Exercise 3: Inspect your clustering

From the course *Transition to Data Science*. Buy the entire course for just $10 for many more exercises and helpful video lectures.

Let's now inspect the clustering you performed in the previous exercise!

Step 1: Load the dataset *(written for you)*.

```
In [1]: import pandas as pd

        df = pd.read_csv('../datasets/ch1ex1.csv')
        points = df.values
```

Step 2: Run your solution to the previous exercise *(filled in for you).*

```
In [2]: from sklearn.cluster import KMeans

        model = KMeans(n_clusters=3)
        model.fit(points)
        labels = model.predict(points)
```

Step 3: Import `matplotlib.pyplot` as `plt`

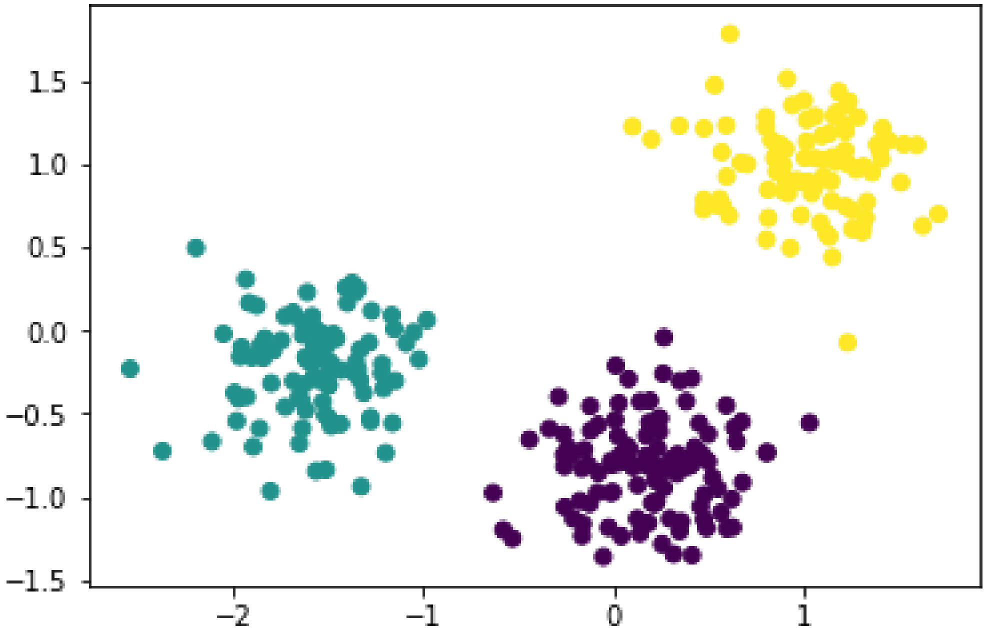
```
In [3]: import matplotlib.pyplot as plt
```

Step 4: Assign column `0` of `points` to `xs`, and column `1` of `points` to `ys`

```
In [4]: xs = points[:,0]
        ys = points[:,1]
```

Step 5: Make a scatter plot of `xs` and `ys`, specifying the `c=labels` keyword arguments to color the points by their cluster label. You'll see that KMeans has done a good job of identifying the clusters!

```
In [5]: plt.scatter(xs, ys, c=labels)
        plt.show()
```



This is great, but let's go one step further, and add the cluster centres (the "centroids") to the scatter plot.

Step 6: Obtain the coordinates of the centroids using the `.cluster_centers_` attribute of `model`. Assign them to `centroids`.

```
In [6]: centroids = model.cluster_centers_
```

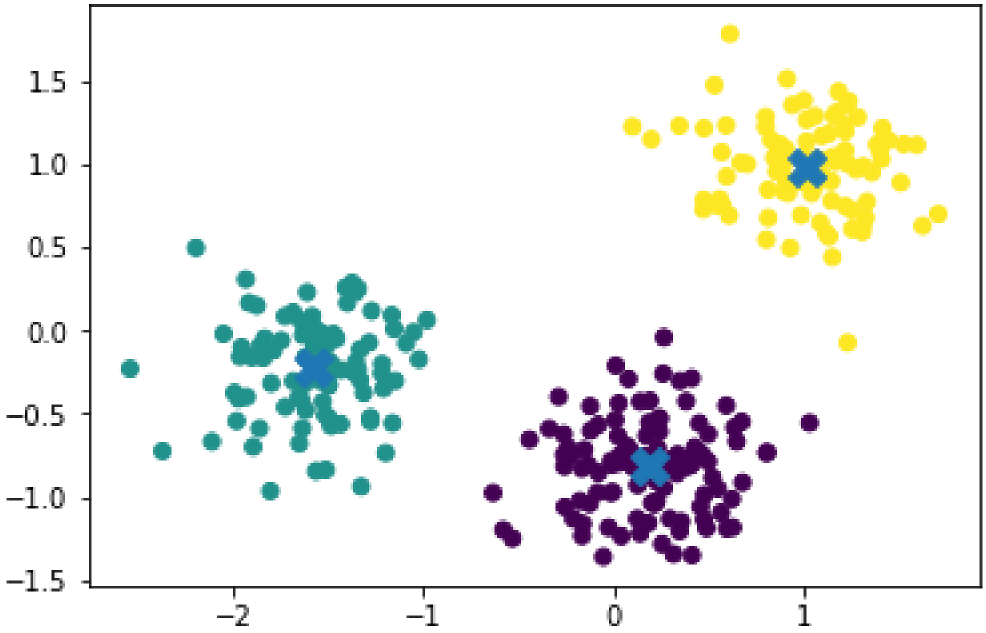
Step 7: Assign column `0` of `centroids` to `centroids_x`, and column `1` of `centroids` to `centroids_y`.

```
In [7]: centroids_x = centroids[:,0]
        centroids_y = centroids[:,1]
```

Step 8: In a single cell, create two scatter plots (this will show the two on top of one another). Call `plt.show()` just once, at the end.

Firstly, the make the scatter plot you made above. Secondly, make a scatter plot of `centroids_x` and `centroids_y`, using `'X'` (a cross) as a marker by specifying the `marker` parameter. Set the size of the markers to be `200` using `s=200`.

```
In [8]: plt.scatter(xs, ys, c=labels)
        plt.scatter(centroids_x, centroids_y, marker='X', s=200)
        plt.show()
```



Great work! The centroids are important because they are what enables KMeans to assign new, previously unseen points to the existing clusters.

```
In [ ]:
```