```
# 1. Importing the necessary libraries and Modules

import pandas as pd
import numpy as np
import matpl Add text cell t as plt
import seaborn as sns
import math
import random


# 2. Importing the Dataset

# Read the Excel file without specifying usecols to inspect the actual column names
dataset = pd.read_excel("/content/kmean.xlsx")
dataset.columns = ["Feature - 1" , "Feature - 2"]
```

	Feature - 1	Feature - 2
0	5.658583	4.799964
1	6.352579	3.290854
2	2.904017	4.612204
3	3.231979	4.939894
4	1.247923	4.932678
...	...	...
294	7.302787	3.380160
295	6.991984	2.987067
296	4.825534	2.779617
297	6.117681	2.854757
298	0.940489	5.715568

299 rows × 2 columns

Next steps: Generate code with dataset | View recommended plots | New interactive sheet

```
# 3. Geting the Statistics of a Dataset

dataset.describe()
```

	Feature - 1	Feature - 2
count	299.000000	299.000000
mean	3.690537	2.981681
std	1.925842	1.685282
min	-0.245127	0.205810
25%	2.163163	1.205974
50%	3.231979	2.949704
75%	5.516022	4.808849
max	8.203398	5.784297

```
# 4. Find the the no. of Clusters

# Randomly initialize the centroids by selecting 3 unique points from the dataset
# `random.sample(range(0, len(dataset)), 3)` will select 3 random indices without replacement from the dataset.
# Each selected index represents a row in the dataset, which will serve as an initial centroid.
init_centroids = random.sample(range(0, len(dataset)), 3)

# Create an empty list to store the initial centroid points.
centroids = []
for i in init_centroids:
    # Append the data point at each randomly chosen index to the centroids list.
    centroids.append(dataset.iloc[i])

# Convert the list of centroids to a NumPy array for easier manipulation in further calculations.
centroids = np.array(centroids)

# Print the initialized centroids
centroids
```

```
array([[2.17989333, 1.30879831],
       [5.99423154, 2.75707858],
       [1.15354031, 4.67866717]])
```

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# 5. Preprocessing the Data
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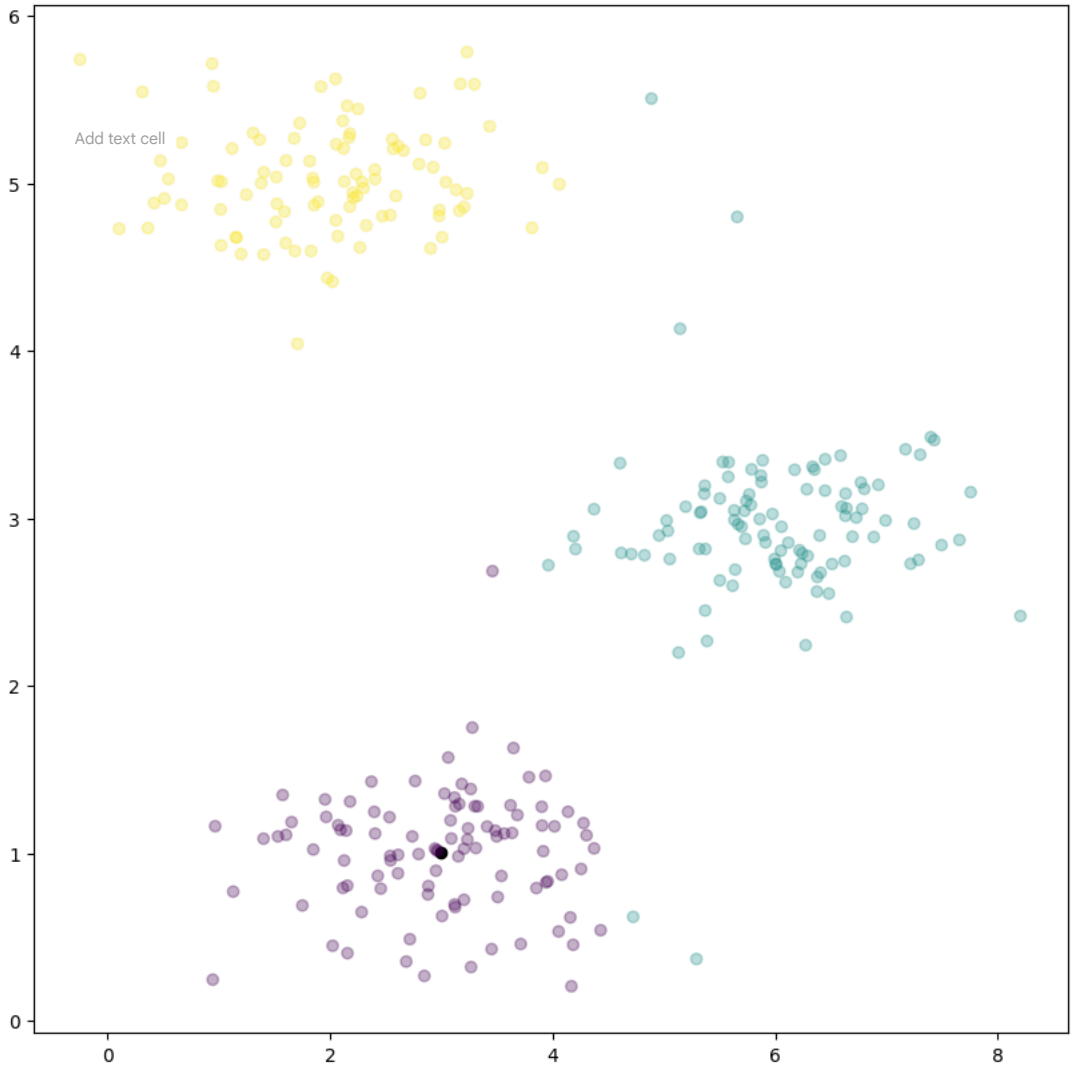
```
X=np.array(dataset)
```

```
# 6. Function to Claculate the Euclidian Distance

def  Calculate_Distance(i,j):
  return np.sqrt(np.sum((i-j)**2))
```

```
# 7. Function to find the Nearest Centroid

def Find_Nerest_Centroid(centroids,X):
  assigned_cluster=[]
  for i in X:
    dist=[]#list of calced distances
    for j in centroids:
      dist.append(Calculate_Distance(i,j))
    assigned_cluster.append(np.argmin(dist))
  return assigned_cluster
```

```
# 8. Function For Getting the New Centroids i.e. Updating the Old Centroids

def Calculating_Centroids(cluster_number,X):
  new_centorids=[]
  new_df=pd.concat([pd.DataFrame(X),pd.Series(cluster_number,name='cluster')],axis=1)
  for c in set(new_df['cluster']):
    current_cluster=new_df[new_df['cluster']==c][new_df.columns[:-1]]
    cluster_mean=current_cluster.mean(axis=0)
    new_centorids.append(cluster_mean)
    return new_centorids
```

```
# 9. Training the Model

epochs=10
for i in range(epochs):
  get_centroids=Find_Nerest_Centroid(centroids,X)
  centroids=Calculating_Centroids(get_centroids,X)
  if i == 0 or i == epochs - 1 :
    plt.figure(figsize=(10,10))
    plt.scatter(np.array(centroids)[:,0],np.array(centroids)[:,1],color="black")
    plt.scatter(X[:,0],X[:,1],c=get_centroids,alpha =0.3)
    plt.show()
```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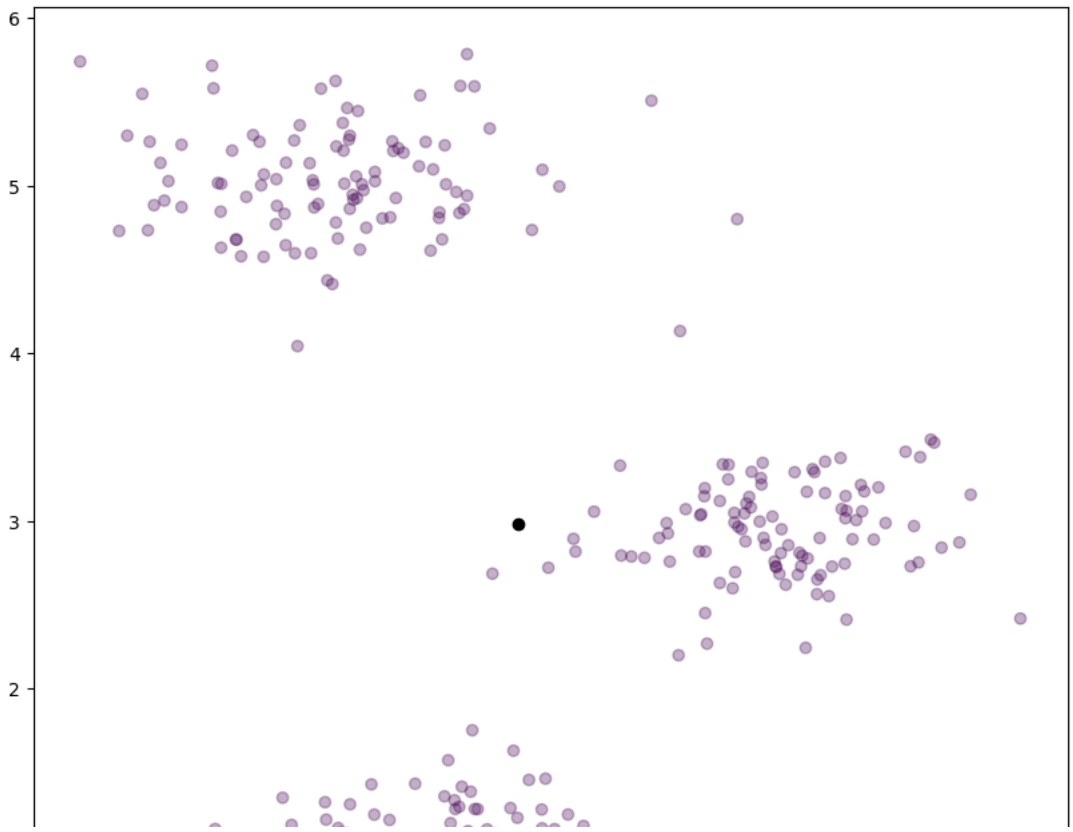
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