Homework# 8 - Due day 11:59PM, 3rd Jan., 2019

- t-SNE
  - There are nice implementations of t-SNE in different programming languages: https://lvdmaaten.github.io/tsne/

20 points ▸ Try to modify the code a little bit and make it back to symmetric SNE (therefore you need to first understand how the t-SNE is implemented and find out the specific code piece to modify)

20 points ▸ Try to visualize the embedding of both t-SNE and symmetric SNE and discuss their differences. (please use the data included in https://lvdmaaten.github.io/tsne/code/tsne_python.zip, there is a file named "mnist2500_X.txt" which contains 2500 feature vectors with length 784, for describing 2500 mnist images. Another file named "mnist2500_labels.txt" provides corresponding labels)

20 points ▸ Try to visualize the distribution of pairwise similarities in both high-dimensional space and low-dimensional space, based on both t-SNE and symmetric SNE

20 points ▸ Try to play with different settings of perplexity, and see if there is any change in visualization

20 points Submit a **report in pdf** format for showing your **code with detailed explanations**, giving **detailed discussion on experiments as well as your observations**.