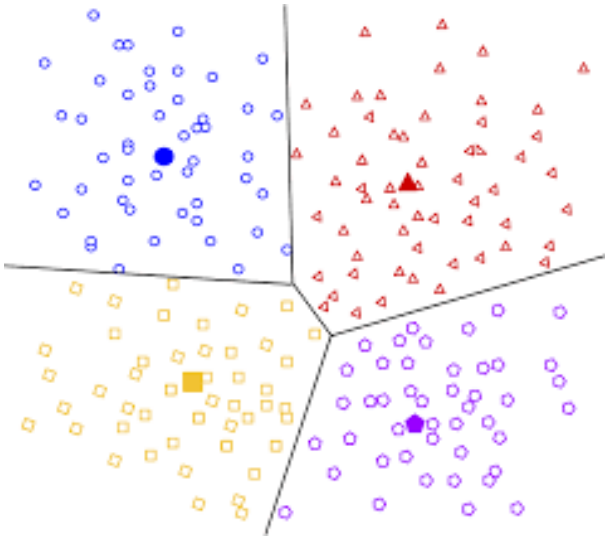
Kmeans Clustering

Using Mall Customers Data



Packages Used

In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import sklearn as sk
```

Load and Preprocess Data

In [2]:
```
# Importing the dataset
dataset = pd.read_csv('../../../_resources/data/Mall_Customers.csv')
X = dataset.iloc[:, [3, 4]].values

```

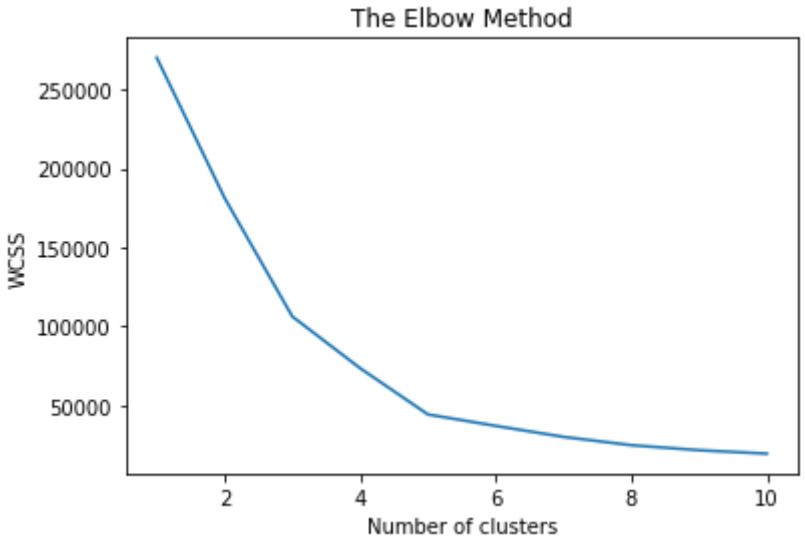
Create Kmeans Class With all Methods

In [3]:

```
class Kmeans:


    def __init__(self, k, seed = None, max_iter = 200):
        self.k = k
        self.seed = seed
        self.centroids = []
        if self.seed is not None:
            np.random.seed(self.seed())
        self.max_iter = max_iter

    def initialise_centroids(self, data):
        initial_centroids = np.random.permutation(data.shape[0])[:self.
        self.centroids = data[initial_centroids]
        return self.centroids

    def assign_clusters(self, data):
        if data.ndim == 1:
            data = data.reshape(-1,1)
        dist_to_centroid = sk.metrics.pairwise_distances(data, self.cen
                                                metric = 'euclidean')
        self.cluster_labels = np.argmin(dist_to_centroid, axis = 1)
        return self.cluster_labels

    def update_centroids(self, data):
        self.centroids = np.array([data[self.cluster_labels == i].mean(
                                   for i in range(self.k)])
        return self.centroids


    def predict(self, data):
        return self.assign_clusters(data)

    def fit_kmeans(self, data):
        self.centroids = self.initialize_centroids(data)
        for iter in range(self.max_iter):
            self.cluster_labels = self.assign_clusters(data)
            self.centroids = self.update_centroids(data)
            if iter % 100 == 0:
                print('Running Model Iteration %d' %iter)
        print('Model finished running')
        return self
```

In [4]:

```
# Using the elbow method to find the optimal number of clusters
from sklearn.cluster import KMeans
wcss = []
for i in range(1, 11):
    kmeans = KMeans(n_clusters = i, init = 'k-means++', random_state =
    kmeans.fit(X)
    wcss.append(kmeans.inertia_)
plt.plot(range(1, 11), wcss)
plt.title('The Elbow Method')
plt.xlabel('Number of clusters')
plt.ylabel('WCSS')
plt.show()

```



In [ ]:

```
# Fitting K-Means to the dataset
kmeans = Kmeans(k = 5)
y_kmeans = kmeans.predict(X)

# Visualising the clusters
plt.scatter(X[y_kmeans == 0, 0], X[y_kmeans == 0, 1], s = 100, c = 'red
plt.scatter(X[y_kmeans == 1, 0], X[y_kmeans == 1, 1], s = 100, c = 'blu
plt.scatter(X[y_kmeans == 2, 0], X[y_kmeans == 2, 1], s = 100, c = 'gre
plt.scatter(X[y_kmeans == 3, 0], X[y_kmeans == 3, 1], s = 100, c = 'cya
plt.scatter(X[y_kmeans == 4, 0], X[y_kmeans == 4, 1], s = 100, c = 'mag
plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:, 1
plt.title('Clusters of customers')
plt.xlabel('Annual Income (k$)')
plt.ylabel('Spending Score (1-100)')
plt.legend()
plt.show()
```

In [ ]:

```

```