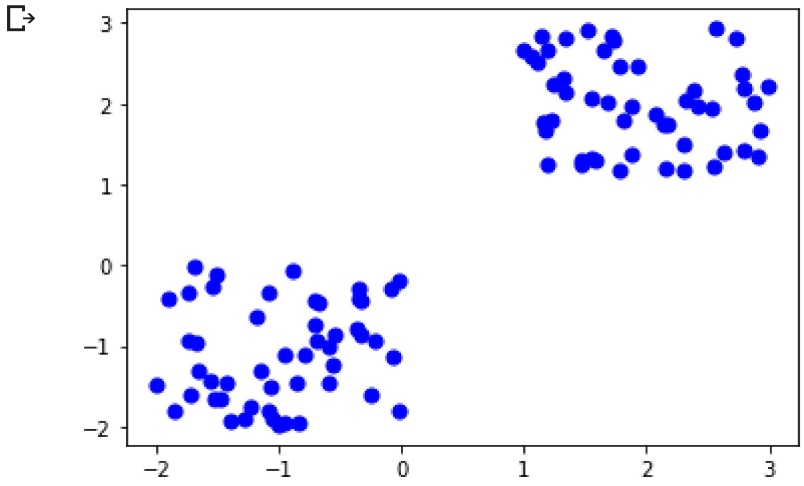
*Step 1: * Pandas for reading and writing spreadsheets Numpy for carrying out efficient computations Matplotlib for visualization of data

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
%matplotlib inline
```

Step 2: Generate random data Generate some random data in a two-dimensional space: { A total of 100 data points has been generated and divided into two groups, of 50 points each.

Here is how the data is displayed on a two-dimensional space:}

```
X= -2 * np.random.rand(100,2)
X1 = 1 + 2 * np.random.rand(50,2)
X[50:100, :] = X1
plt.scatter(X[ : , 0], X[ :, 1], s = 50, c = 'b')
plt.show()
```



Step 3: Use Scikit-Learn

We'll use some of the available functions in the Scikit-learn library to process the randomly generated data.

```
from sklearn.cluster import KMeans
Kmean = KMeans(n_clusters=2)
Kmean.fit(X)
```

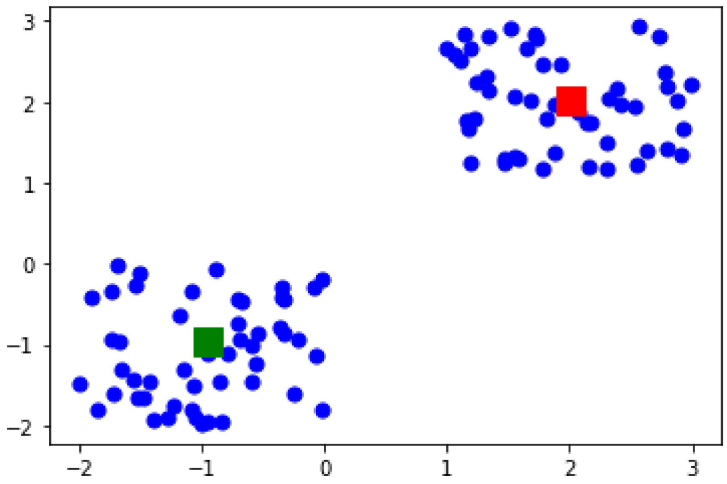
```
KMeans(n_clusters=2)
```

Step 4: Finding the centroid

```
Kmean.cluster_centers_
```

Let's display the cluster centroids (using green and red color).

```
plt.scatter(X[ : , 0], X[ : , 1], s =50, c='b')
plt.scatter(-0.94665068, -0.97138368, s=200, c='g', marker='s')
plt.scatter(2.01559419, 2.02597093, s=200, c='r', marker='s')
plt.show()
```



Step 5: Testing the algorithm

Here is the code for getting the labels property of the K-means clustering example dataset; that is, how the data points are categorized into the two clusters.

```
Kmean.labels_
```

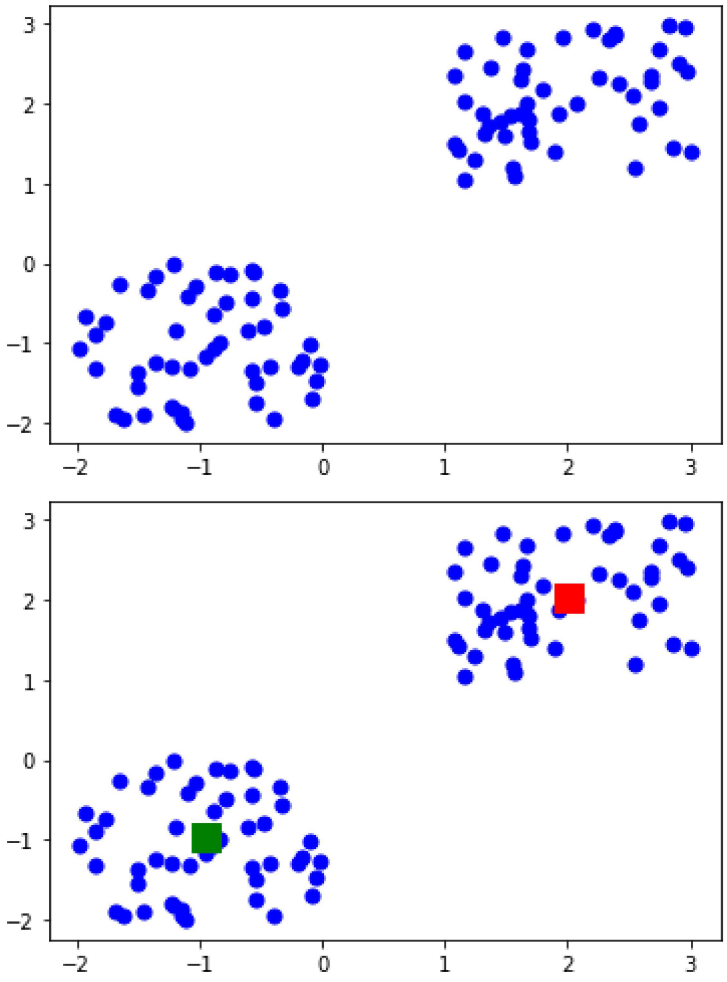
```
array([0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1], dtype=int32)
```

```
sample_test=np.array([-3.0,-3.0])
second_test=sample_test.reshape(1, -1)
Kmean.predict(second_test)
```

```
array([0], dtype=int32)
```

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
%matplotlib inline
X= -2 * np.random.rand(100,2)
X1 = 1 + 2 * np.random.rand(50,2)
X[50:100, :] = X1
plt.scatter(X[ : , 0], X[ :, 1], s = 50, c = 'b')
plt.show()
from sklearn.cluster import KMeans
```

```
plt.scatter(-0.94665068, -0.97138368, s=200, c='g', marker='s')
plt.scatter(2.01559419, 2.02597093, s=200, c='r', marker='s')
plt.show()
Kmean.labels_
sample_test=np.array([-3.0,-3.0])
second_test=sample_test.reshape(1, -1)
Kmean.predict(second_test)
```



```
array([1], dtype=int32)
```

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