LAB EXERCISE – 10

k-Means Algorithm

Aim of the Experiment

The main aim of this experiment is to explore k-Means clustering algorithm. The objectives of this experiment are

1. Explore kmeans algorithm for the small dataset given
2. Explore kmeans algorithm for Iris Dataset

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Kmeans model can be created by scikit-learn as

```
kmeans = KMeans(n_clusters = 2)
```

The algorithm can be applied to the given data as

```
kmeans.fit(df)
```

The predictions of the constructed model can be done as

```
df['pred'] = kmeans.predict(df)
```

The scatter diagram can be constructed using seaborn lmplot as

```
sns.lmplot('X','Y',scatter=True,fit_reg=False,data=df,hue='pred')
```

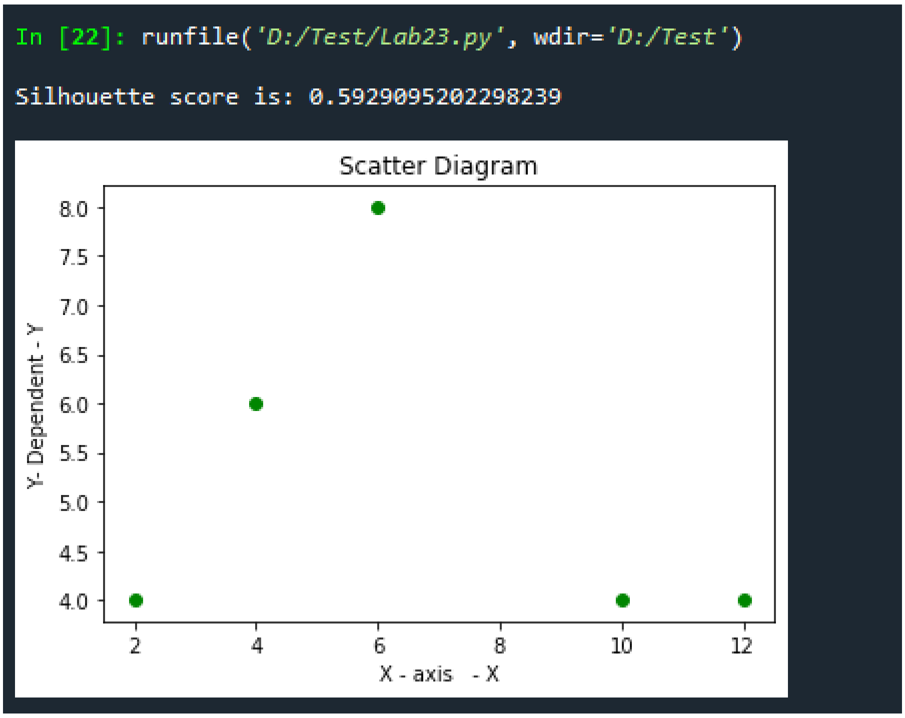
Listing - 1

```
import pandas as pd
from sklearn.cluster import KMeans
from sklearn import metrics
import matplotlib.pyplot as plt
import seaborn as sns

data = [[2,4],[4,6],[6,8],[10,4],[12,4]]
df = pd.DataFrame(data, columns = ['X','Y'])

plt.scatter(df['X'],df['Y'],color='green')
plt.title('Scatter Diagram')
plt.xlabel('X - axis   - X')
plt.ylabel('Y- Dependent - Y')
kmeans = KMeans(n_clusters = 2)
kmeans.fit(df)
```

```
df['pred'] = kmeans.predict(df)

sns.lmplot('X','Y',scatter=True,fit_reg=False,data=df,hue='pred')

labels = kmeans.labels_

score=metrics.silhouette_score(df, labels, metric='euclidean')

# Print Silhouette score

print('\nSilhouette score is:',score)
```

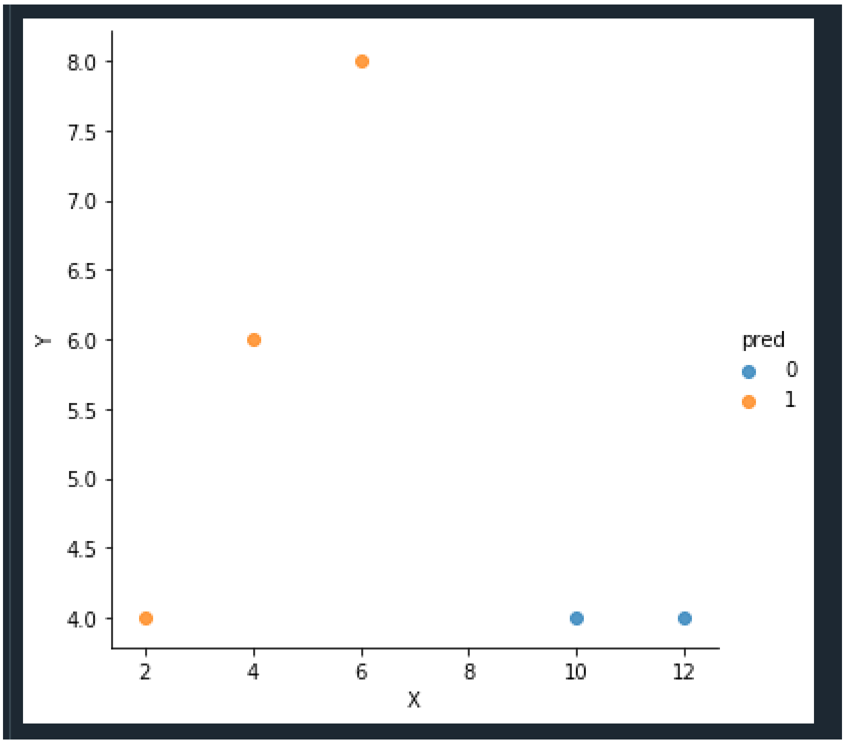
Output

The scatter diagram of the given data is given as follows:



```
In [22]: runfile('D:/Test/Lab23.py', wdir='D:/Test')

Silhouette score is: 0.5929095202298239
```

The constructed clusters are shown as follows:

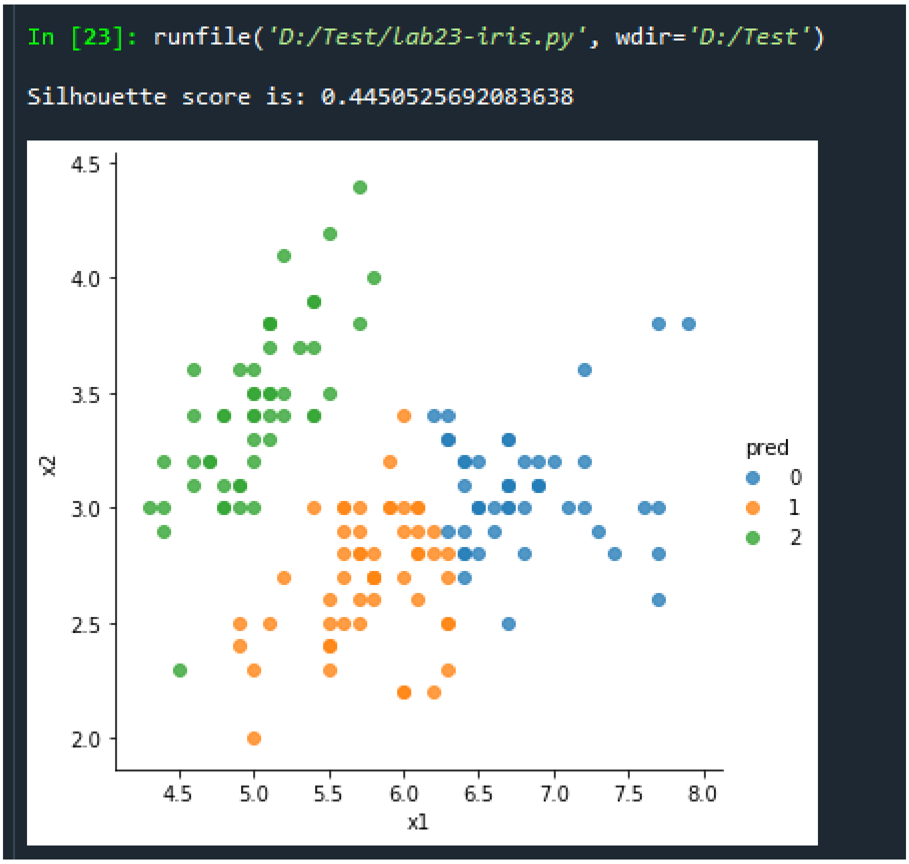


Listing 2

```
import pandas as pd
from sklearn.cluster import KMeans
import seaborn as sns
df = pd.read_csv("iris.csv")
df.columns =['x1','x2','x3','x4','y']
df = df.drop(['x3','x4'],1)
print(df.head(10))
kmeans = KMeans(n_clusters = 3)
X=df.values[:,0:2]
kmeans.fit(X)
df['pred'] = kmeans.predict(X)
df.head(10)
sns.lmplot('x1','x2',scatter=True,fit_reg=False,data=df,hue='pred')
```

```
df = pd.read_csv("iris.csv")

df.columns =['x1','x2','x3','x4','y']

df = df.drop(['x3','x4'],1)

print(df.head(10))

kmeans = KMeans(n_clusters = 3)

X=df.values[:,0:2]

kmeans.fit(X)

df['pred'] = kmeans.predict(X)

df.head(10)

sns.lmplot('x1','x2',scatter=True,fit_reg=False,data=df,hue='pred')
```

Output



```
In [23]: runfile('D:/Test/lab23-iris.py', wdir='D:/Test')

Silhouette score is: 0.4450525692083638
```