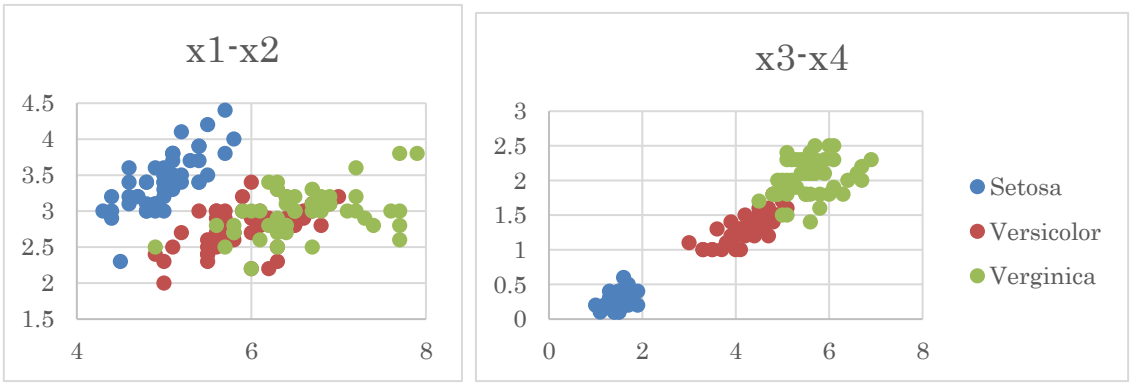
● Exercise 2

Fuzzy c-Means (FCM) is an extension of k-Means, which is often said to be more robust to random initialization than k-Means, i.e., we can derive the most appropriate solution more often by FCM than k-Means.
Develop the program source of FCM by C language or Python and apply it to Iris data set, which is composed of 4-D observations on 150 objects drawn from three Iris classes with 50 objects each: Iris Setosa, Iris Versicolour and Iris Virginica.



The detail of FCM is available on web sites such as Wikipedia.
https://en.wikipedia.org/wiki/Fuzzy_clustering

“Note”
FCM also suffers from “local minima” and can bring different clustering results with different initialization.
In this exercise, you should apply your FCM program with 100 different initial cluster centers. Then, you should report “how many different cluster partitions you found in the 100 trials” and “how often each of the partitions appeared”.
Here, in comparison of cluster partitions, all objects should be assigned to the cluster, to which each object has the largest membership.
Additionally, the values of the cost functions (objective functions) should also be compared.

“Deadline”
You should finish this exercise in 3 weeks. (by 30, June 2022)