HW 4: Data Clustering/Segmentation

Due Date: 4/4/2021

Lecturer: Dr. Abd-AlRahman AlMomani *Data-Driven Science & ML*

In the attached, "HW04_Data.mat", you find two datasets:

- X: Is a two dimensional data points.
- I: Is an image.

for each one of them, you need to apply:

1. K-means Clustering.
2. Spectral Clustering without normalization.
3. Spectral Clustering using normalized random-walk Laplacian.
4. Spectral Clustring using normalized symmetric Laplacian (Ng-Jordan-Weiss).

Number of clusters is assumed to be always $K = 3$.

Use the built-in functions for this purpose:

- spectralcluster (`https://www.mathworks.com/help/stats/spectralcluster.html`)
- kmeans (`https://www.mathworks.com/help/stats/kmeans.html`)

or their equivalent in python.

Report all your results, and explain (based on your opinion and analysis) the differences in the results and what was the best clustering method for each dataset. Take into consideration the run time for each of them.