Aoi ass 7

q1a)

Why do we get a 10x10 matrix? What do the numbers represent?

The learning_connection weights between the pre_learning and post_learning ensembles determine with what number the signal gets multiplied before being summed into the new neuron's signal.

There is a 10 X 10 matrix as we are dealing with two sets of 10 neurons. The matrix weights show us how much each neuron of pre_learning influences each neuron from post_learning

q1b)

Can you see a relation between the values of both ensembles for different runs? Explain why there is a relation or not.

There does not seem to be a one-to-one relationship between the ensembles over different runs. There does however seem to be a trend that *often* a part of the post_learning output follows the pre_learning input. As the weights are randomly determined, it is only natural that part of the signal is captured well. The small number of neurons increases the error.

q1c)

Explain why post_learning does not represent the same value as pre_learning, even though the neurons are directly connected

Though the neurons are connected one-to-one by the transformation with the identity matrix, the encoding process in the pre_learning ensemble does not match with the decoding process of the post_learning ensemble.

The post_learning ensemble will have different values than pre_learning due to this mismatch.

q1d)

what would be the requirement for the above to work?

For the output ensemble to be the same as the input ensemble there are two options:

- Have matching encoding and decoding processes for the pre_learning ensemble and the post_learning ensemble respectively.
- Connect the ensembles instead of the neurons directly. This is what would normally be the case in Nengo.

Try out if this works by setting the seed argument of both ensembles (the seed argument sets the seed of the random number generator).

Setting the seed for both ensembles does not seem to give the intended effect. This could arise due to that there is further encoding, decoding, or other processes that act on the signal.