# Unsupervised K-means clustering on Iris dataset

In [1]:

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

In [2]:

```
df=pd.read_csv("./iris.csv")
df.head()
```

Out[2]:

|   | Id | SepalLengthCm | SepalWidthCm | PetalLengthCm | PetalWidthCm | Species |
|---|---|---|---|---|---|---|
| **0** | 1 | 5.1 | 3.5 | 1.4 | 0.2 | Iris-setosa |
| **1** | 2 | 4.9 | 3.0 | 1.4 | 0.2 | Iris-setosa |
| **2** | 3 | 4.7 | 3.2 | 1.3 | 0.2 | Iris-setosa |
| **3** | 4 | 4.6 | 3.1 | 1.5 | 0.2 | Iris-setosa |
| **4** | 5 | 5.0 | 3.6 | 1.4 | 0.2 | Iris-setosa |

In [3]:

```
# K-means Function

def kmeans(X, K, max_iters):
    # Use the first K data points as the initial centroids
    centroids = X[:K]

    for _ in range(max_iters):
        # Assign each data point to the nearest centroid
        labels = np.argmin(np.linalg.norm(X[:, np.newaxis] - centroids, axis=2), axis=1)

        # Update the centroids based on the assigned points
        new_centroids = np.array([X[labels == k].mean(axis=0) for k in range(K)])

        # If the centroids did not change, stop iterating
        if np.all(centroids == new_centroids):
            break

        centroids = new_centroids

    return labels, centroids
```

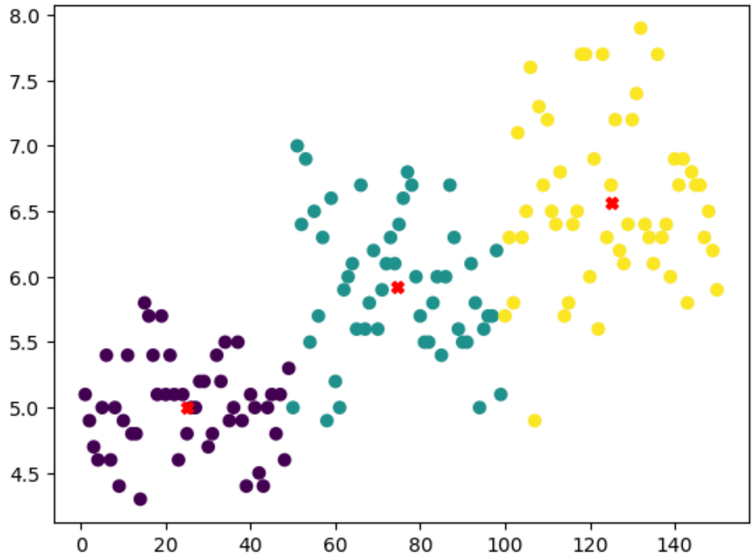
In [4]:

```
# Fit Model

X=np.array(df.iloc[:,:-1].values)
labels,c=kmeans(X,3,200)
print(labels)
print(c)
```

```
[0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2
 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
 2 2]
[[ 25.           5.00612245   3.42040816   1.46530612   0.24489796]
 [ 74.5          5.922        2.78         4.206        1.304     ]
 [125.           6.57058824   2.97058824   5.52352941   2.01176471]]
```

In [5]:

```
#Plot Graph

plt.scatter(X[:,0],X[:,1],c=labels)
plt.scatter(c[:,0],c[:,1],marker="X",color="red")
plt.show()
```


8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
0
20
40
60
80
100
120
140