# **K-Means Clustering**

## In [ ]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

## In [3]:

```
data_set = pd.read_csv("https://raw.githubusercontent.com/AP-State-Skill-Development-Co
rporation/Datasets/master/Classification/Social_Network_Ads.csv")
data_set.head()
```

## Out[3]:

	User ID	Gender	Age	EstimatedSalary	Purchased
0	15624510	Male	19	19000	0
1	15810944	Male	35	20000	0
2	15668575	Female	26	43000	0
3	15603246	Female	27	57000	0
4	15804002	Male	19	76000	0

## In [4]:

```
data_set.info()
```

```
RangeIndex: 400 entries, 0 to 399

Data columns (total 5 columns):

User ID 400 non-null int64

Gender 400 non-null object

Age 400 non-null int64

EstimatedSalary 400 non-null int64
```

<class 'pandas.core.frame.DataFrame'>

dtypes: int64(4), object(1)
memory usage: 15.7+ KB

Purchased

```
data_set.columns
```

400 non-null int64

## Out[5]:

In [5]:

```
Index(['User ID', 'Gender', 'Age', 'EstimatedSalary', 'Purchased'], dtype
='object')
```

In [16]:

X = data\_set.iloc[:,[3,4]].values
print(X)

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## In [7]:

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```
from sklearn.cluster import KMeans
```

## In [8]:

```
elbow = []
for i in range(1,11):
    kmeans = KMeans(n_clusters = i,init = "k-means++",random_state = 42)
    kmeans.fit(X)
    elbow.append(kmeans.inertia_)
```

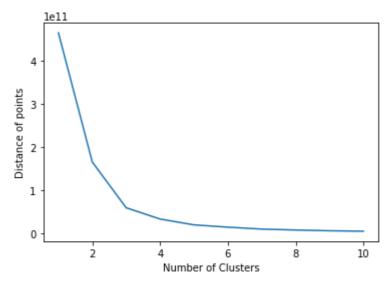
## In [9]:

```
print(elbow)
```

[463878477591.8775, 165190293074.85718, 59489922495.063545, 33459707476.55 077, 19983360116.390648, 14690873439.203066, 10202678741.900618, 810746288 1.326336, 6348472196.173229, 5283655668.908146]

## In [10]:

```
plt.plot(range(1,11),elbow)
plt.xlabel("Number of Clusters")
plt.ylabel("Distance of points")
plt.show()
```



## In [11]:

```
kmeans = KMeans(n_clusters = 5,init = "k-means++",random_state = 42)
y_means = kmeans.fit_predict(X)
```

## In [12]:

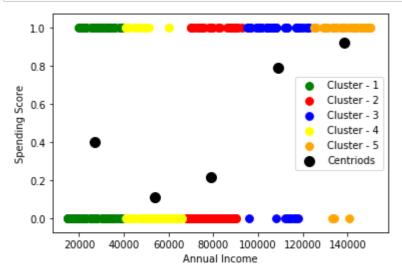
```
y_means
```

### Out[12]:

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```

## In [14]:

```
plt.scatter(X[y_means == 0,0],X[y_means == 0,1],s = 60,c = "green",label = "Cluster -
1")
plt.scatter(X[y_means == 1,0],X[y_means == 1,1],s = 60,c = "red",label = "Cluster - 2")
plt.scatter(X[y_means == 2,0],X[y_means == 2,1],s = 60,c = "blue",label = "Cluster - 3")
plt.scatter(X[y_means == 3,0],X[y_means == 3,1],s = 60,c = "yellow",label = "Cluster -
4")
plt.scatter(X[y_means == 4,0],X[y_means == 4,1],s = 60,c = "orange",label = "Cluster -
5")
plt.scatter(kmeans.cluster_centers_[:,0],kmeans.cluster_centers_[:,1],s = 100,c = "black",label = "Centriods")
plt.xlabel("Annual Income")
plt.ylabel("Spending Score")
plt.legend(loc = "best")
plt.show()
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