**ICA Hints**

**Kmeans Clustering in Scikit**

* The optimal clustering is found, but not consistently. To be more consistent, we could change the number of times we run k-means or use a better initialization.
* It appears that k-means++ is a viable initialization method and does not require multiple runs to consistently find the optimal SSE solution.

**Mini-batching for better performance**

* Mini-batch converges more quickly when it is moving to the global optimum, but it converges less quickly when it gets caught in a local optimum. This is because the local optimum has a flatter convexity, causing the algorithm to run for more iterations before reaching the stopping criteria.
* SSE is indicated by the inertia property below, which is sklearn's SSE computation. The SSE results for mini-batch seem to be 'close' to the optimal found by kmeans, they are not quite optimal. The graph shows that the end results are highly similar

**DBSCAN**

* For the DB Scan sections, your answers will impact the appearance of the final two graphs!

**Minimum points**

* Many different values will work here, but we should be looking for a value of minpts that minimizes the slope of the line in the plots below. A lesser slope signifies more consistent neighbor distances. It is hard to tell directly from the data what the value should be. For X2, though, the value of eps should be about half the size of the width of swirl. About 0.1-0.2. For X3, the value should be less than the density of the noise points in the bottom left corner, maybe around 0.1.

**What is the value of Eps and MinPts and why do you think it will work given these graphs?**

* For X2, there is a marked increase at about 0.15 on the graph (though any value near this will be reasonable). For X3, the noise points greatly extend the tail of X3 upward, and the value of minpts may need to be heavily increased. Given N of about 15, the value of eps seems to be about 0.1 or maybe slightly higher.
* If you are still having trouble with minpts and eps for x2 and x3, try 8 and 25 for min pts and 0.17 and 0.12 for eps. However, this is not the only correct answer! You may find a combination of values that you prefer better!

**Final Message**

* If you are done with the assignment, you may drop off at any time, and I will see you next week!
* Make sure at least one group member turns in the assignment for grading and that everyone's name is included. You may also want to have one other group member turn in the assignment for backup!