Experiment :3

Problem statement:
Implement K-Means_Clustering using python

Aim: TO Implement K-Means_Clustering using python
ALGORITHM:
Step 1: Read the Given data Sample to X
Step 2: Train Dataset with K=5
Step 3: Find optimal number of clusters(k) in a dataset using Elbow method
Step 4: Train Dataset with K=3 (optimal K-Value)
Step 4: Compare results
Step 6: End
PROGRAM:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
from sklearn import datasets
#Read DataSet
df = datasets.load_iris()
x = df.data
y = df.target
print(x)
print(y)
#Lets try with k=5 initially
kmeans5 = KMeans(n_clusters=5)
y_kmeans5 = kmeans5.fit_predict(x)
print(y_kmeans5)
print(kmeans5.cluster_centers_)
# To find optimal number of clusters(k) in a dataset
Error =[ ]
for i in range(1, 11):
        kmeans = KMeans(n_clusters = i).fit(x)
        kmeans.fit(x)
        Error.append(kmeans.inertia_)
import matplotlib.pyplot as plt
plt.plot(range(1, 11), Error)
plt.title('Elbow method')
plt.xlabel('No of clusters')
plt.ylabel('Error')
plt.show()
#Now try with k=3 finally
kmeans3 = KMeans(n_clusters=3)
y_kmeans3 = kmeans3.fit_predict(x)
print(y_kmeans3)
print(kmeans3.cluster_centers_)
```

OUTPUT:

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

[[6.52916667 3.05833333 5.50833333 2.1625    ]
 [5.006      3.428      1.462      0.246     ]
 [6.20769231 2.85384615 4.74615385 1.56410256]
 [7.475      3.125      6.3        2.05      ]
 [5.508      2.6        3.908      1.204     ]]
```

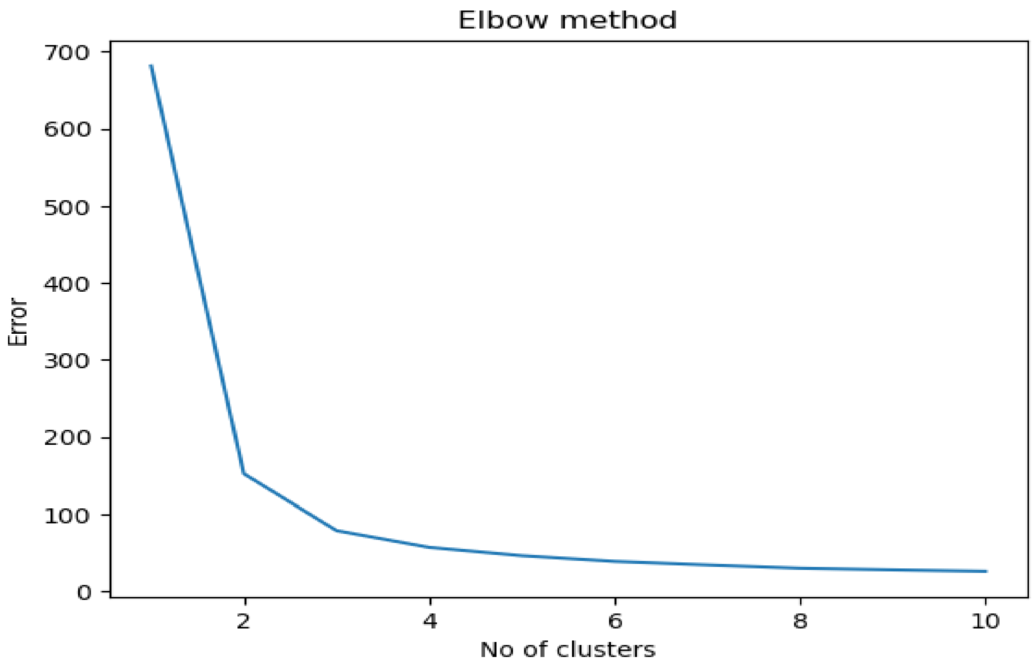


```
[1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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 2 2 0 0 2 2 2 2 0 2 0 2 0 2 2 0 0 2 2 2 2 2 0 2 2 2 2 0 2 2 2 0 2 2 2 0 2
 2 0]

[[5.9016129  2.7483871  4.39354839 1.43387097]
 [5.006      3.428      1.462      0.246     ]
 [6.85       3.07368421 5.74210526 2.07105263]]
```

Result: The program has been executed successfully and K-Means clustering algorithm is implemented.