# Project 2: Unsupervised Learning (K-means)

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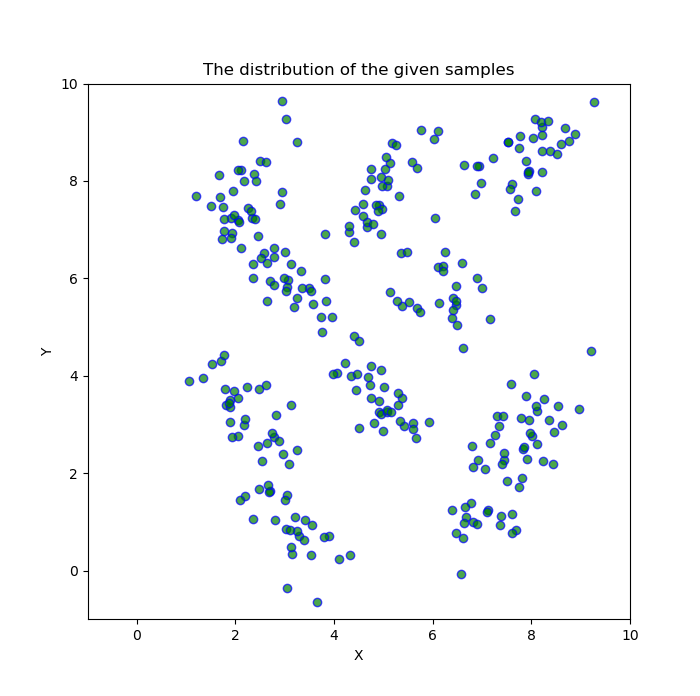
## Introduction:

K-means clustering is one of the simplest unsupervised machine learning algorithms in artificial learning so far. Unsupervised algorithms use only input vectors to make inferences from the data set without reference to known or labeled results.

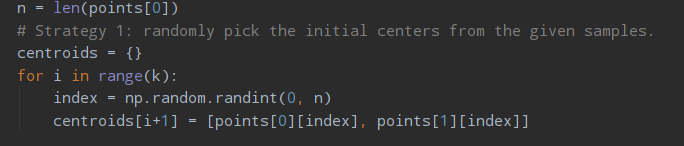
The main goal of this project, Part 2, is to use the K-means clustering algorithm to perform clustering on a provided set of data points containing two-dimensional points. According to the Project specifications, this project selects two different implementations of the initial cluster center using two different strategies in two ways. After learning Python, this project has greatly influenced my view on and use of artificial intelligence, especially for k-means.

## Dataset:

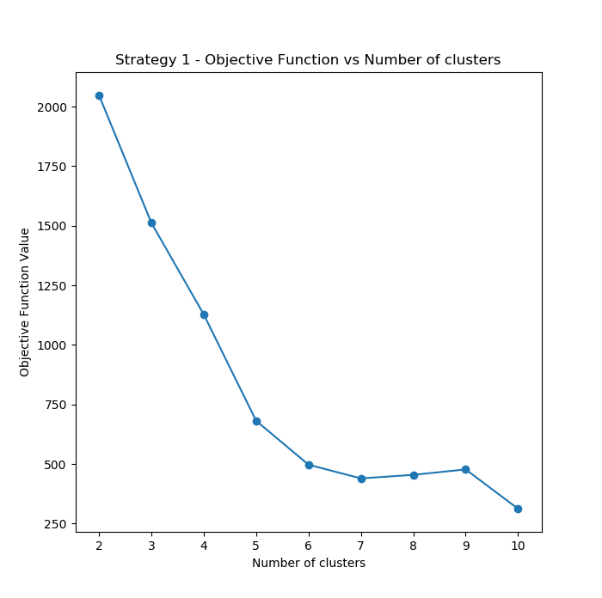
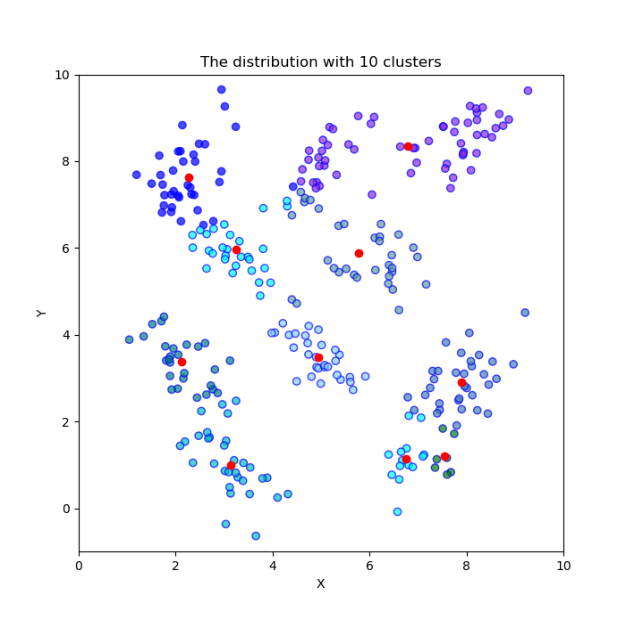
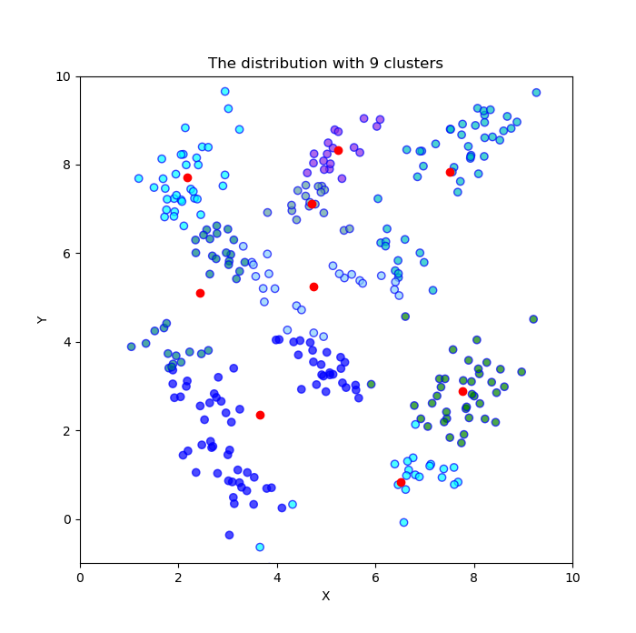
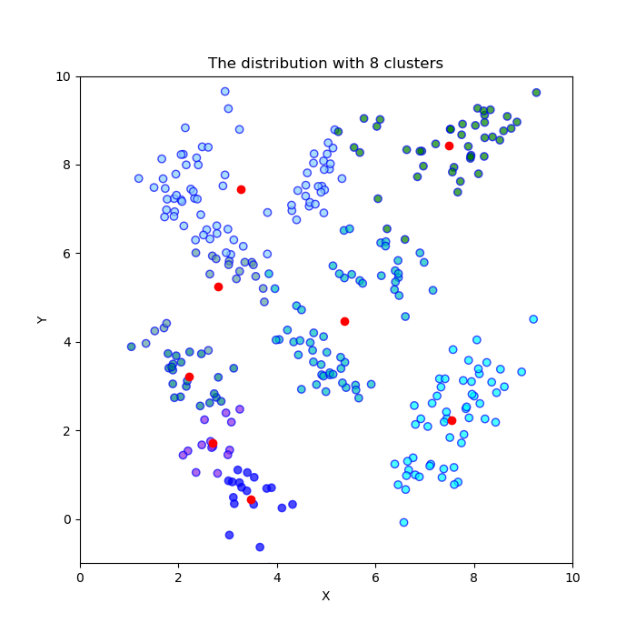
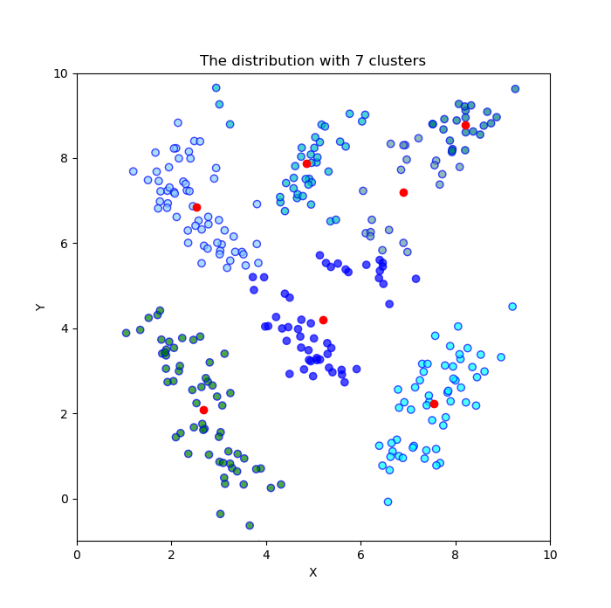
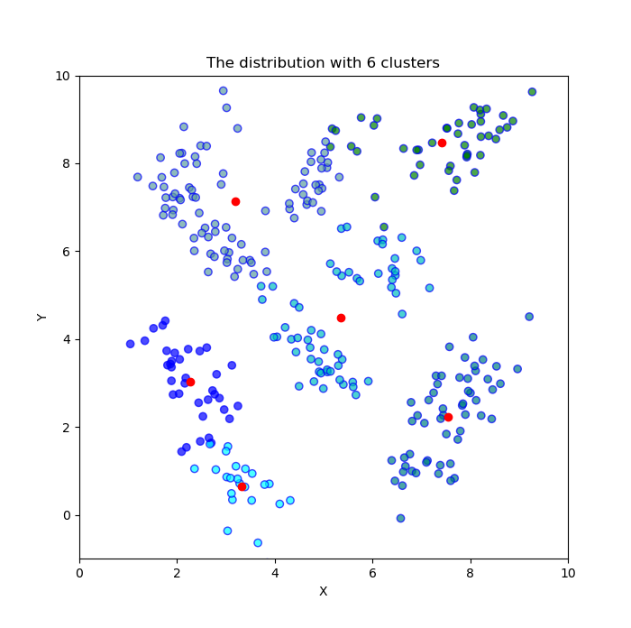
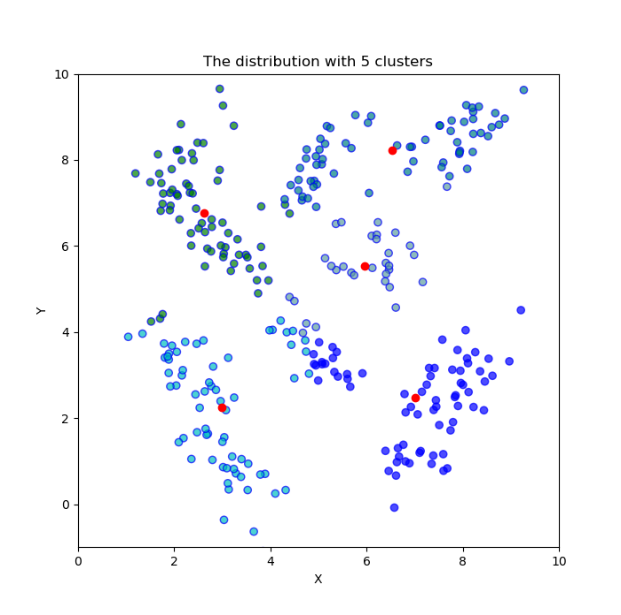
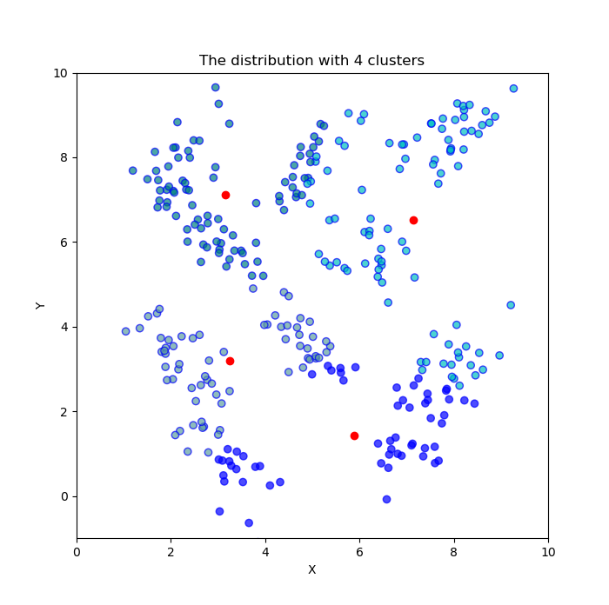
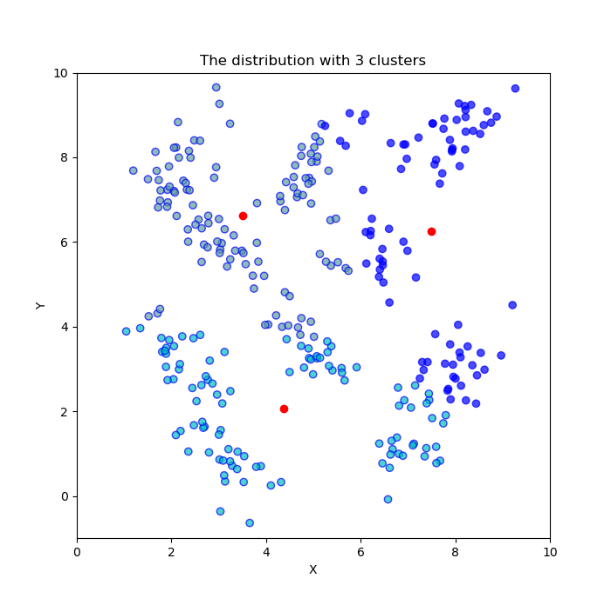
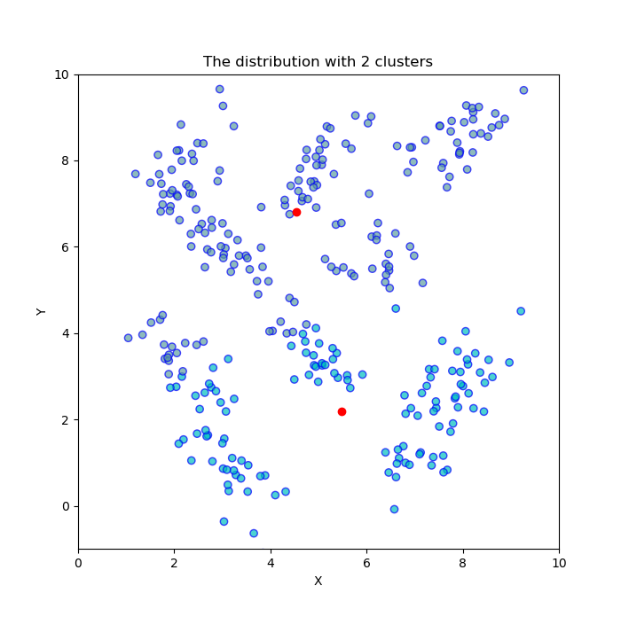
In this project, the dataset is a collection of 2-dimensional dataset.



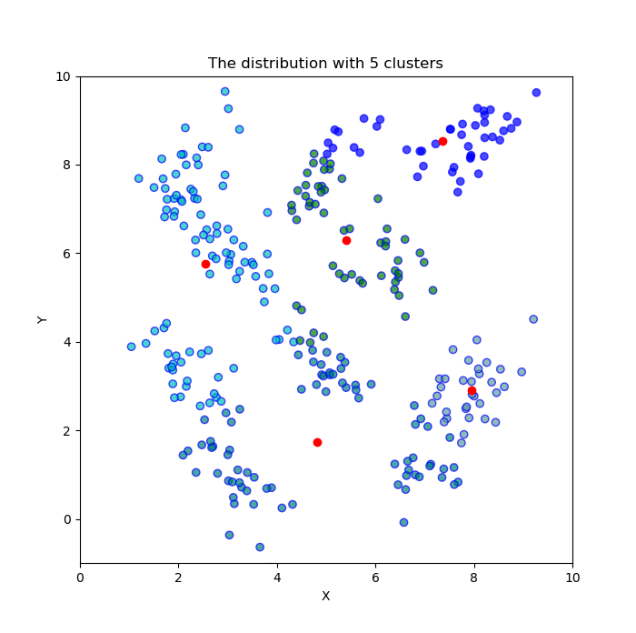
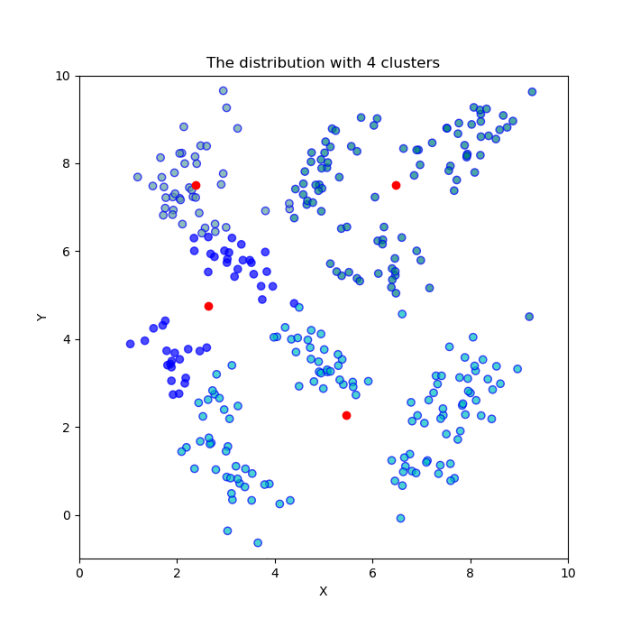
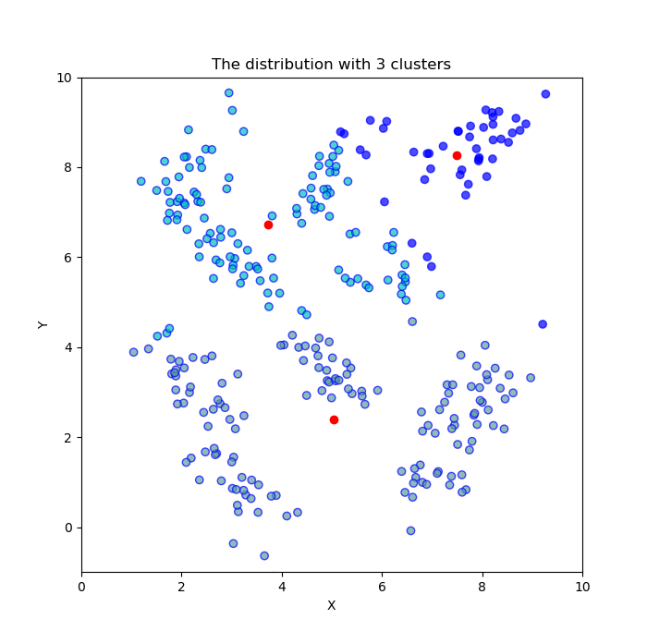
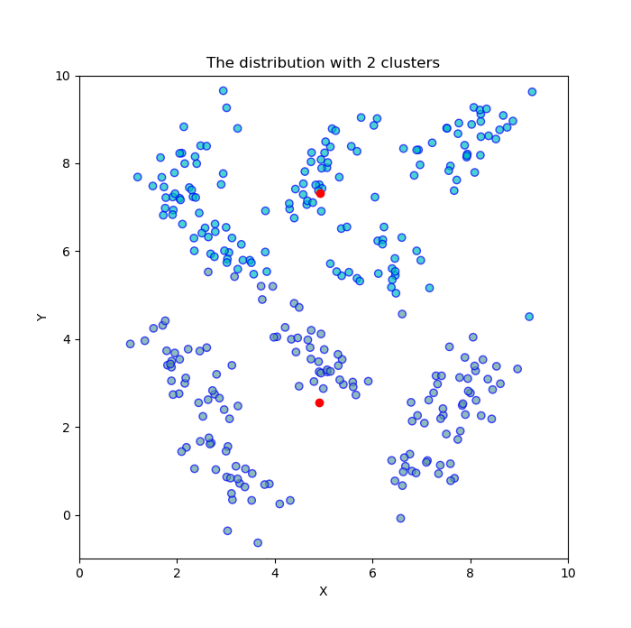
## Implementation of K-means algorithm (Strategy 1: random)

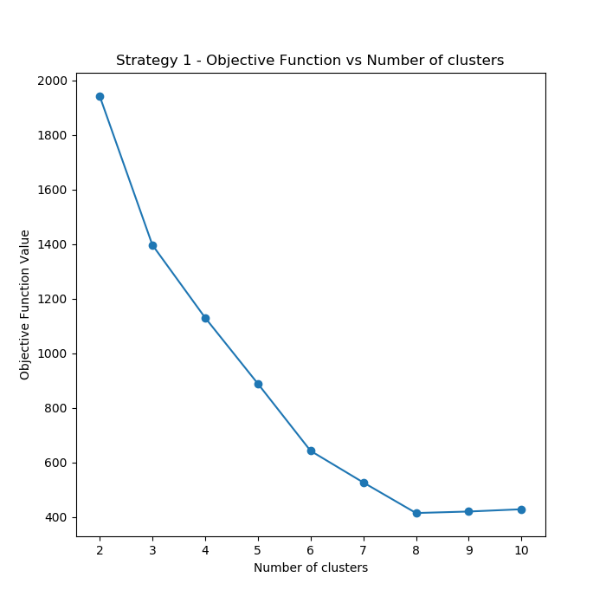
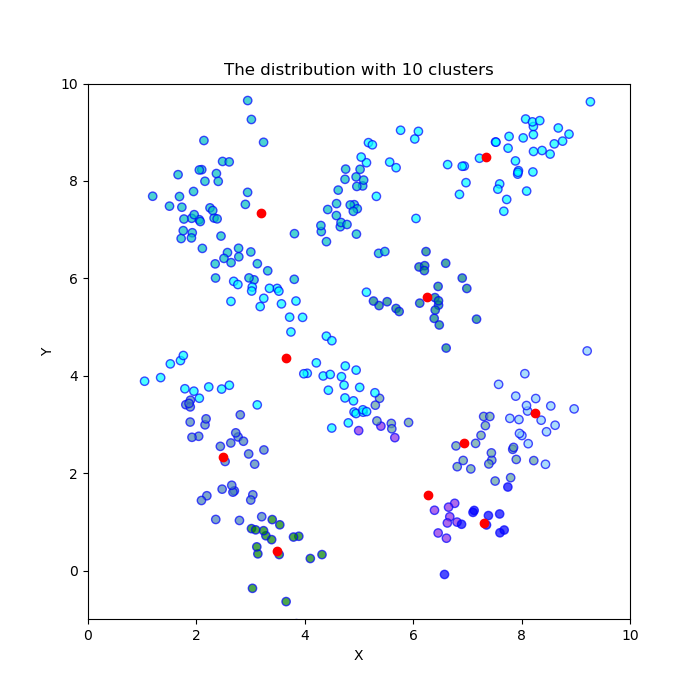
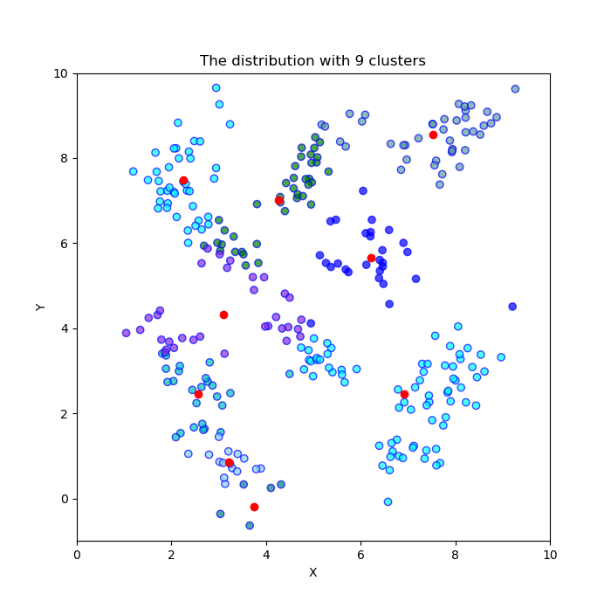
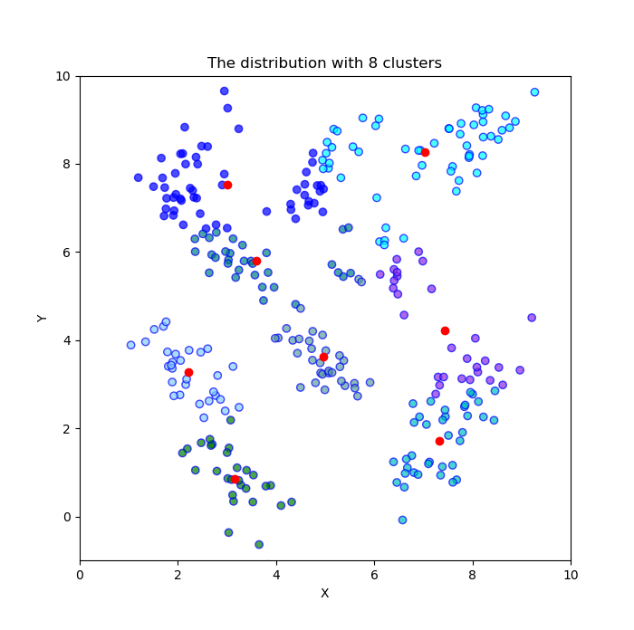
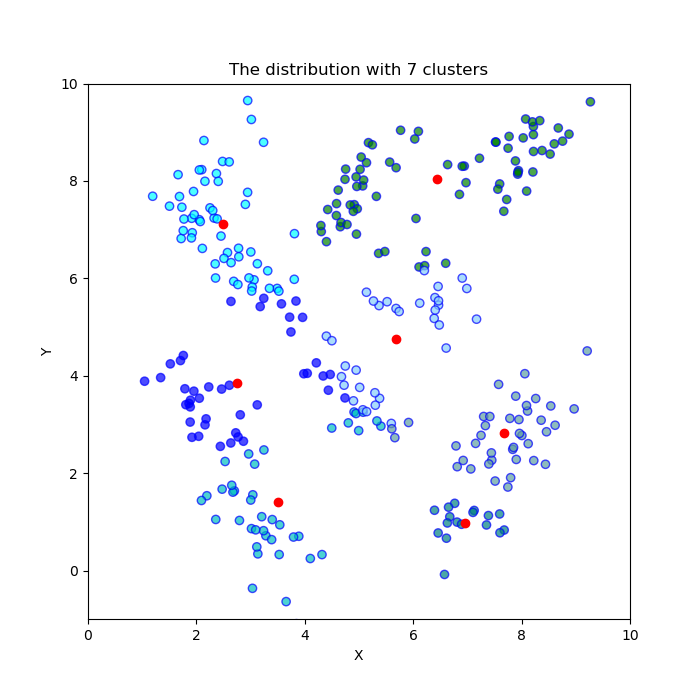
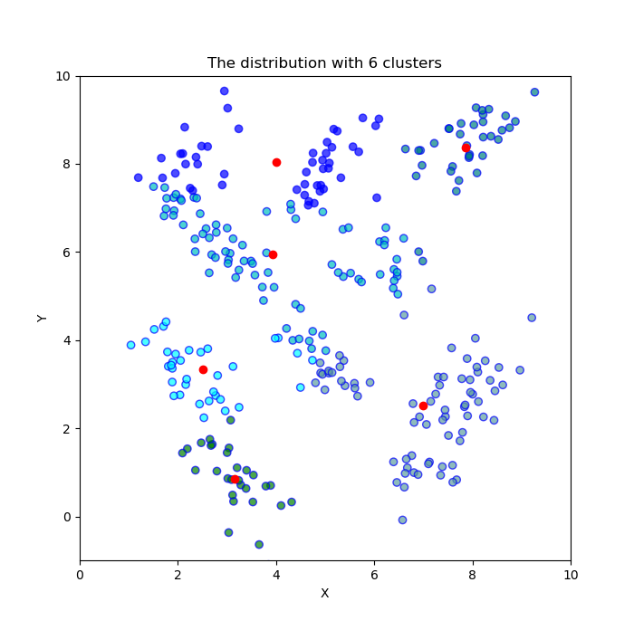


The result of the first run of Strategy 1:

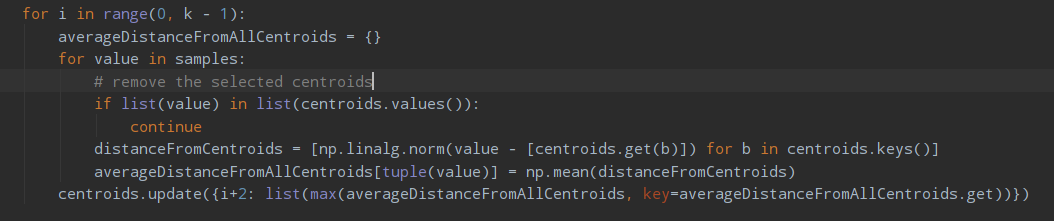


The result of the second run of Strategy 1:

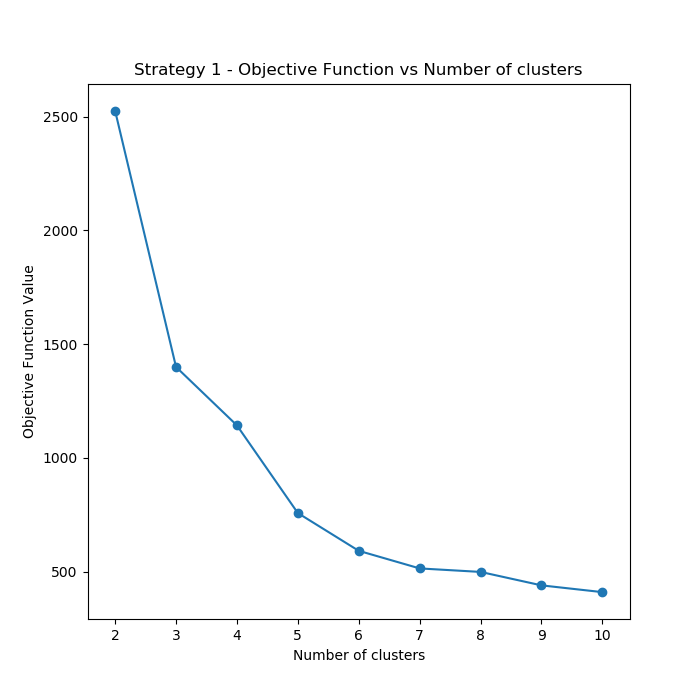
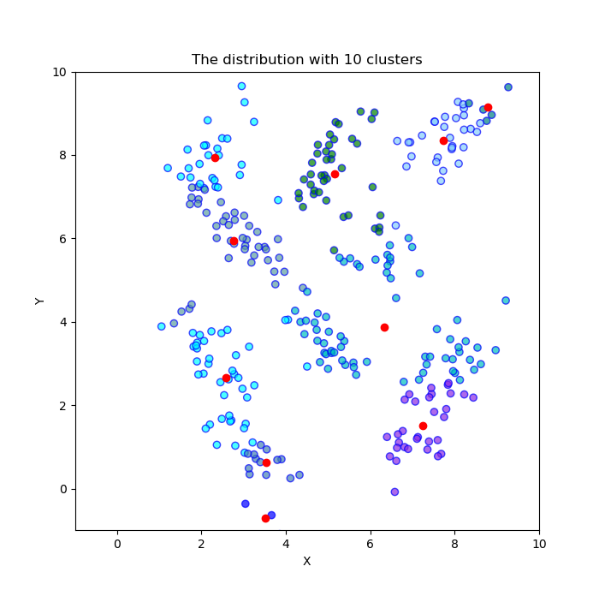
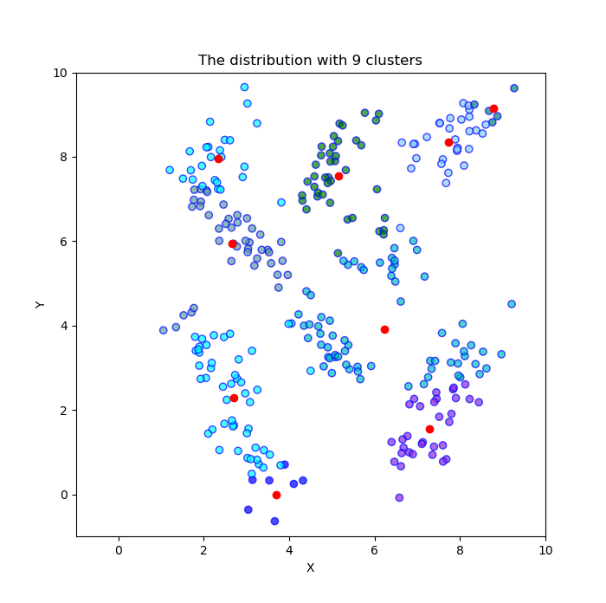
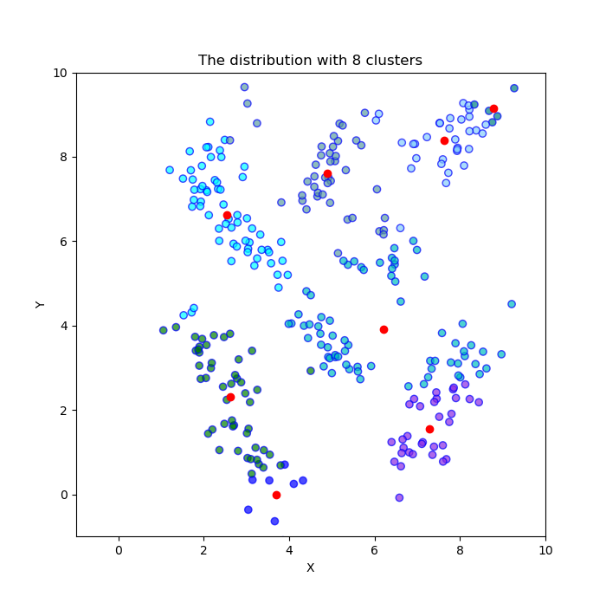
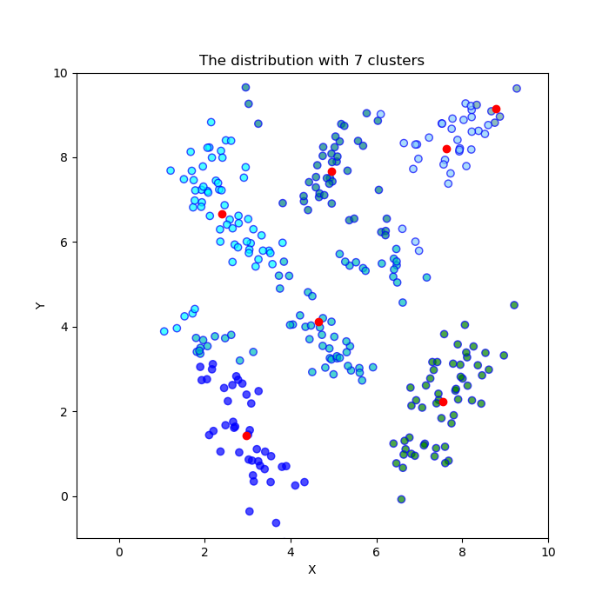
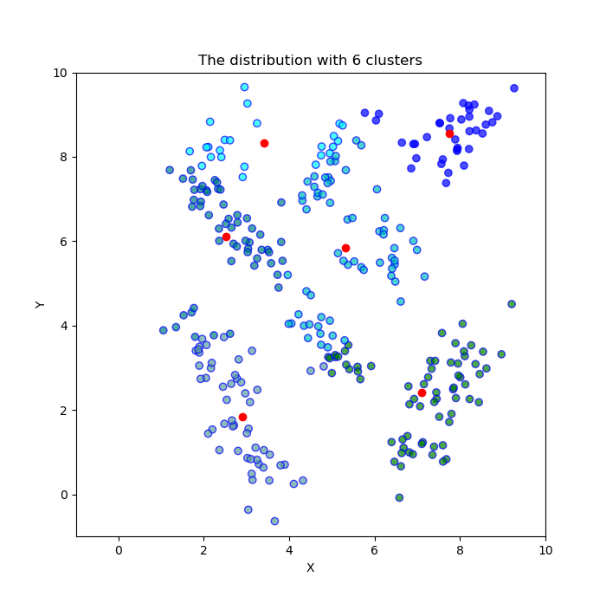
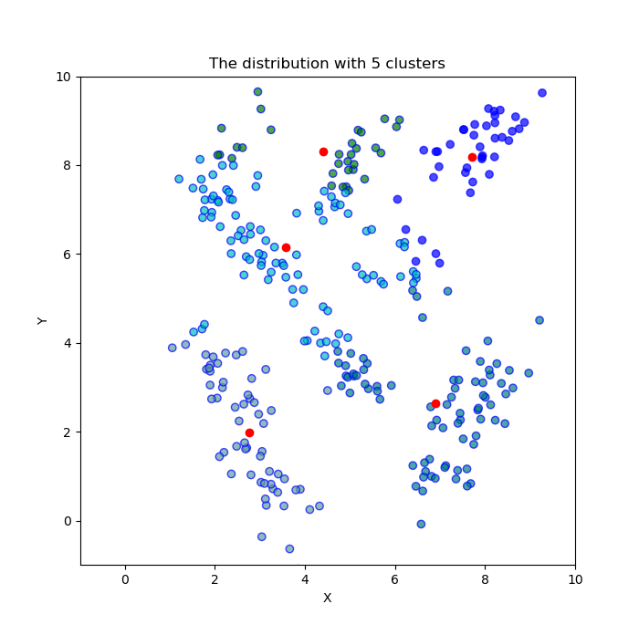
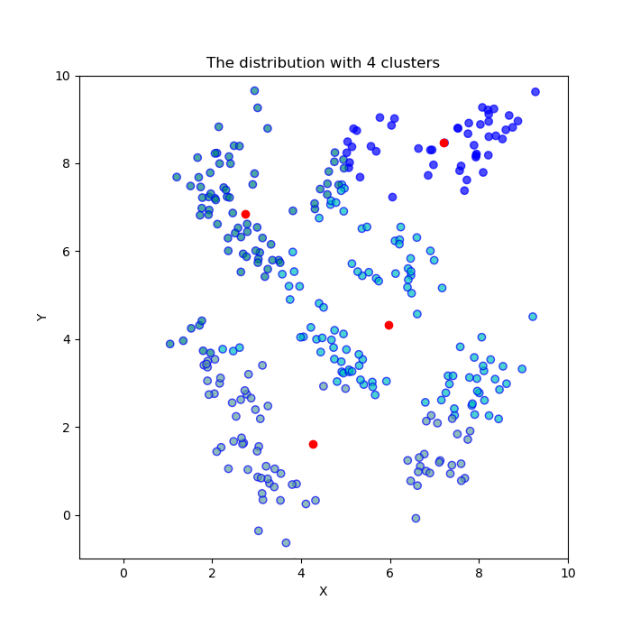
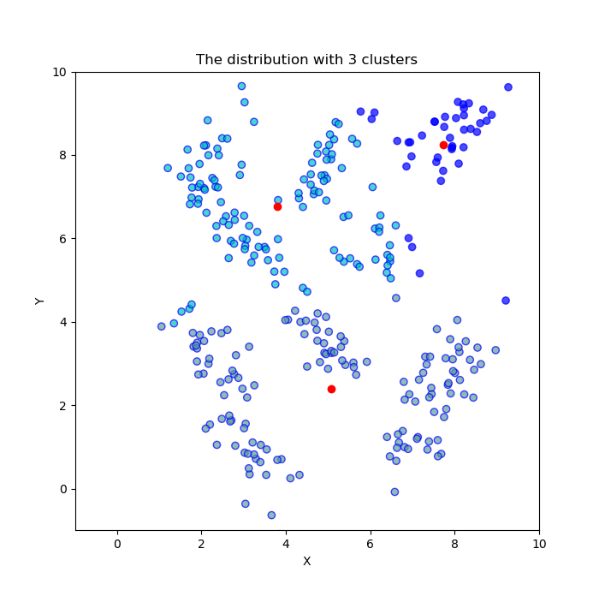
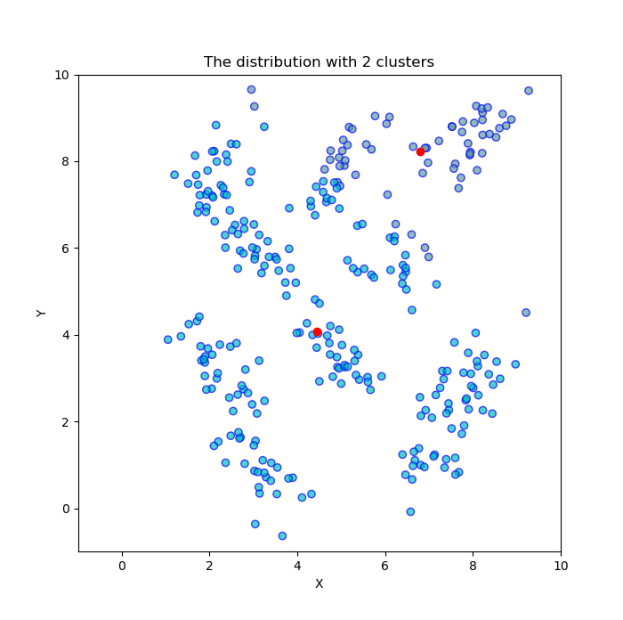




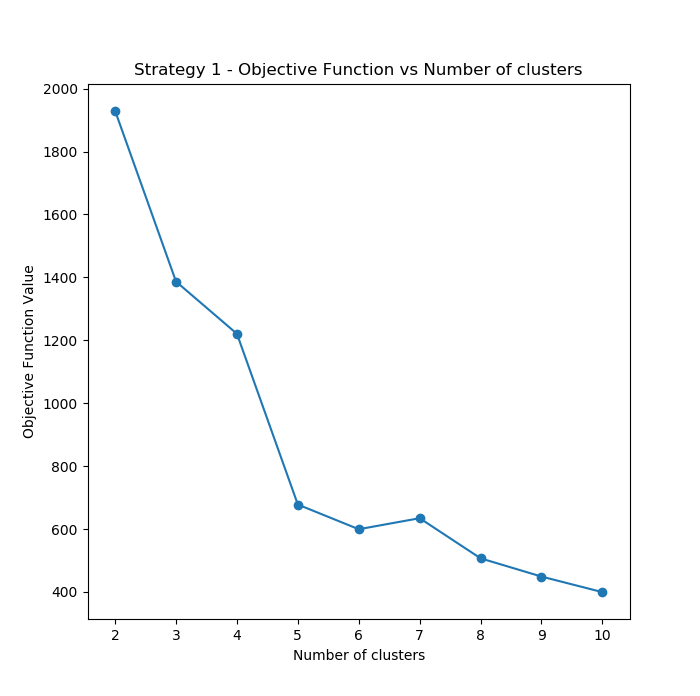
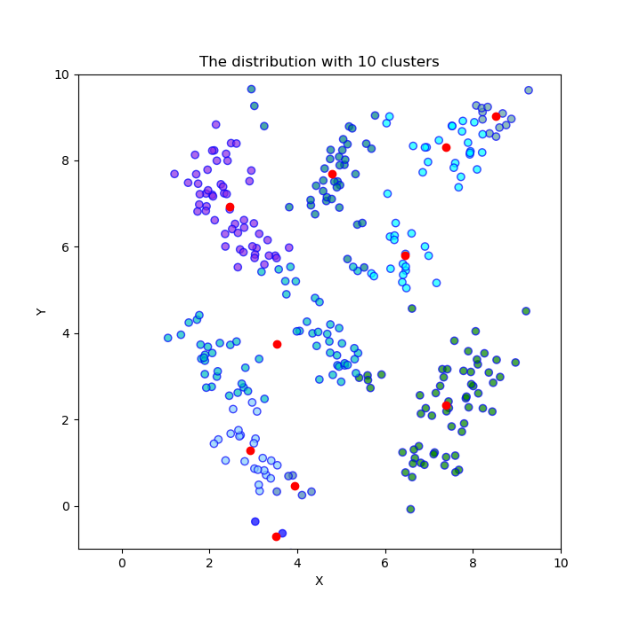
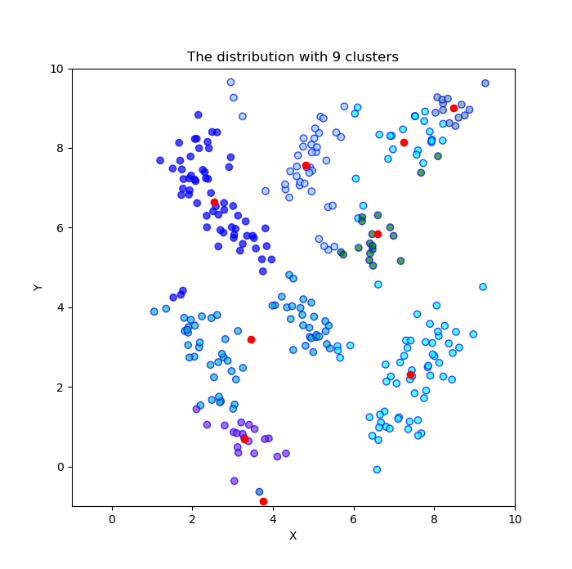
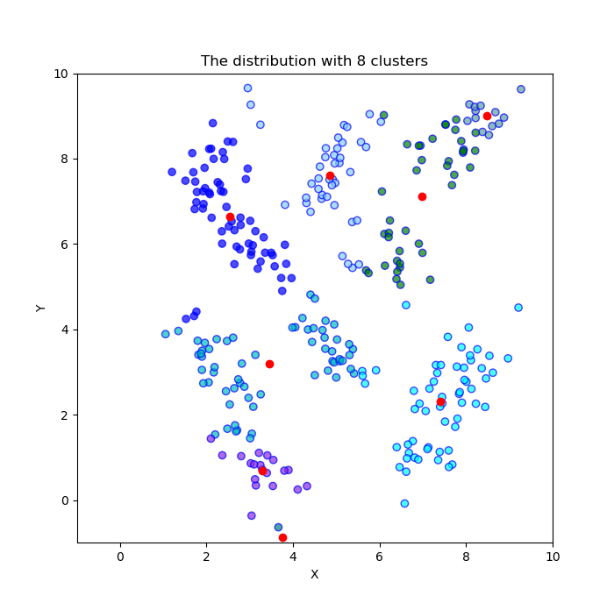
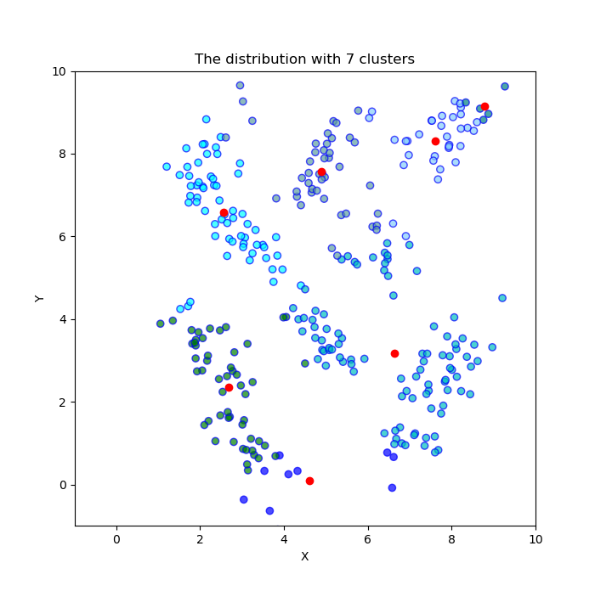
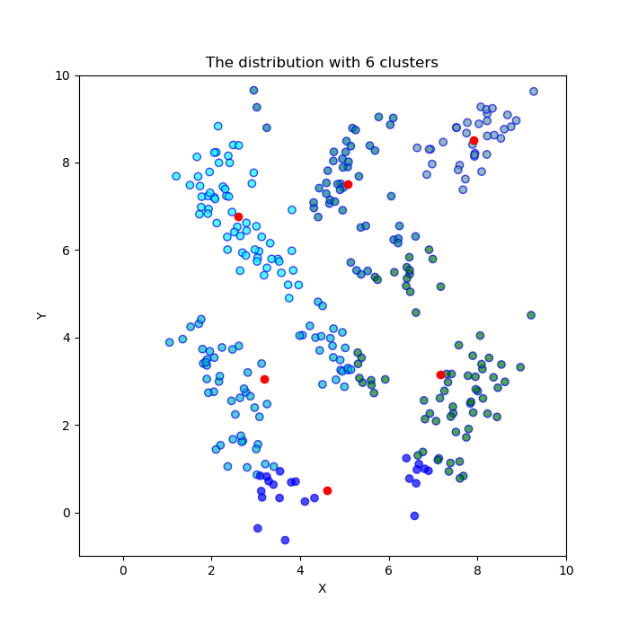
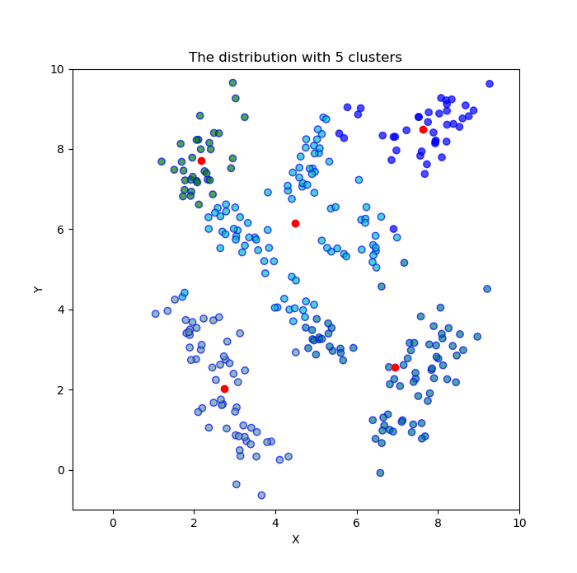
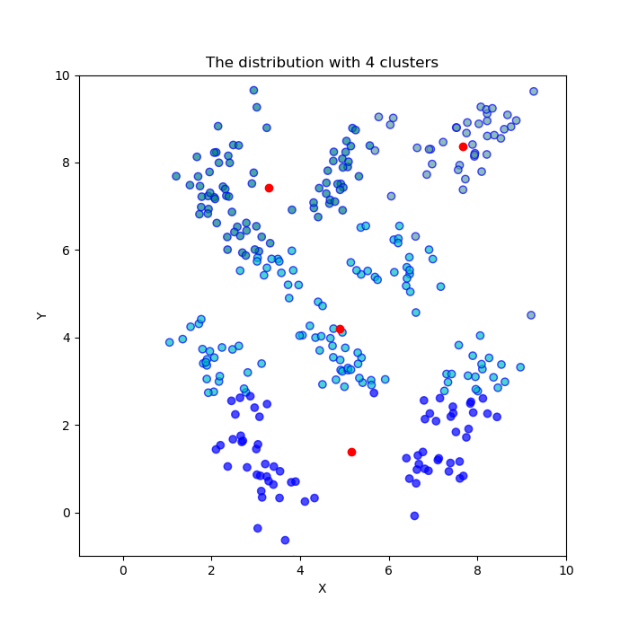
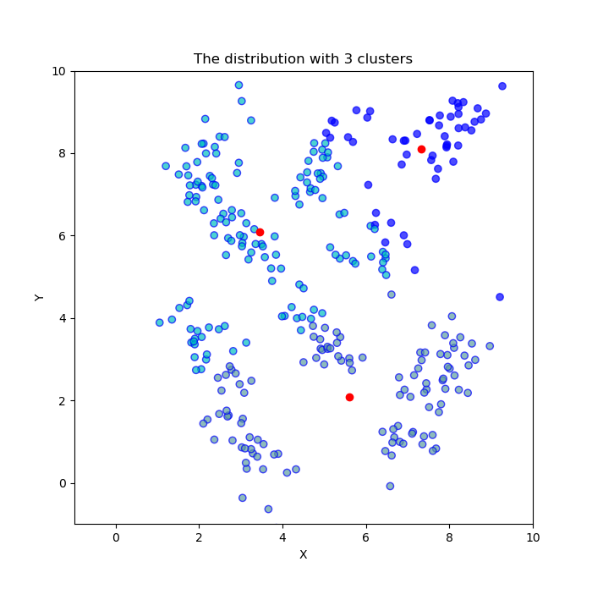
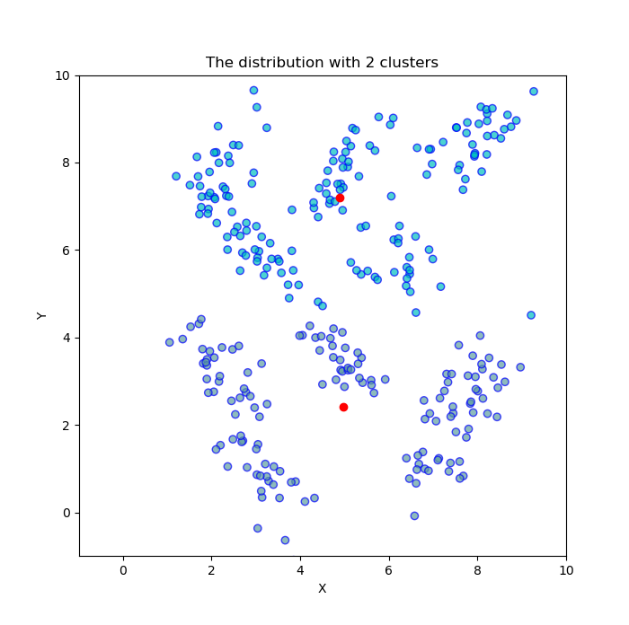
## Implementation of K-means algorithm (Strategy 2)



The result of the first run of Strategy 2:



The results of the second run of Strategy 2:



## Conclusion:

So far, the result of this Project is very good.The random strategy is very simple, but the result is quite good! For learning procedure, a random initialization is a good choice.