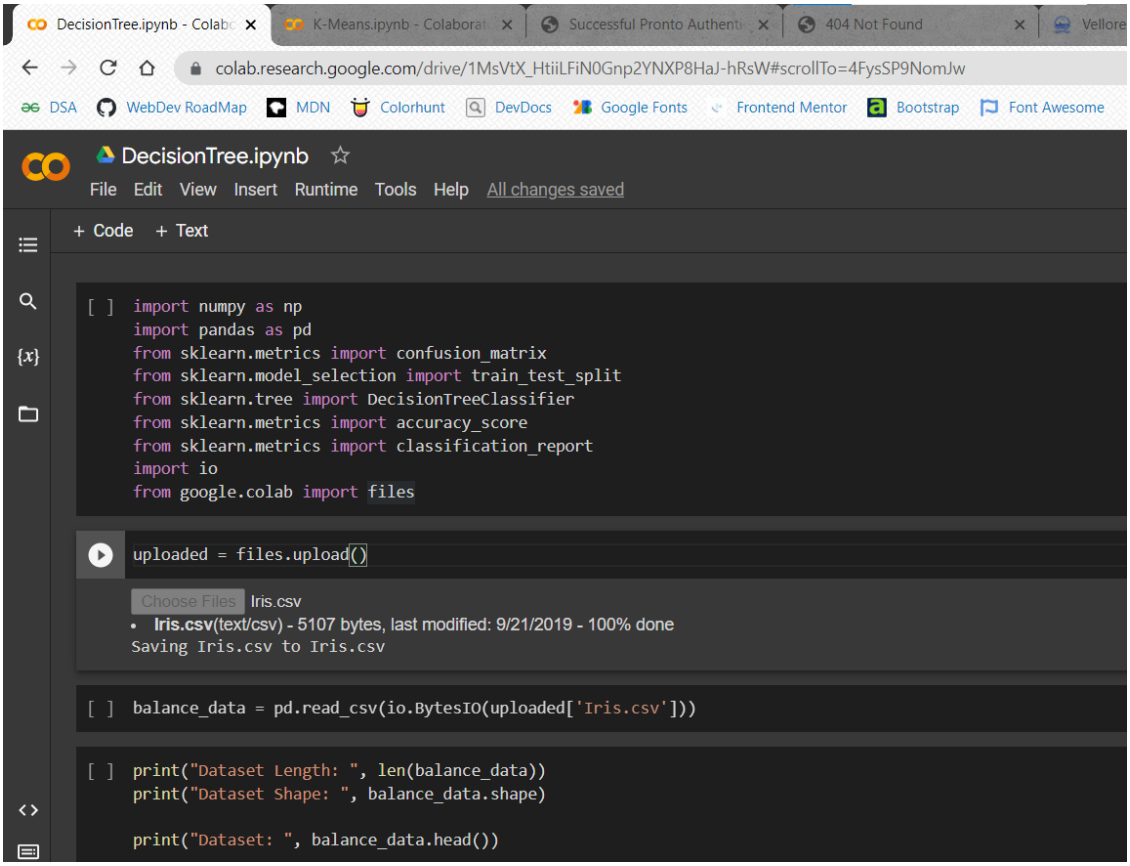
VIBHU KUMAR SINGH 19BCE0215

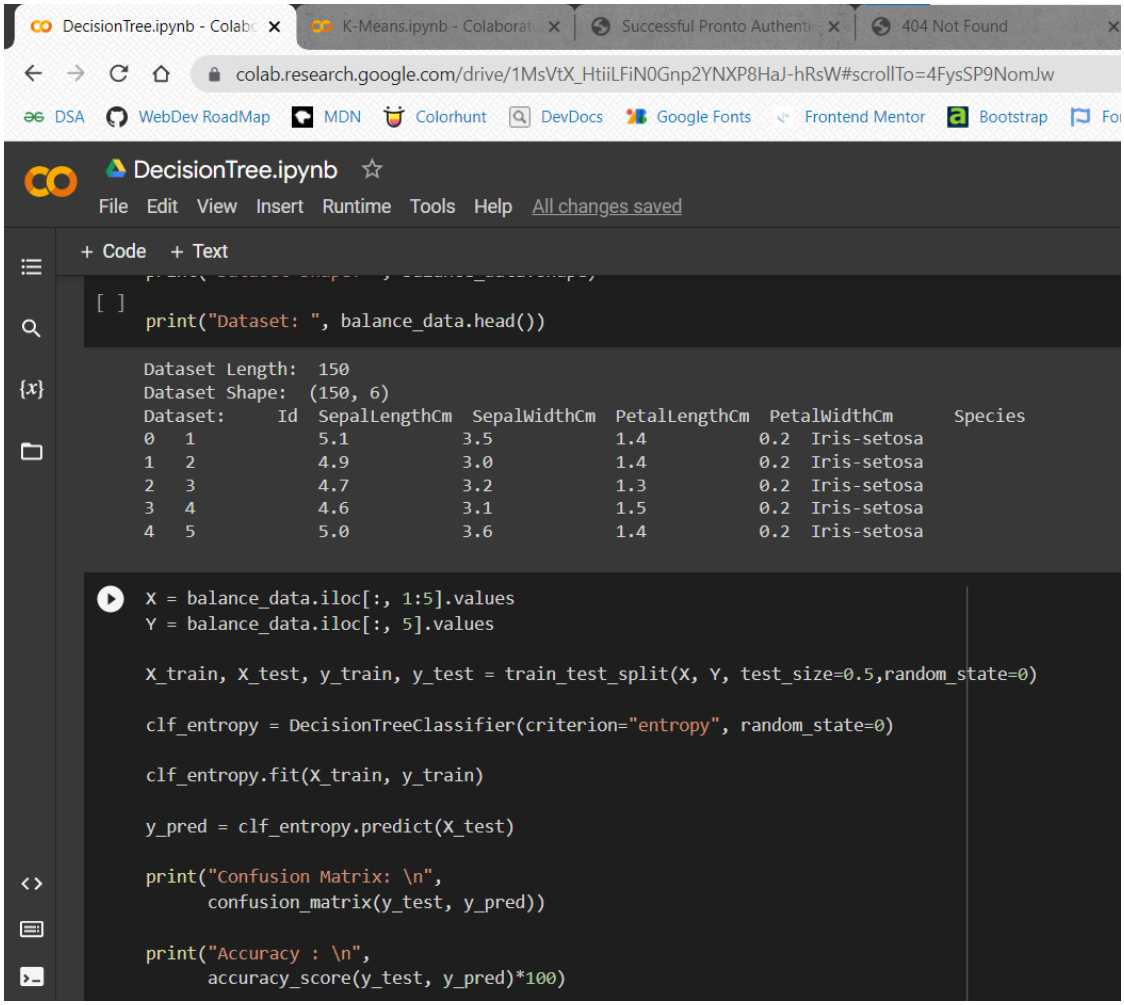
```
import numpy as np
import pandas as pd
from sklearn.metrics import confusion_matrix
from sklearn.model_selection import train_test_split
.
.
.
import io

uploaded = files.upload()

balance_data = pd.read_csv(io.BytesIO(uploaded['iris.csv']))

print("Dataset Length: ", len(balance_data)
print("Dataset Shape: ", balance_data.shape)

print("Dataset: ", balance_data.head())

X = balance_data.iloc[:, 1:5].values
Y = balance_data.iloc[:, 5].values

X_train, X_test, y_train, y_test = train_test_split(X, Y, test_size
= 0.5, random_state = 0)

clf_entropy = DecisionTreeClassifier(criterion = "entropy",
                                     random_state = 0)

clf_entropy.fit(X_train, y_train)

y_pred = clf_entropy.predict(X_test)

print("Confusion Matrix: \n", confusion_matrix(y_test, y_pred))

print("Accuracy: ", classification_report(y_test, y_pred)*100)
print("Report: \n", "                (y_test, y_pred))
print("Prediction: \n", y_pred)
```

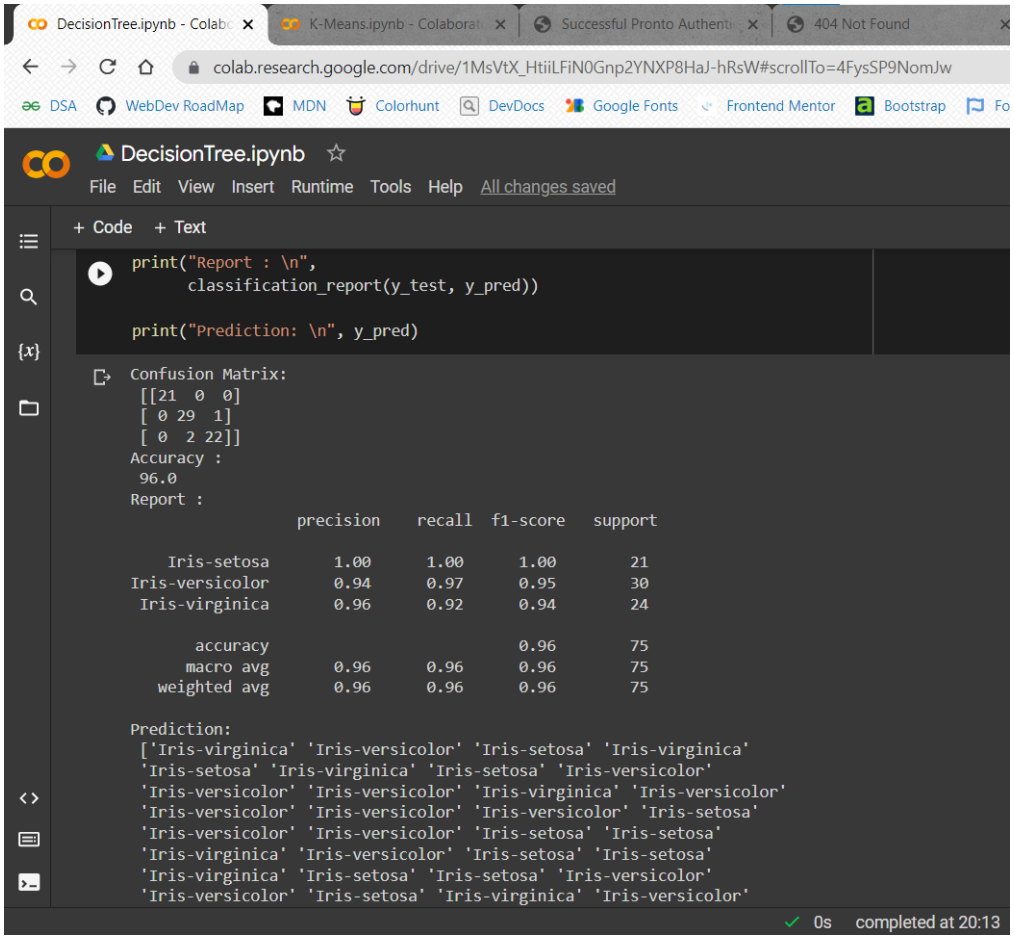
CODE:

```
#NAME: VIBHU KUMAR SINGH
#ROLL NO: 19BCE0215
#WEB MINING

import numpy as np
import pandas as pd
from sklearn.metrics import confusion_matrix
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier
from sklearn.metrics import accuracy_score
from sklearn.metrics import classification_report
import io
from google.colab import files

uploaded = files.upload()

balance_data = pd.read_csv(io.BytesIO(uploaded['Iris.csv']))

print("Dataset Length: ", len(balance_data))
print("Dataset Shape: ", balance_data.shape)

print("Dataset: ", balance_data.head())

X = balance_data.iloc[:, 1:5].values
Y = balance_data.iloc[:, 5].values

X_train, X_test, y_train, y_test = train_test_split(X, Y, test_size=0.5,random_state
=0)

clf_entropy = DecisionTreeClassifier(criterion="entropy", random_state=0)

clf_entropy.fit(X_train, y_train)

y_pred = clf_entropy.predict(X_test)

print("Confusion Matrix: \n",
      confusion_matrix(y_test, y_pred))

print("Accuracy : \n",
      accuracy_score(y_test, y_pred)*100)

print("Report : \n",
      classification_report(y_test, y_pred))

print("Prediction: \n", y_pred)
```

CODE SCREENSHOT:






DecisionTree.ipynb - Colab
K-Means.ipynb - Colaborat
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DSA
WebDev RoadMap
MDN
Colorhunt
DevDocs
Google Fonts
Frontend Mentor
Bootstrap
DecisionTree.ipynb
File Edit View Insert Runtime Tools Help All changes saved
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print("Report : \n",
classification_report(y_test, y_pred))
print("Prediction: \n", y_pred)
Confusion Matrix:
[[21 0 0]
[0 29 1]
[0 2 22]]
Accuracy :
96.0
Report :
precision recall f1-score support
Iris-setosa 1.00 1.00 1.00 21
Iris-versicolor 0.94 0.97 0.95 30
Iris-virginica 0.96 0.92 0.94 24
accuracy 0.96 75
macro avg 0.96 0.96 0.96 75
weighted avg 0.96 0.96 0.96 75
Prediction:
['Iris-virginica' 'Iris-versicolor' 'Iris-setosa' 'Iris-virginica'
'Iris-setosa' 'Iris-virginica' 'Iris-setosa' 'Iris-versicolor'
'Iris-versicolor' 'Iris-versicolor' 'Iris-virginica' 'Iris-versicolor'
'Iris-versicolor' 'Iris-versicolor' 'Iris-versicolor' 'Iris-setosa'
'Iris-versicolor' 'Iris-versicolor' 'Iris-setosa' 'Iris-setosa'
'Iris-virginica' 'Iris-versicolor' 'Iris-setosa' 'Iris-setosa'
'Iris-virginica' 'Iris-setosa' 'Iris-setosa' 'Iris-versicolor'
'Iris-versicolor' 'Iris-setosa' 'Iris-virginica' 'Iris-versicolor'
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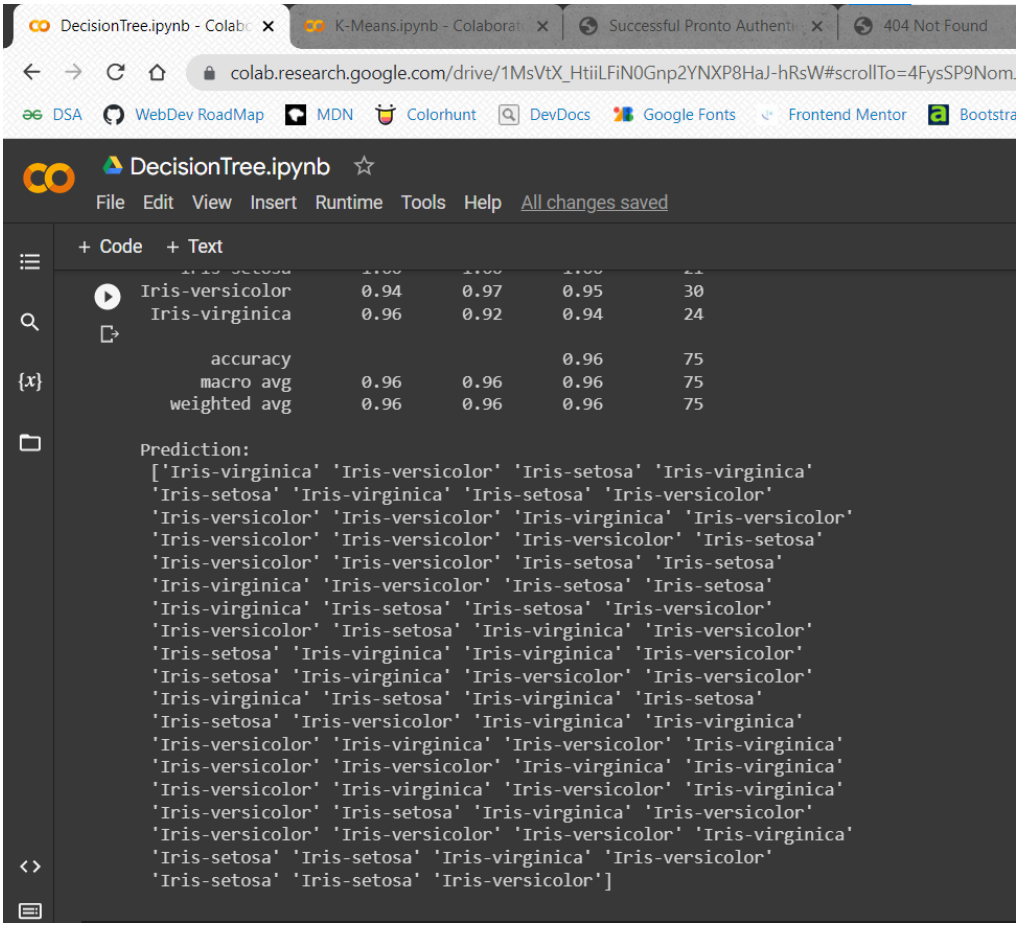
DecisionTree.ipynb - Colab
K-Means.ipynb - Colaborat
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colab.research.google.com/drive/1MsVtX_HtiiLFiN0Gnp2YNXP8HaJ-hRsW#scrollTo=4FysSP9Nom
DSA
WebDev RoadMap
MDN
Colorhunt
DevDocs
Google Fonts
Frontend Mentor
Bootstra
DecisionTree.ipynb
File Edit View Insert Runtime Tools Help All changes saved
+ Code + Text
Iris-versicolor 0.94 0.97 0.95 30
Iris-virginica 0.96 0.92 0.94 24
accuracy 0.96 75
macro avg 0.96 0.96 0.96 75
weighted avg 0.96 0.96 0.96 75
Prediction:
['Iris-virginica' 'Iris-versicolor' 'Iris-setosa' 'Iris-virginica'
'Iris-setosa' 'Iris-virginica' 'Iris-setosa' 'Iris-versicolor'
'Iris-versicolor' 'Iris-versicolor' 'Iris-virginica' 'Iris-versicolor'
'Iris-versicolor' 'Iris-versicolor' 'Iris-versicolor' 'Iris-setosa'
'Iris-versicolor' 'Iris-versicolor' 'Iris-setosa' 'Iris-setosa'
'Iris-virginica' 'Iris-versicolor' 'Iris-setosa' 'Iris-setosa'
'Iris-virginica' 'Iris-setosa' 'Iris-setosa' 'Iris-versicolor'
'Iris-versicolor' 'Iris-setosa' 'Iris-virginica' 'Iris-versicolor'
'Iris-setosa' 'Iris-virginica' 'Iris-virginica' 'Iris-versicolor'
'Iris-setosa' 'Iris-virginica' 'Iris-versicolor' 'Iris-versicolor'
'Iris-virginica' 'Iris-setosa' 'Iris-virginica' 'Iris-setosa'
'Iris-setosa' 'Iris-versicolor' 'Iris-virginica' 'Iris-virginica'
'Iris-versicolor' 'Iris-virginica' 'Iris-versicolor' 'Iris-virginica'
'Iris-versicolor' 'Iris-versicolor' 'Iris-virginica' 'Iris-virginica'
'Iris-versicolor' 'Iris-virginica' 'Iris-versicolor' 'Iris-virginica'
'Iris-versicolor' 'Iris-setosa' 'Iris-virginica' 'Iris-versicolor'
'Iris-versicolor' 'Iris-versicolor' 'Iris-versicolor' 'Iris-virginica'
'Iris-setosa' 'Iris-setosa' 'Iris-virginica' 'Iris-versicolor'
'Iris-setosa' 'Iris-setosa' 'Iris-versicolor']

OUTPUT:

Confusion Matrix:
[[21 0 0]
[0 29 1]
[0 2 22]]
Accuracy :
96.0
Report :

	precision	recall	f1-score	support
Iris-setosa	1.00	1.00	1.00	21
Iris-versicolor	0.94	0.97	0.95	30
Iris-virginica	0.96	0.92	0.94	24
accuracy			0.96	75
macro avg	0.96	0.96	0.96	75
weighted avg	0.96	0.96	0.96	75

Prediction:
['Iris-virginica' 'Iris-versicolor' 'Iris-setosa' 'Iris-virginica'
'Iris-setosa' 'Iris-virginica' 'Iris-setosa' 'Iris-versicolor'
'Iris-versicolor' 'Iris-versicolor' 'Iris-virginica' 'Iris-versicolor'
'Iris-versicolor' 'Iris-versicolor' 'Iris-versicolor' 'Iris-setosa'
'Iris-versicolor' 'Iris-versicolor' 'Iris-setosa' 'Iris-setosa'
'Iris-virginica' 'Iris-versicolor' 'Iris-setosa' 'Iris-setosa'
'Iris-virginica' 'Iris-setosa' 'Iris-setosa' 'Iris-versicolor'
'Iris-versicolor' 'Iris-setosa' 'Iris-virginica' 'Iris-versicolor'
'Iris-setosa' 'Iris-virginica' 'Iris-virginica' 'Iris-versicolor'
'Iris-setosa' 'Iris-virginica' 'Iris-versicolor' 'Iris-versicolor'
'Iris-virginica' 'Iris-setosa' 'Iris-virginica' 'Iris-setosa'
'Iris-setosa' 'Iris-versicolor' 'Iris-virginica' 'Iris-virginica'
'Iris-versicolor' 'Iris-virginica' 'Iris-versicolor' 'Iris-virginica'
'Iris-versicolor' 'Iris-versicolor' 'Iris-virginica' 'Iris-virginica'
'Iris-versicolor' 'Iris-virginica' 'Iris-versicolor' 'Iris-virginica'
'Iris-versicolor' 'Iris-setosa' 'Iris-virginica' 'Iris-versicolor'
'Iris-versicolor' 'Iris-versicolor' 'Iris-versicolor' 'Iris-virginica'
'Iris-setosa' 'Iris-setosa' 'Iris-virginica' 'Iris-versicolor'
'Iris-setosa' 'Iris-setosa' 'Iris-versicolor']

OUTPUT SCREENSHOT:

```
Confusion Matrix:
 [[21  0  0]
 [ 0 29  1]
 [ 0  2 22]]
Accuracy :
 96.0
Report :
                  precision    recall  f1-score   support

    Iris-setosa       1.00      1.00      1.00        21
Iris-versicolor       0.94      0.97      0.95        30
 Iris-virginica       0.96      0.92      0.94        24

       accuracy                           0.96        75
      macro avg       0.96      0.96      0.96        75
   weighted avg       0.96      0.96      0.96        75

Prediction:
 ['Iris-virginica' 'Iris-versicolor' 'Iris-setosa' 'Iris-virginica'
 'Iris-setosa' 'Iris-virginica' 'Iris-setosa' 'Iris-versicolor'
 'Iris-versicolor' 'Iris-versicolor' 'Iris-virginica' 'Iris-versicolor'
 'Iris-versicolor' 'Iris-versicolor' 'Iris-versicolor' 'Iris-setosa'
 'Iris-versicolor' 'Iris-versicolor' 'Iris-setosa' 'Iris-setosa'
 'Iris-virginica' 'Iris-versicolor' 'Iris-setosa' 'Iris-setosa'
 'Iris-virginica' 'Iris-setosa' 'Iris-setosa' 'Iris-versicolor'
 'Iris-versicolor' 'Iris-setosa' 'Iris-virginica' 'Iris-versicolor'
 'Iris-setosa' 'Iris-virginica' 'Iris-virginica' 'Iris-versicolor'
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 'Iris-virginica' 'Iris-setosa' 'Iris-virginica' 'Iris-setosa'
 'Iris-setosa' 'Iris-versicolor' 'Iris-virginica' 'Iris-virginica'
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 'Iris-versicolor' 'Iris-versicolor' 'Iris-virginica' 'Iris-virginica'
 'Iris-versicolor' 'Iris-virginica' 'Iris-versicolor' 'Iris-virginica'
 'Iris-versicolor' 'Iris-setosa' 'Iris-virginica' 'Iris-versicolor'
 'Iris-versicolor' 'Iris-versicolor' 'Iris-versicolor' 'Iris-virginica'
 'Iris-setosa' 'Iris-setosa' 'Iris-virginica' 'Iris-versicolor'
 'Iris-setosa' 'Iris-setosa' 'Iris-versicolor']
```

(P.T.O.)

2. Create a Python programme that uses the K-means clustering algorithm and displays all clusters in different colours.

Ans 2.

HANDWRITTEN CODE:

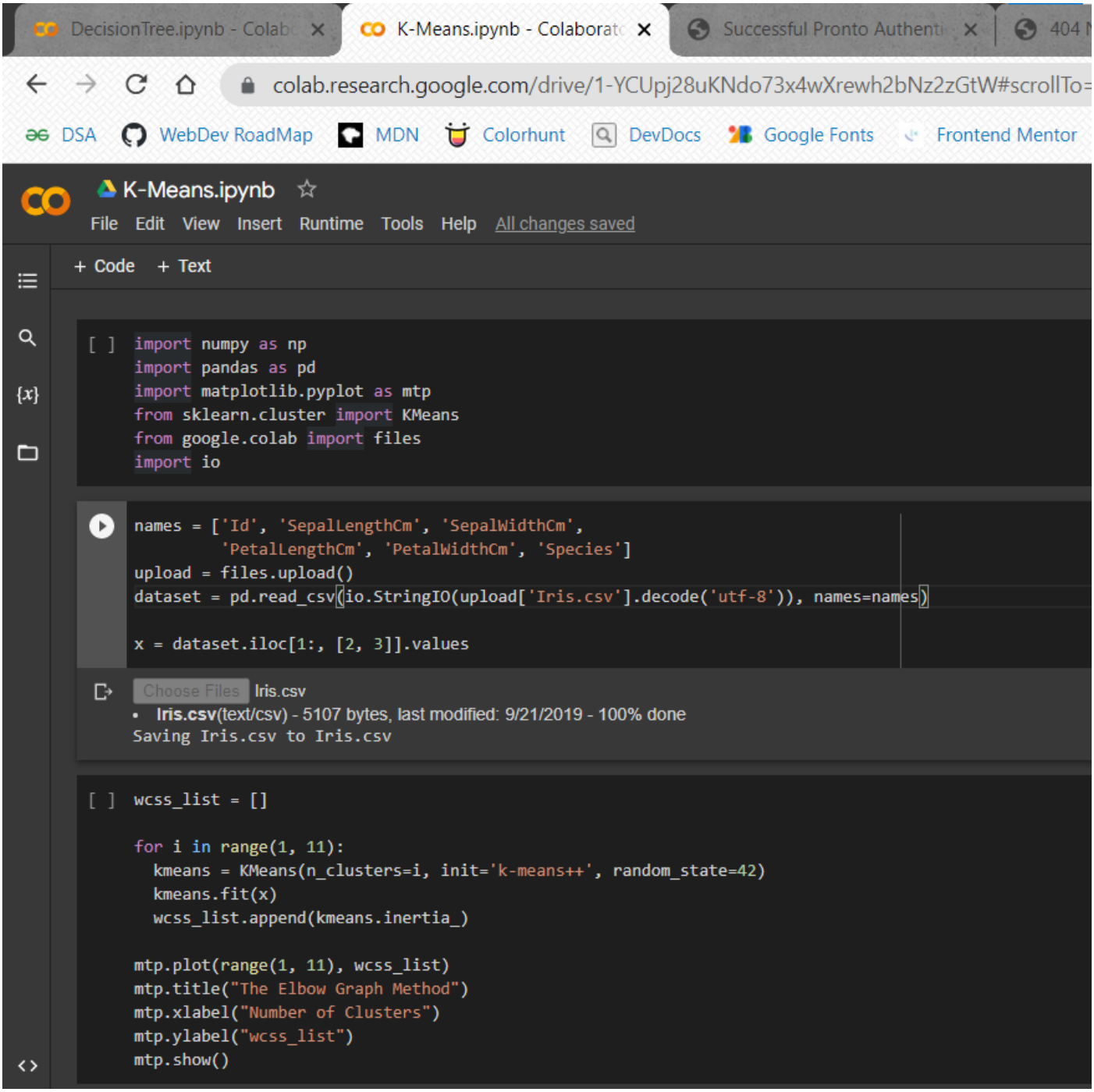
VIBHU KUMAR SINGH 19BCE0215

```
import numpy as np
:
import io

names = ['Id', 'SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm',
         'PetalWidthCm', 'Species']

upload = files.upload()
dataset = pd.read_csv(io.StringIO(upload['Iris.csv'].
                      decode('utf-8')), names = names)

X = dataset.iloc[1:, [2,3]].values

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 Graph Method")
mtp.x_label("Number of Clusters")
mtp.ylabel("wcss_list")
mtp.show()
.
:
mtp.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_
    centers_[:, 1], s = 300, c = "yellow", label = 'Centroid')

mtp.title('clusters')
```

CODE:

```
#NAME: VIBHU KUMAR SINGH
#ROLL NO: 19BCE0215
#WEB MINING

import numpy as np
import pandas as pd
import matplotlib.pyplot as mtp
from sklearn.cluster import KMeans
from google.colab import files
import io
names = ['Id', 'SepalLengthCm', 'SepalWidthCm',
         'PetalLengthCm', 'PetalWidthCm', 'Species']
upload = files.upload()
dataset = pd.read_csv(io.StringIO(upload['Iris.csv'].decode('utf-8')), names=names)

x = dataset.iloc[1:, [2, 3]].values

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 Graph Method")
mtp.xlabel("Number of Clusters")
mtp.ylabel("wcss_list")
mtp.show()

kmeans = KMeans(n_clusters=4, init='k-means++', random_state=42)
y_predict = kmeans.fit_predict(x)

mtp.scatter(x[y_predict == 0, 0], x[y_predict == 0, 1],
            s=100, c='magenta', label='Cluster1')
mtp.scatter(x[y_predict == 1, 0], x[y_predict == 1, 1],
            s=100, c='cyan', label='Cluster2')
mtp.scatter(x[y_predict == 2, 0], x[y_predict == 2, 1],
            s=100, c='red', label='Cluster3')
mtp.scatter(x[y_predict == 3, 0], x[y_predict == 3, 1],
            s=100, c='blue', label='Cluster4')

mtp.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[
            :, 1], s=300, c='yellow', label='Centroid')
mtp.title('Clusters')
```

CODE SCREENSHOT:



DecisionTree.ipynb - Colab | K-Means.ipynb - Colaborat | Successful Pronto Authenti | 404

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K-Means.ipynb

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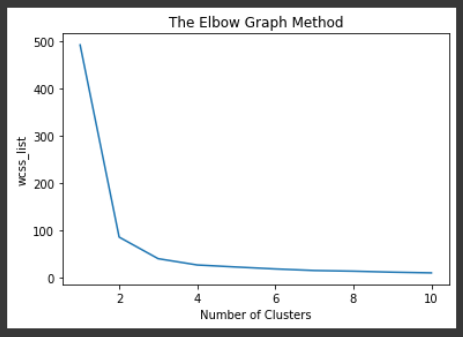
```
wcss_list = []

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 Graph Method")
mtp.xlabel("Number of Clusters")
mtp.ylabel("wcss_list")
mtp.show()
```



DecisionTree.ipynb - Colab | K-Means.ipynb - Colaborat | Successful Pronto Authenti | 404

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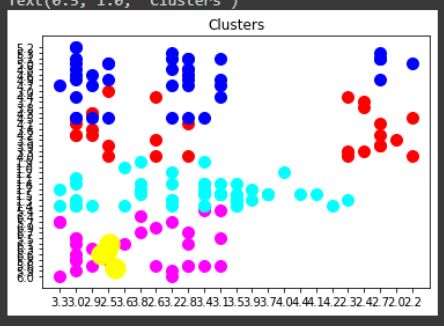
K-Means.ipynb

File Edit View Insert Runtime Tools Help All changes saved

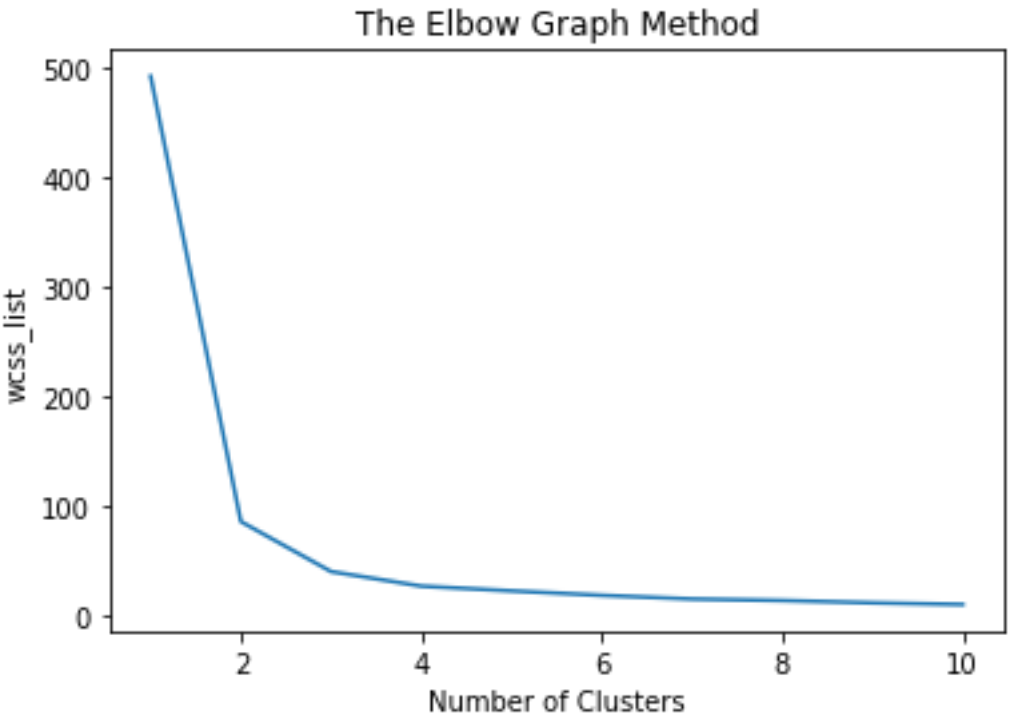
+ Code + Text

```
kmeans = KMeans(n_clusters=4, init='k-means++', random_state=42)
y_predict = kmeans.fit_predict(x)

mtp.scatter(x[y_predict == 0, 0], x[y_predict == 0, 1],
            s=100, c='magenta', label='Cluster1')
mtp.scatter(x[y_predict == 1, 0], x[y_predict == 1, 1],
            s=100, c='cyan', label='Cluster2')
mtp.scatter(x[y_predict == 2, 0], x[y_predict == 2, 1],
            s=100, c='red', label='Cluster3')
mtp.scatter(x[y_predict == 3, 0], x[y_predict == 3, 1],
            s=100, c='blue', label='Cluster4')

mtp.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[
            :, 1], s=300, c='yellow', label='Centroid')
mtp.title('Clusters')
```

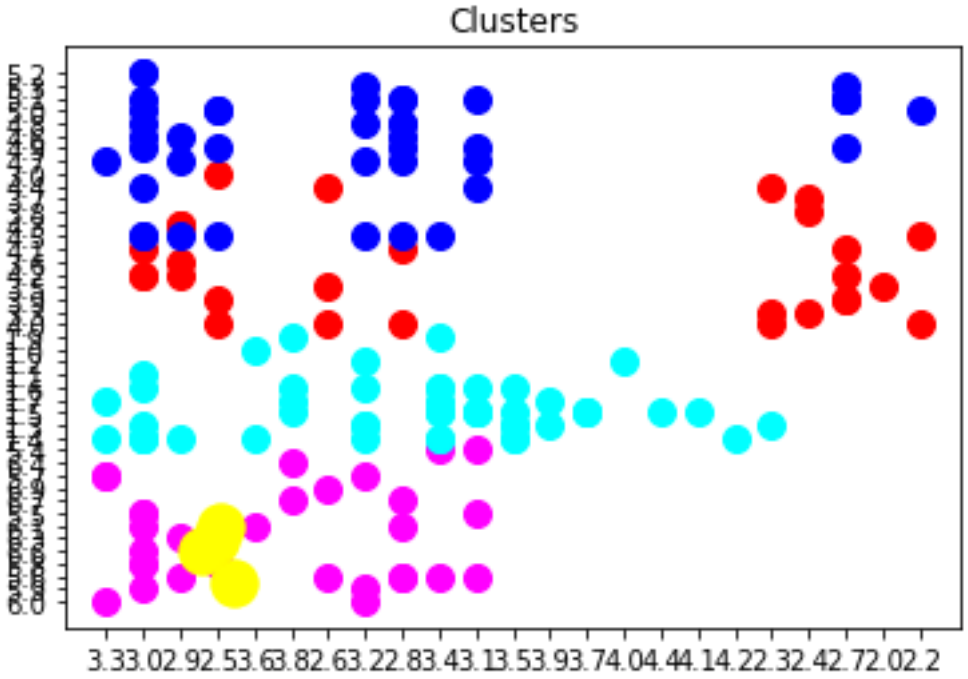
```
Text(0.5, 1.0, 'Clusters')
```



OUTPUT SCREENSHOT:



(The Elbow Graph Method)



(Clusters)