In [2]:

```
import random
import math
import numpy as np
def random_centers(data,k):
    data_ = np.array(data)
    centres_list = []
    for x in range(0,k):
        temp_rand = np.random.randint( 0,high = 1999)
        temp = data_[temp_rand]
        centres list.append(temp)
        data_ = np.delete(data_,temp,axis = 0)
    return((centres_list))
def assign_data_centers(data, k,centres):
    thePartition = [[] for _ in range(0,k)] # list of k empty lists
    c = np.array(centres)
    dp = np.array(data)
    for a in dp:
        temp_norm = np.linalg.norm((c-a),axis =1 )
        minn = temp_norm.min()
        temp_list = list(temp_norm)
        thePartition[temp_list.index(minn)].append(a)
    return thePartition
def revalaute_centres(data_with_centres,k):
    data = data_with_centres
    new_centres=[]
    for x in data:
        temp = np.array(x)
        temp m = temp.mean(axis = 0)
        new centres.append(temp m)
    return(new_centres)
```

In [3]:

```
import pandas as pd
data = pd.read_csv('clustering.csv')
```

```
In [4]:
```

```
k = 10
C = random centers(data,k)
D C 2 = assign data centers(data,k,C)
while tol > 0.00001:
  N_C = revalaute_centres(D_C_2,k)
  DC1 = DC2
  D_C_2 = assign_data_centers(data,k,N_C)
  temp sum = 0
  tol = tol/10
```

C:\Users\Karthik\Anaconda3\lib\site-packages\ipykernel_launcher.py:12: Dep recationWarning: using a non-integer array as obj in delete will result in an error in the future if sys.path[0] == '':

C:\Users\Karthik\Anaconda3\lib\site-packages\ipykernel_launcher.py:12: Fut ureWarning: in the future negative indices will not be ignored by `numpy.d elete`.

if sys.path[0] == '':

In [6]:

```
import pandas as pd
data = pd.read_csv('ShapedData.csv')
```

In [11]:

```
k = 10
C = random_centers(data,k)
D_C_2 = assign_data_centers(data,k,C)
while tol > 0.00001:
  N_C = revalaute_centres(D_C_2,k)
  DC1 = DC2
  D C 2 = assign data centers(data,k,N C)
  temp sum = 0
  tol = tol/10
```

C:\Users\Karthik\Anaconda3\lib\site-packages\ipykernel launcher.py:12: Dep recationWarning: using a non-integer array as obj in delete will result in an error in the future

if sys.path[0] == '':

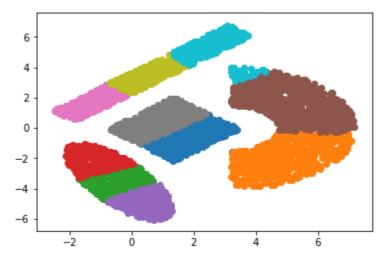
C:\Users\Karthik\Anaconda3\lib\site-packages\ipykernel launcher.py:12: Fut ureWarning: in the future negative indices will not be ignored by `numpy.d elete`.

```
if sys.path[0] == '':
```

In [12]:

```
import matplotlib.pyplot as plt
plt.plot()
for i in D_C_2:
    plt.scatter(pd.DataFrame(i)[0],pd.DataFrame(i)[1])

plt.show()
```



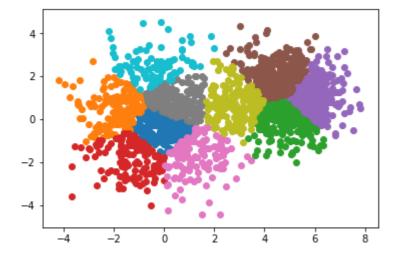
In [9]:

```
import pandas as pd
data = pd.read_csv('ShapedData.csv')
```

In [10]:

```
import matplotlib.pyplot as plt
plt.plot()
for i in D_C_2:
    plt.scatter(pd.DataFrame(i)[0],pd.DataFrame(i)[1])

plt.show()
```



In []: