NOTED: both the GANs and Autoencoders are compiled and training under Google Colab GPU environment. To rerun the code, need to set up all the necessary environments to run these codes.

**Problem1:**

The images that generated by GANs with random shuffling and Autoencoders are all stored in the files ‘Problem1\_a’, ‘Problem1\_b\_1’, ‘Problem1\_b\_2’, ‘Problem1\_b\_3’. ‘Problem1\_c’ is the result that we train the GAN using these 888 images generated above.

To compare and assess our results in part (a) & (c), we can see that when we use 3 different autoencoders to create three different set of (222) images, some images show good results while others are blurry. When we input all these images into GANs, the result from (c) is slightly better than the result from (a) due to the availability of more training data for the GANs, but is not quite visually obvious on the first sight.

**Problem2:**

In building an architecture for a deep convolutional GAN, we use 5 convolutional layer for

the generator using tf.layers.conv2d\_transpose and 5 covolutional layer for the discriminator using tf.layers.conv2d. We write out the sample codes in ‘IEOR4742\_HW5\_Problem2.ipynb’.

In our sample code, we specify filters, kernel size, and strides in our deep convolutional GAN architecture if the image sizes are 1024×1024. Please go through the sample code to have a better understanding of our architecture.