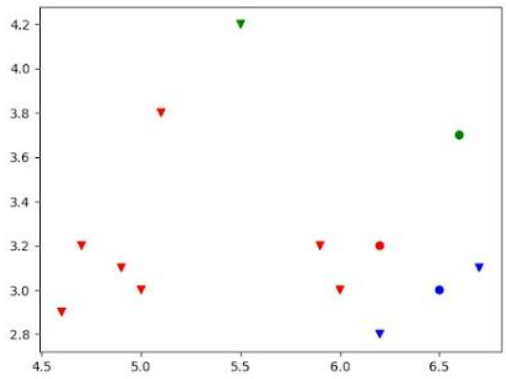
Task 2: K-Means Clustering

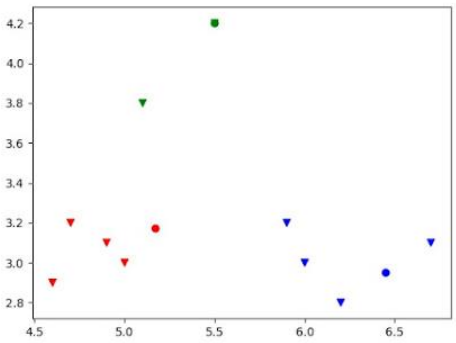
Introduction:

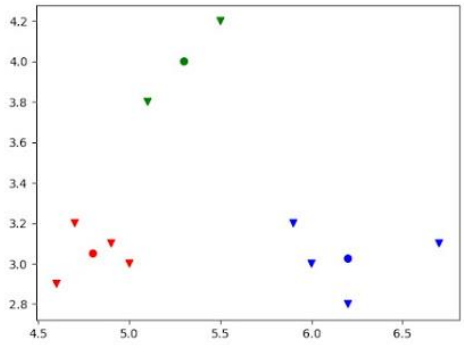
K-Means Clustering is a clustering algorithm using to form clusters in the unsupervised learning methods. The clusters which are formed after K-means clustering resembles closely with the one another in some aspects of their properties. In this assignment we will be implementing the clustering on a set of 10 data points in the first task and then on the quantization of the image of a baboon.

Sub-Task-1 :

The Centroids are given in the question along with the 10 data points. These data-points are mapped based on their between the center

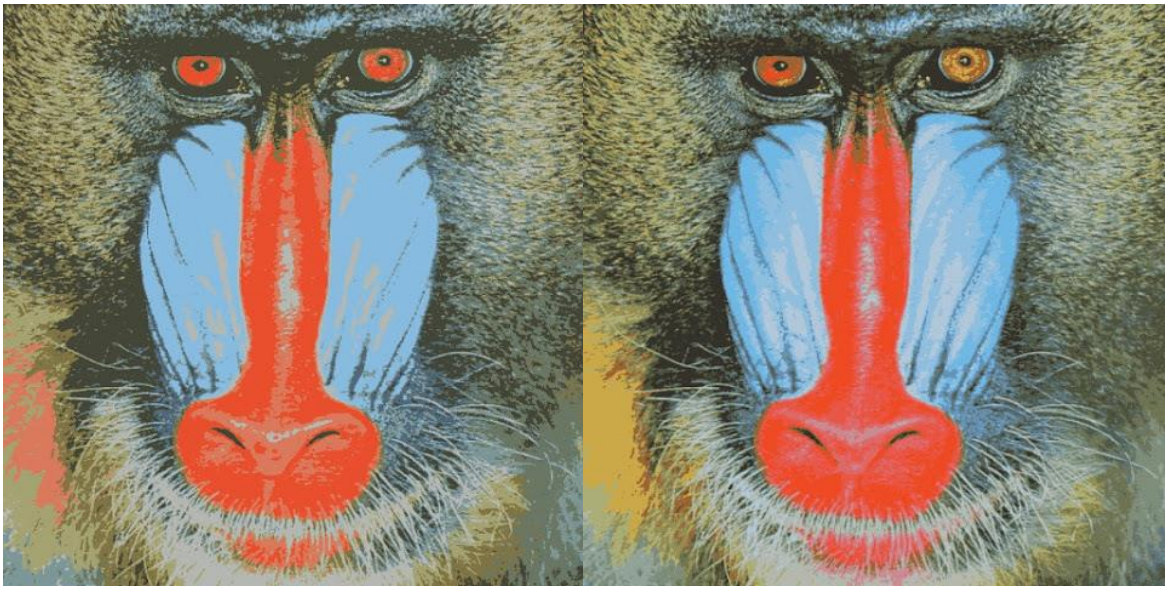






a. Iteration 0
b. Iteration 1
c. Iteration 2

Sub- Task 2:



a. 3 Clusters
b. 5 Clusters
c. 10 Clusters
d. 20 Clusters

Steps of Implementation:

1. Read an Image
2. Resized it to smaller pixels but same pixel value
3. Randomized the clusters
4. Channelized the image for every pixel in three filters
5. Looped through the image to find Euclidean distance between the pixel and assigned it to closest one. 2 for loops
6. Recalculated the clusters based on average of the currently formed pixels
7. Calculated the difference between the previous and current clusters and averaged them.
8. Looped over until the accuracy drops to less then 0.10
9. Re-assigned the pixel values same as new clusters
10. Displayed the image.

References:

Professors Notes and www.opencv.org