1. Load the dataset [CreditCards.csv](https://maryville.instructure.com/courses/71038/files/16328158/download?wrap=1)[Download CreditCards.csv](https://maryville.instructure.com/courses/71038/files/16328158/download?download_frd=1)into memory.

Graphical user interface, text, application

Description automatically generated

1. Perform the k-means cluster analysis
   1. Remove the first column: CUST\_ID since it doesn’t provide any info for cluster.



* 1. Determine the optimal number of clusters. Justify your answer. It may take longer running time since it uses a large dataset.

Table

Description automatically generated with low confidence

Chart, line chart

Description automatically generated

* 1. Perform k-means clustering using the optimal number of clusters.



* 1. Visualize the clusters in different colors.

Chart, scatter chart

Description automatically generated