CSI 5138 Homework Exercise 4

In this exercise, you will write programs to generate images. The training datasets to use are:

- MNIST: `http://yann.lecun.com/exdb/mnist/`
- CIFAR 10: `https://www.cs.toronto.edu/~kriz/cifar.html`

Your need to implement and train three models: VAE, GAN, and WGAN. Feel free to explore any network architecture for the encoder/decoder components in VAE, the generator/discriminator components in GAN, and the generator/critic components in WGAN. When designing your model, feel free to look up code available in the public domain so as to save time tuning hyper-parameters.

Your need to report the training behaviour of each of the three models: against training iterations/epochs, you should plot the loss function for VAE, estimated JSD for GAN, and estimated EMD for WGAN. For each trained model, you also need to visually inspect the qualities of the generated images, and include in your report a gallery of such images for each model and each dataset.

Two key hyper-parameters to investigate are the model complexity (use any measure that you feel convenient, for example, number of network layers) and the dimension of the latent space. Examine whether and to what extent these hyper-parameters impact the performance of your models. Comment on any observations you have in your experiments.

Submit your report and together with your code in a single zip file.