8 *k*-medoids and *c*-means

You can use external libraries for linear algebra operations but you are expected to write your own algorithms.

8.1 Exercise 1

Use the `s3.txt` dataset from the previous lab.

1. Run **your** k-means code 20 times with $k = 15$. Save the minimum, maximum and average values of the loss.
2. Modify your code such that it uses the k-means++ initialization. Perform the same experiment of point 1 and compare the obtained values.
3. Build a scree plot by plotting the best (ie. the lowest) loss out of 20 runs for $k = 2, \ldots, 20$ (with k-means++). What is the optimal value of k?
4. Modify your code to perform k-medoids. Repeat the assignment of point 3 with the new implementation.
5. Modify your code to perform c-means. Repeat the assignment of point 3 with the new implementation.