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University of London International Programmes

Computing and Information Systems

Study Centre: SIM Global Education, Singapore

Topic:

CO3311 Neural Networks

Coursework 1

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Contents

Question 1 [929 Words]

The topic chosen for this research is developments in ANNs on chemical discoveries. Chemical discoveries are an important task carried by chemists and researchers. The main objectives of chemical discoveries are to explore the diversity of chemical by experimenting and researching on isolated and characterized compounds, reduce complexity of compound structure, and to improve the probability of finding new chemical entities (Singh & Peláez, 2008). Chemicals are a big part of our lives such that their uses are not limited in food, cleaning or medicines. Hence, chemical discoveries are important and development in ANNs on chemical discoveries can help in reducing chemical waste, speed up innovation, and most importantly, the safety of scientists, researchers and chemical research (NYU Tandon School of Engineering, 2018). The reasons on why this topic is chosen is firstly because even though there already exist an ANN for chemical discoveries since 1986, there are still ongoing development now on the topic of chemical discoveries. Another reason is that this topic is not only interesting, but it also concerns the quality of life of living things as well as uncovering unknown mysteries of compounds which makes it a feasible, yet interesting topic to research on.

Firstly, let us consider the progress before 2018. In 1985, Zytkow & Simon (1986) created STAHL, a chemical discovery system named after G.E. Stahl, a German chemist. STAHL is an ANN that processes componential models of substances involved in a reaction, from given descriptions of chemical reaction. The **input** required for STAHL is an ordered list of chemical reactions. The **output** produced is a list of chemical elements and the compound components. STAHL consists of three hidden layers, which takes in weight based on representation rules to deal with synthesis and decompositions. The **three hidden layers** are known as Reduce layer, Infer-components layer and Substitute layer. In the **Reduce layer**, if the ANN is given a more complete description of a reaction as input, this layer will breakdown the description into simplified reactions which are then feed forward to the Infer-components layer. In the **Infer-components layer**, several inference rules for analysing chemical reactions are incorporated and the system will unambiguously infer components of the compound and feed forward to the Substitute layer. Finally, in the **Substitute layer**, information about the components of the compound are drawn upon based on rules and feed forward as output. The limitations of STAHL are it is unable to deal with affinities based on facts of internal structure of chemicals, unable to consider shape, taste and colour, and must be relied entirely by data supplied by experimenter (Zytkow & Simon, 1986). A year later, Rose & Langley (1986) designed STAHLp as an attempt to improvise STAHL. As compared to STAHL, STAHLp uses an enhancement of the representation rules, an additional layer to handle error detection and recovery, and also offers modification of data as bias to allow consistent models to be achieved (Rose & Langley, 1986). Thus, with a base created for ANN on chemical discoveries, there will definitely be rooms for more enhancement and corrections to be made on it.

Next, we shall consider the current development between 2018 and 2019. According to an article by NYU Tandon School of Engineering (2018), researchers, from the NYU Tandon School of Engineering, are creating a new chemical discovery system by combining ANNs with infrared thermal imaging and enhanced supervised machine learning algorithms, where both are recent developments in the field of Artificial Intelligence. This system is created as an improvement to conventional methods or systems such as STAHL or STAHLp. Previously, more than 100 litres of chemical reactions are taken as an input, but now with a system using a more advanced ANN, a few small drops of chemical reactions will suffice as input. This new system consists of a new hidden layer that utilises infrared thermography to handle changes in heat during a reaction. Also, since this new system has a non-contact nature, it can be utilized on reactions that operate at extreme temperatures or even reactions in extreme conditions, such as bioreactor which requires sterile field. Lastly, this new system is so revolutionary such that the output result produced are very accurate and the system is able to reduce decision making process from a year to weeks, indirectly reducing tons of chemical waste and energy (NYU Tandon School of Engineering, 2018). Hence, by comparing current development and previous development, we can see a huge gap in terms of efficiency and effectiveness. With current development, we can use much lesser quantity of input to produce a more accurate output at a much lesser time via high quality hidden layers to perform calculation and prediction at a higher level of degree in terms of speed and time.

In conclusion, developments in ANNs on chemical discoveries is a crucial topic that are still being researched. Future challenges and directions for chemical discovery system are discussed recently to seek answers and solutions to aid in major chemical fields such as drug discovery and medicinal chemistry (Lo, Rensi, Torng & Altman, 2018). Also, there are plans to create systems that are able to effectively design new chemical structures, predict property profiles of desired molecules and displaying how to properly synthesize compounds (Sellwood, Ahmed, Segler & Brown, 2018). Since chemistry is a huge subject in science and there are still so many mysteries yet to be discovered as well as doubts and questions that still does not have an answer, new developments in ANNS for chemical discoveries will indeed be one of the much focussed topics – even in the near future.
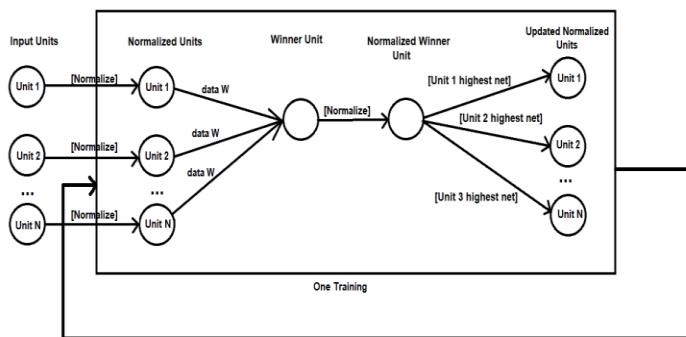
Developing a Kohonen Network

Introduction

Kohonen network, also commonly known as the self-organising map, is an Artificial Neural Network that works by identifying clusters via similar relationships among objects in a data set (Vracko, 2005). These clusters are centralised among units, and the role of Kohonen network is to find or shift the units based on training, given the data set (Kajan, Sekaj & Lajtman, 2014).

The architecture of the Kohonen Network is as follows:

Program Description and Development

Kohonen network are based upon an unsupervised learning algorithm known as "winner takes all" to decide which object belongs to which unit (Hu, Bodyanskiy, Tyshchenko & Boiko, 2016).

A Java program has been developed to perform training on a 3 attribute data set, and then clustering them. To use the Kohonen network, a data set must be required. Users are given the choice to choose the number of initial units and the method to select initial units. There are two different methods implemented to select the initial units, either via random selection, generating random values between the lowest data and highest data, or via user input. This Kohonen network has been developed to allow users to choose the units to be either random or via user input. Also, users are allowed to set their own learning rate and epoch value. One epoch determines testing of one set of data.

To perform training, an activation function that fires unit with the highest net will be used - to meet the criteria of "winner takes all". The activated units will then be updated accordingly, and training will continue. Training will stop when the program finish running through the data sets based on the number of epochs declared. However, it will be optimal if the training is to end when the overall difference in weight change are 0 between the previous and current epoch.

The network is developed to begin training by first normalising both the data set and the units. From this point onwards, normalized data sets and normalized units will be used as data sets and units respectively. Since the data sets and units have 3 variables, they are normalised using the formula:

$$\sqrt{X^2 + Y^2 + Z^2}$$

Then, training will begin by updating the unit as it iterates through the data sets. For each data, every unit will compute the net using the formula:

$net_x = data(X)_x * unit(X)_y + data(Y)_x * unit(Y)_y + data(Z)_{ix} * unit(Z)_y$

Unit with the highest net will be chosen as the winner and will update itself using the formula:

*Updated Unit = (Unit X, Unit Y, Unit Z) + (Learning Rate) * [(Data X, Data Y, Data Z) – (Unit X, Unit Y, Unit Z)]*

This new updated unit will be normalized and updated before continuing training with the next set of data. Once training is done with a data set, an epoch is considered to be complete and the network continue training until it completes the number of epochs based on the number of epochs declared.

Next, once the training is completed, three txt file will be generated:

1) output.txt - consist of choice of unit selection, data set, unit, normalised data set, normalised unit and all training results
2) trainingresult.txt - consist of post-training, pre-training and summary of weight change for each epoch
3) cluster.txt - consists of which data in the data set belongs to which units

Finally, an Excel Workbook (.xlsx) file is created to provide support in analysis of the training results. It provides support in the form of displaying a Line Graph for Overall Sum of Weight Change and the Changes in Attributes for each Units. However, Users have to first complete running the Kohonen Java file to get the trainingresult.txt and then copying the content of the trainingresult.txt into the first cell of the Excel Workbook.

Testing with AND Gate

This network will be tested against an AND Gate. For AND gate, we have 3 attributes of bias, X and Y. Bias will be set to 1, and X and Y are truth table values of:

Bias	X	Y
1	0	0
1	0	1
1	1	0
1	1	1

The expected output for AND Gate would be:

Bias	X	Y	Expected Outcome
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

The 2 units selected to test the network are:

Bias	X	Y
1	-1	-1
-2	1	1

Since we already know the expected outcome, the learning rate will be set to 0 and epoch will be set to 1.

The normalized units are:

X	Y	Z
0.5773502691896258	- 0.5773502691896258	- 0.5773502691896258
- 0.8164965809277261	0.4082482904638631	0.4082482904638631

Finally, the cluster results are:

Data 1: 1.0, 0.0, 0.0 Belongs to Unit 1
Data 2: 1.0, 1.0, 0.0 Belongs to Unit 1
Data 3: 1.0, 0.0, 1.0 Belongs to Unit 1
Data 4: 1.0, 1.0, 1.0 Belongs to Unit 2

Hence, from this test strategy, we can see that the network is correct since the expected outcome matches the cluster results.

Training using given data

The next task would be to cluster the given data into its groups.

2 Units Training Results

The data sets used for training are taken from the coursework question. Number of initial units are set to 2, learning rate is set to 0.15 and epoch is set to 60. Units are chosen to be selected at random.

The initial 2 units are chosen by random from the given data set:

X	Y	Z
0.37	-0.21	0.41
0.48	0.82	-0.3

We get the initial units by normalizing the 2 units:
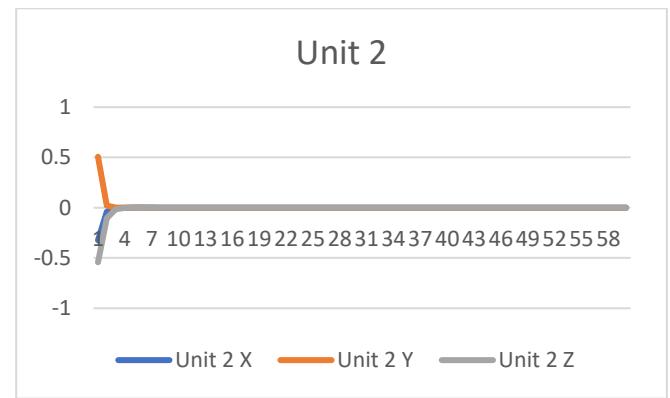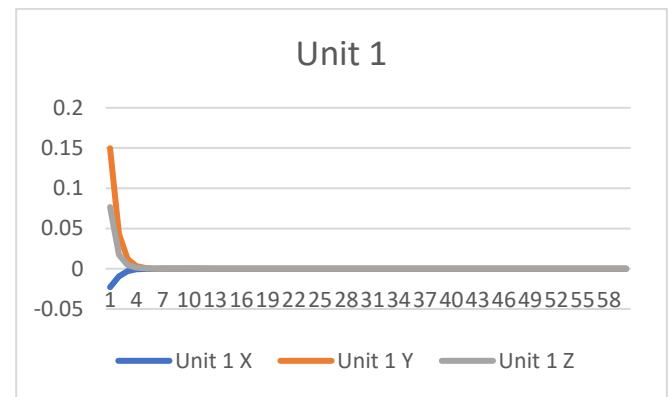
X	Y	Z
0.6262198065067094	-0.35542205234164587	0.6939192450479752
0.5510585287743714	0.45425094939509	0.6999932662809584

After 7 epochs, the new units are:
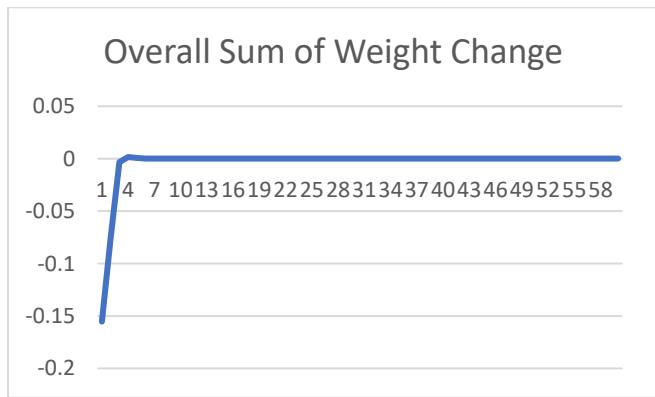
X	Y	Z
0.589840022680701	-0.145855747466527	0.794238533801408
0.180389625494047	0.982846909974361	0.0383605861264887

Lastly, after running all 60 epochs, the final units are:

X	Y	Z
0.589833169348288	-0.145828472688046	0.794248631657634
0.180389402558799	0.982846968913543	0.0383601243733541

Overall Sum of Weight Change

Unit 1

Unit 2

The summary of the full training is shown at appendix A and each epoch is trained using the 24 data sets.

3 Units Training Results

The data sets used for training are taken from the coursework question. Number of initial units are set to 3, learning rate is set to 0.15 and epoch is set to 60. Units are chosen to be selected at selection.

The initial 3 units are chosen by random from the given data set:

X	Y	Z
-0.66	0.49	0.42
-0.69	0.96	0.42
0.31	-0.05	0.41

Normalizing the 3 units:
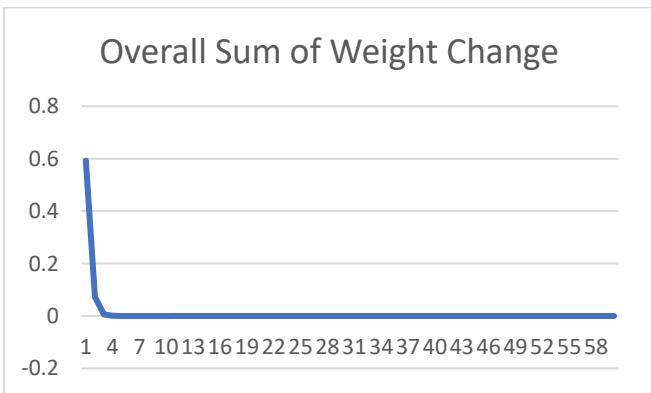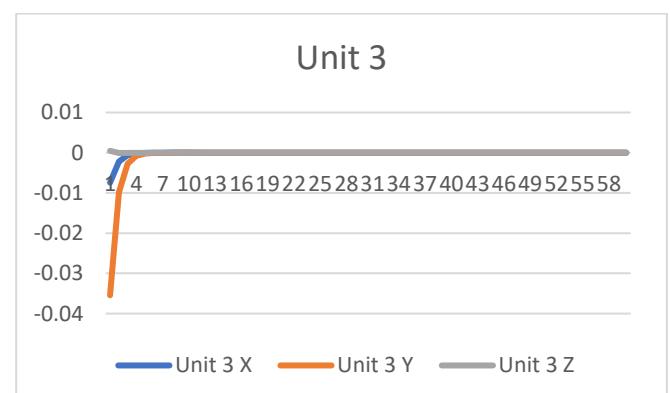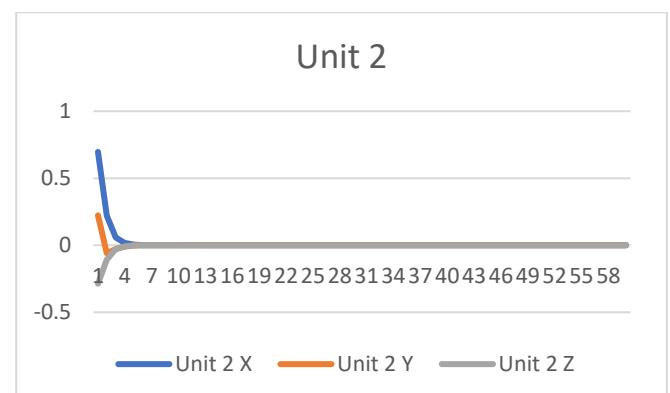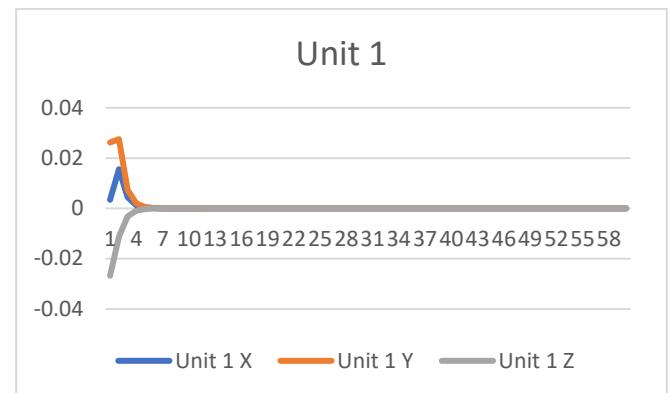
X	Y	Z
-0.7149878353798949	0.5308243020244674	0.45499225887811484
-0.5499623148376319	0.7651649597740967	0.3347596699011673
0.6002749026530724	-0.09681853268597942	0.7939119680250312

After 7 epochs, the new units are:

X	Y	Z
-0.6899132971896125	0.5947942565000978	0.4126008177348336
0.4463596761465343	0.8891716586247311	-0.1006816815955392
0.589834514456725	-0.1458222898992883	0.794248767908473

Lastly, after running all 60 epochs, the final units are:

X	Y	Z
-0.6899038350753692	0.5948099770710997	0.41259397659803
0.44649003455919345	0.8890987804370037	-0.10074724643762203
0.589833169348288	-0.1458284726880467	0.7942486316576348

Unit 1

Unit 2

Unit 3

The summary of the full training is shown at appendix B and each epoch is trained using the 24 data sets.

Overall Sum of Weight Change

4 Units Training Results

The data sets used for training are taken from the coursework question. Number of initial units are set to 4, learning rate is set to 0.15 and epoch is set to 60. Units are chosen to be selected at selection.

The initial 4 units are chosen by random from the given data set:

X	Y	Z
0.36	-0.06	0.72
0.58	0.6	0.76
0.58	0.83	-0.3
-0.69	0.9	0.67

Normalizing the 4 units:
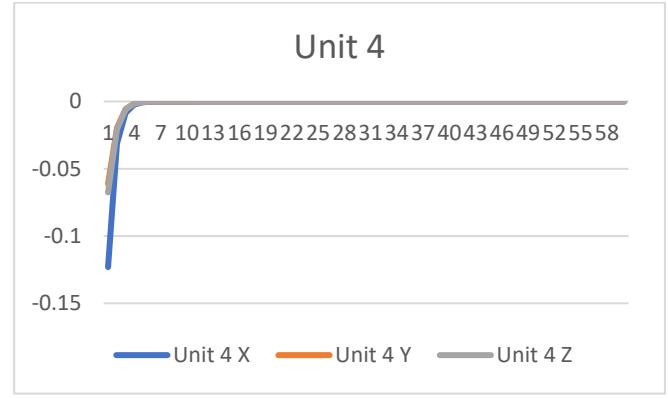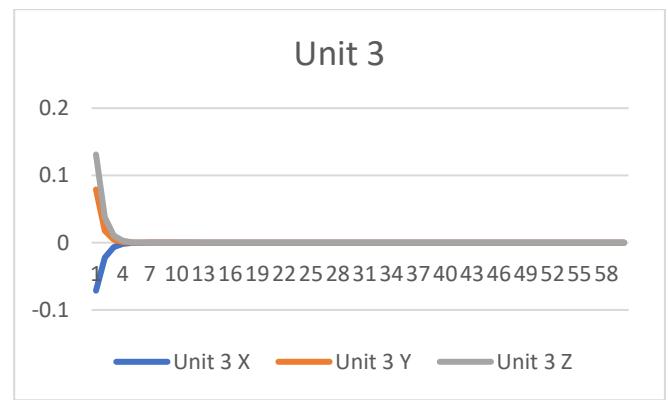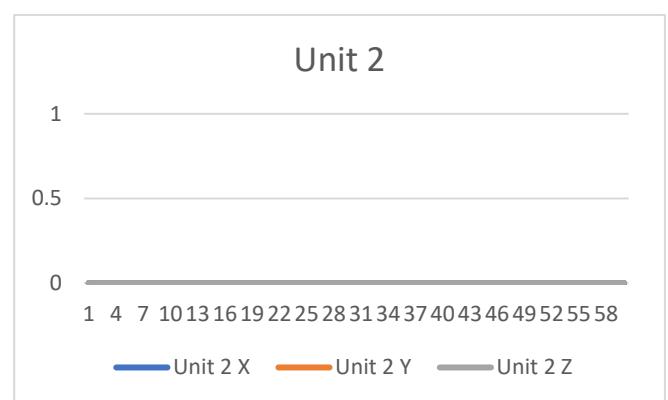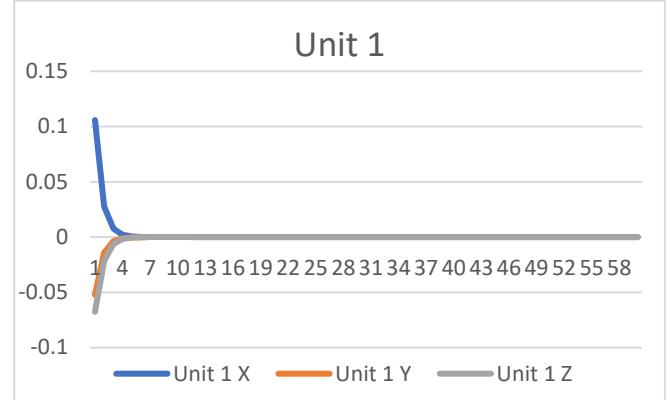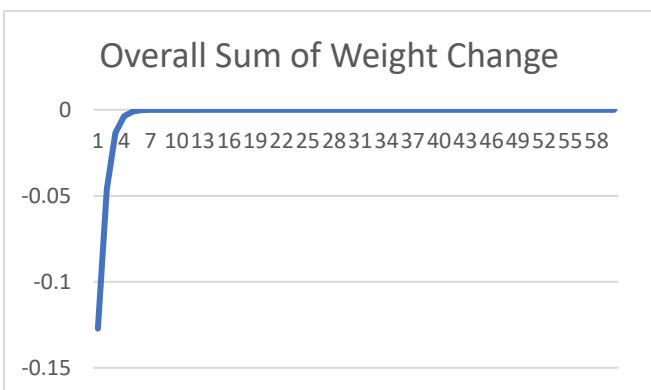
X	Y	Z
0.44597648774829984	-0.07432941462471664	0.8919529754965997
0.5138581861552921	0.5315774339537505	0.6733314163414174
0.5492020409064917	0.7859270585386002	-0.2840700211585302
-0.5238408364207751	0.683270656201011	0.5086570440607526

After 7 epochs, the new units are:

X	Y	Z
0.5898162057056265	-0.1458200682921835	0.794262772116559
0.5138581861552921	0.5315774339537505	0.6733314163414174
0.4465051910241154	0.8890884460336326	-0.10077127327774844
-0.6898861421554664	0.5948219257568435	0.4126063347802211

Lastly, after running all 60 epochs, the final units are:

X	Y	Z
0.589833169348288	-0.1458284726880467	0.7942486316576348
0.5138581861552921	0.5315774339537505	0.6733314163414174
0.44649003455919345	0.8890987804370037	-0.10074724643762205
-0.6899038350753692	0.5948099770710997	0.41259397659803

The summary of the full training is shown at appendix C and each epoch is trained using the 24 data sets.

Analysis

As seen from the results from Training Results above, all units, with the exception of Unit 2 from 4 Unit Training, have difference in weight change to be steep from Epoch 1 to Epoch 7. Then, the difference in weight change are starting to become very minimal such that it is reaching very close to 0. For 2 Unit Training, the changes for all units reaches a complete 0 at epoch 30. Next, for 3 Unit Training, the changes for all units reaches a complete 0 at epoch 32. Finally, for 4 Unit Training, the changes for all units reaches a complete 0 at epoch 30. Thus, we can conclude that the training is completed successfully.

For Unit 2 from 4 Unit Training, there is no changes at all, hence it can be assumed that there are no units among the 24 units that belongs to that of Unit 2.

Result

The final step is to cluster each data to its respective units. For simplicity purposes, the 24 data in the data will be labelled from 1 to 24.

2 Unit Cluster:
Generated Units:
```
Unit 1: 0.37          -0.21          0.41
Unit 2: 0.48          0.82           -0.3
```
```
Data 1: -0.82, 0.49, 0.29 Belongs to Unit 2
Data 2: -0.77, 0.47, 0.43 Belongs to Unit 2
Data 3: -0.73, 0.55, 0.41 Belongs to Unit 2
Data 4: -0.71, 0.61, 0.36 Belongs to Unit 2
Data 5: -0.69, 0.59, 0.42 Belongs to Unit 2
Data 6: -0.68, 0.6, 0.42 Belongs to Unit 2
Data 7: -0.66, 0.58, 0.48 Belongs to Unit 2
Data 8: -0.61, 0.69, 0.4 Belongs to Unit 2
Data 9: 0.28, 0.96, 0.01 Belongs to Unit 2
Data 10: 0.31, 0.95, 0.07 Belongs to Unit 2
Data 11: 0.35, -0.06, 0.94 Belongs to Unit 1
Data 12: 0.36, 0.91, -0.22 Belongs to Unit 2
Data 13: 0.37, 0.93, 0.09 Belongs to Unit 2
Data 14: 0.43, 0.83, -0.34 Belongs to Unit 2
Data 15: 0.43, 0.9, 0.01 Belongs to Unit 2
Data 16: 0.47, -0.1, 0.88 Belongs to Unit 1
Data 17: 0.47, -0.07, 0.88 Belongs to Unit 1
Data 18: 0.48, 0.82, -0.3 Belongs to Unit 2
Data 19: 0.53, -0.23, 0.82 Belongs to Unit 1
Data 20: 0.54, -0.21, 0.82 Belongs to Unit 1
Data 21: 0.58, -0.38, 0.72 Belongs to Unit 1
Data 22: 0.58, 0.81, 0.0 Belongs to Unit 2
Data 23: 0.65, -0.04, 0.76 Belongs to Unit 1
Data 24: 0.74, -0.05, 0.67 Belongs to Unit 1
```

Cluster 1: Data 11, 16, 17, 19, 20, 21, 23, 24
Cluster 2: Data 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 18, 22

3 Unit Cluster:
Generated Units:
```
Unit 1: -0.66          0.49          0.42
Unit 2: -0.69          0.96          0.42
Unit 3: 0.31           -0.05         0.41
```
```
Data 1: -0.82, 0.49, 0.29 Belongs to Unit 1
Data 2: -0.77, 0.47, 0.43 Belongs to Unit 1
Data 3: -0.73, 0.55, 0.41 Belongs to Unit 1
Data 4: -0.71, 0.61, 0.36 Belongs to Unit 1
Data 5: -0.69, 0.59, 0.42 Belongs to Unit 1
Data 6: -0.68, 0.6, 0.42 Belongs to Unit 1
Data 7: -0.66, 0.58, 0.48 Belongs to Unit 1
Data 8: -0.61, 0.69, 0.4 Belongs to Unit 1
Data 9: 0.28, 0.96, 0.01 Belongs to Unit 2
Data 10: 0.31, 0.95, 0.07 Belongs to Unit 2
Data 11: 0.35, -0.06, 0.94 Belongs to Unit 3
Data 12: 0.36, 0.91, -0.22 Belongs to Unit 2
Data 13: 0.37, 0.93, 0.09 Belongs to Unit 2
Data 14: 0.43, 0.83, -0.34 Belongs to Unit 2
Data 15: 0.43, 0.9, 0.01 Belongs to Unit 2
Data 16: 0.47, -0.1, 0.88 Belongs to Unit 3
Data 17: 0.47, -0.07, 0.88 Belongs to Unit 3
Data 18: 0.48, 0.82, -0.3 Belongs to Unit 2
Data 19: 0.53, -0.23, 0.82 Belongs to Unit 3
Data 20: 0.54, -0.21, 0.82 Belongs to Unit 3
Data 21: 0.58, -0.38, 0.72 Belongs to Unit 3
Data 22: 0.58, 0.81, 0.0 Belongs to Unit 2
Data 23: 0.65, -0.04, 0.76 Belongs to Unit 3
Data 24: 0.74, -0.05, 0.67 Belongs to Unit 3
```

Cluster 1: Data 1, 2, 3, 4, 5, 6, 7, 8
Cluster 2: Data 9, 10, 12, 13, 14, 15, 18, 22
Cluster 3: 11, 16, 17, 19, 20, 21, 23, 24

4 Unit Cluster:

```
Generated Units:
Unit 1: 0.36        -0.06        0.72
Unit 2: 0.58        0.6          0.76
Unit 3: 0.58        0.83         -0.3
Unit 4: -0.69       0.9          0.67
```

```
Data 1: -0.82, 0.49, 0.29 Belongs to Unit 4
Data 2: -0.77, 0.47, 0.43 Belongs to Unit 4
Data 3: -0.73, 0.55, 0.41 Belongs to Unit 4
Data 4: -0.71, 0.61, 0.36 Belongs to Unit 4
Data 5: -0.69, 0.59, 0.42 Belongs to Unit 4
Data 6: -0.68, 0.6, 0.42 Belongs to Unit 4
Data 7: -0.66, 0.58, 0.48 Belongs to Unit 4
Data 8: -0.61, 0.69, 0.4 Belongs to Unit 4
Data 9: 0.28, 0.96, 0.01 Belongs to Unit 3
Data 10: 0.31, 0.95, 0.07 Belongs to Unit 3
Data 11: 0.35, -0.06, 0.94 Belongs to Unit 1
Data 12: 0.36, 0.91, -0.22 Belongs to Unit 3
Data 13: 0.37, 0.93, 0.09 Belongs to Unit 3
Data 14: 0.43, 0.83, -0.34 Belongs to Unit 3
Data 15: 0.43, 0.9, 0.01 Belongs to Unit 3
Data 16: 0.47, -0.1, 0.88 Belongs to Unit 1
Data 17: 0.47, -0.07, 0.88 Belongs to Unit 1
Data 18: 0.48, 0.82, -0.3 Belongs to Unit 3
Data 19: 0.53, -0.23, 0.82 Belongs to Unit 1
Data 20: 0.54, -0.21, 0.82 Belongs to Unit 1
Data 21: 0.58, -0.38, 0.72 Belongs to Unit 1
Data 22: 0.58, 0.81, 0.0 Belongs to Unit 3
Data 23: 0.65, -0.04, 0.76 Belongs to Unit 1
Data 24: 0.74, -0.05, 0.67 Belongs to Unit 1
```

Cluster 1: Data 11, 16, 17, 19, 20, 21, 23, 24
Cluster 2:
Cluster 3: Data 9, 10, 12, 13, 14, 15, 18, 22
Cluster 4: Data 1, 2, 3, 4, 5, 6, 7, 8

Conclusion

In conclusion, by comparing 2 Unit Cluster and 3 Unit Cluster, we can see that:

- Cluster 1 from 2 Unit Cluster = Cluster 3 from 3 Unit Cluster
- Cluster 2 from 2 Unit Cluster = Cluster 1 + 2 from 3 Unit Cluster

Hence, it is possible for us to say that both Cluster 1 and Cluster 2 of 3 Unit Cluster are closely related since both of them belongs to a same cluster, Cluster 2 from 1 Unit Cluster, in 2 Unit Cluster.

Next, we can see that even though both 3 Unit Cluster and 4 Unit Cluster uses different generated units, there is a very close resemblance such that the data that are clustered together in 3 Unit Cluster are clustered congruently with 4 Unit Cluster, leaving a unit empty.

- Cluster 1 from 3 Unit Cluster = Cluster 4 from 4 Unit Cluster
- Cluster 2 from 3 Unit Cluster = Cluster 3 from 4 Unit Cluster
- Cluster 3 from 3 Unit Cluster = Cluster 1 from 4 Unit Cluster

Therefore, we can say that this data set have 3 cluster:

Cluster 1: Data 1,2,3,4,5,6,7,8
Cluster 2: Data 9, 10, 12, 13, 14, 15, 18, 22
Cluster 3: Data 11, 16, 17, 19, 20, 21, 23, 24

Appendix

Appendix A (2 Units Training summary)

```
##############Training Result################
>>>>>>>>>>Epoch 1:
Post-training Unit 1:        0.6032412269491998 -
0.20561006413058083        0.7706001061750786
Post-training Unit 2:        0.22789914914933873
        0.9608179661428689 0.15776822796142514

Pre-training Unit 1:        0.6262198065067094 -
0.35542205234164587        0.6939192450479752
Pre-training Unit 2:        0.5510585287743714 0.45425094939509
        0.6999932662809584

Changes in Unit 1: -0.022978579557509593
        0.14981198821106503        0.07668086112710337

Changes in Unit 2: -0.3231593796250327
        0.5065670167477789 -0.5422250383195333
Overall change of weight:    -0.15530313141612828

>>>>>>>>>>Epoch 2:
Post-training Unit 1:        0.5938163981387965 -
0.16248785916208197        0.7880227033064401
Post-training Unit 2:        0.18642426987788005
        0.98101114152565   0.05350824051527183

Pre-training Unit 1:        0.6032412269491998 -
0.20561006413058083        0.7706001061750786
Pre-training Unit 2:        0.22789914914933873
        0.9608179661428689 0.15776822796142514

Changes in Unit 1: -0.009424828810403296
        0.04312220496849886        0.017422597131361517

Changes in Unit 2: -0.04147487927145868
        0.020193175382781203        -0.10425998744615331

Overall change of weight:    -0.0744217180453737

>>>>>>>>>>Epoch 3:
Post-training Unit 1:        0.5909621126922696 -
0.15045136062922995        0.7925453737465779
Post-training Unit 2:        0.1811765082403263
        0.9826264078052313 0.040254385421096356

Pre-training Unit 1:        0.5938163981387965 -
0.16248785916208197        0.7880227033064401
Pre-training Unit 2:        0.18642426987788005
        0.98101114152565   0.05350824051527183

Changes in Unit 1: -0.002854285446526883
        0.012036498532852019        0.004522670440137766

Changes in Unit 2: -0.0052477616375537495
        0.0016152662795811956        -0.013253855094175475

Overall change of weight:    -0.0031814669256851266

>>>>>>>>>>Epoch 4:
Post-training Unit 1:        0.5901492520425057 -
0.14711001115377456        0.793777364839794
Post-training Unit 2:        0.1804920302936208
        0.9828188635182354 0.03859674226163076

Pre-training Unit 1:        0.5909621126922696 -
0.15045136062922995        0.7925453737465779
Pre-training Unit 2:        0.1811765082403263
        0.9826264078052313 0.040254385421096356

Changes in Unit 1: -8.128606497639357E-4
        0.0033413494754553907        0.0012319910932161449

Changes in Unit 2: -6.844779467055084E-4
        1.924557130041915E-4        -0.0016576431594655938

Overall change of weight:    0.0016108145257406892

>>>>>>>>>>Epoch 5:
Post-training Unit 1:        0.5899213716443783 -
0.1461836404598882 0.7941178240910535
```

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Post-training Unit 2:        0.18040273747881114
        0.9828433671706305 0.038389685057947785

Pre-training Unit 1:        0.5901492520425057 -
0.14711001115377456        0.793777364839794
Pre-training Unit 2:        0.1804920302936208
        0.9828188635182354 0.03859674226163076

Changes in Unit 1: -2.2788039812737804E-4
        9.263706938863747E-4        3.4045925125947285E-4

Changes in Unit 2: -8.929281480965501E-5
        2.4503652395035935E-5        -2.070572036829768E-4

Overall change of weight:    7.671031809208737E-4

>>>>>>>>>>Epoch 6:
Post-training Unit 1:        0.5898577589577287 -
0.14592689702499   0.7942122920995519
Post-training Unit 2:        0.18039112935002463
        0.982846507796934 0.03836381841258901

Pre-training Unit 1:        0.5899213716443783 -
0.1461836404598882 0.7941178240910535
Pre-training Unit 2:        0.18040273747881114
        0.9828433671706305 0.038389685057947785

Changes in Unit 1: -6.361268664956121E-5
        2.5674343489817675E-4        9.44680084984384E-5

Changes in Unit 2: -1.1608128786505523E-5
        3.140626303577143E-6        -2.5866645358772755E-5

Overall change of weight:    2.532646089053528E-4

>>>>>>>>>>Epoch 7:
Post-training Unit 1:        0.5898400226807011 -
0.14585574746652757        0.7942385338014081
Post-training Unit 2:        0.18038962549404722
        0.982846909974361 0.03836058612648873

Pre-training Unit 1:        0.5898577589577287 -
0.14592689702499   0.7942122920995519
Pre-training Unit 2:        0.18039112935002463
        0.982846507796934 0.03836381841258901

Changes in Unit 1: -1.773627702761349E-5
        7.114955846243554E-5        2.62417018561667E-5

Changes in Unit 2: -1.5038559774138704E-6
        4.021774269169498E-7        -3.232286100281201E-6

Overall change of weight:    7.532101864021062E-5

>>>>>>>>>>Epoch 8:
Post-training Unit 1:        0.5898350792421145 -
0.1458360308472326 0.7942458255491014
Post-training Unit 2:        0.18038943126414944
        0.9828469613916867 0.03836018210755722

Pre-training Unit 1:        0.5898400226807011 -
0.14585574746652757        0.7942385338014081
Pre-training Unit 2:        0.18038962549404722
        0.982846909974361 0.03836058612648873

Changes in Unit 1: -4.943438586590965E-6
        1.9716619294979365E-5        7.29174769331653E-6

Changes in Unit 2: -1.9422989777639899E-7
        5.1417325730440666E-8        -4.0401893151159607E-7

Overall change of weight:    2.1518096898147376E-5

>>>>>>>>>>Epoch 9:
Post-training Unit 1:        0.5898337015738738 -
0.14583056713152723 0.7942478518559302
Post-training Unit 2:        0.18038940624624653
        0.9828469679549469 0.038360131593807335

Pre-training Unit 1:        0.5898350792421145 -
0.1458360308472326 0.7942458255491014
Pre-training Unit 2:        0.18038943126414944
        0.9828469613916867 0.03836018210755722
```

Changes in Unit 1: -1.3776682407096175E-6
        5.463715705367189E-6   2.026306828772917E-6

Changes in Unit 2: -2.5017902915980272E-8
        6.563260157577133E-9   -5.051374988435109E-8

Overall change of weight: 6.043385900787734E-6

>>>>>>>>>>Epoch 10:
Post-training Unit 1:   0.5898333176572803 -
0.1458290530775451 0.7942484149558704
Post-training Unit 2:   0.18038940303149537
        0.9828469687915335 0.03836012527658119

Pre-training Unit 1:   0.5898337015738738 -
0.14583056713152723   0.7942478518559302
Pre-training Unit 2:   0.18038940624624653
        0.9828469679549469 0.038360131593807335

Changes in Unit 1: -3.8391659351599827E-7
        1.5140539821323351E-6   5.630999402317372E-7

Changes in Unit 2: -3.2147511597191425E-9
        8.365866888127016E-10   -6.3172261449695455E-9

Overall change of weight: 1.684541938232198E-6

>>>>>>>>>>Epoch 11:
Post-training Unit 1:   0.5898332106745581 -
0.14582863351871567   0.7942485714380647
Post-training Unit 2:   0.18038940261928205
        0.9828469688980319 0.03836012448636603

Pre-training Unit 1:   0.5898333176572803 -
0.1458290530775451 0.7942484149558704
Pre-training Unit 2:   0.18038940303149537
        0.9828469687915335 0.03836012527658119

Changes in Unit 1: -1.0698272223663707E-7
        4.1955882942867895E-7   1.5648219431341204E-7

Changes in Unit 2: -4.122133190342936E-10
        1.0649836568177307E-10   -7.902151571981264E-10

Overall change of weight: 4.6796237139490326E-7

>>>>>>>>>>Epoch 12:
Post-training Unit 1:   0.589833180863515 -
0.14582851725537996   0.7942486149232653
Post-training Unit 2:   0.18038940256652566
        0.9828469689115736 0.03836012438749709

Pre-training Unit 1:   0.5898332106745581 -
0.14582863351871567   0.7942485714380647
Pre-training Unit 2:   0.18038940261928205
        0.9828469688980319 0.03836012448636603

Changes in Unit 1: -2.981104307853144E-8
        1.1626333570879943E-7   4.34852005515296E-8

Changes in Unit 2: -5.275638259583104E-11
        1.3541723298260422E-11   -9.88689408121246E-11

Overall change of weight: 1.297994095816879E-7

>>>>>>>>>>Epoch 13:
Post-training Unit 1:   0.5898331725568218 -
0.1458284850379312 0.7942486270073726
Post-training Unit 2:   0.18038940025597852
        0.9828469689132936 0.038360124375124406

Pre-training Unit 1:   0.589833180863515 -
0.14582851725537996   0.7942486149232653
Pre-training Unit 2:   0.18038940256652566
        0.9828469689115736 0.03836012438749709

Changes in Unit 1: -8.306693222159822E-9
        3.221744876436006E-8   1.2084107381404863E-8

Changes in Unit 2: -6.740469293831097E-12
        1.7199575097492925E-12   -1.2372686208905748E-11

Overall change of weight: 3.597746972561211E-8

>>>>>>>>>>Epoch 14:

Post-training Unit 1:   0.5898331702422699 -
0.14582847611026423   0.7942486303653986
Post-training Unit 2:   0.1803894025589253
        0.982846968913512 0.03836012437357575

Pre-training Unit 1:   0.5898331725568218 -
0.1458284850379312 0.7942486270073726
Pre-training Unit 2:   0.18038940025597852
        0.9828469689132936 0.038360124375124406

Changes in Unit 1: -2.3145518834866152E-9
        8.927666966807024E-9   3.3580259684029556E-9

Changes in Unit 2: -8.598954881477994E-13
        2.183808689437683E-13   -1.5486570359435348E-12

Overall change of weight: 9.968950880068217E-9

>>>>>>>>>>Epoch 15:
Post-training Unit 1:   0.589833169597368 -
0.1458284736363577 0.7942486312985453
Post-training Unit 2:   0.18038940255881575
        0.9828469689135396 0.038360124373381856

Pre-training Unit 1:   0.5898331702422699 -
0.14582847611026423   0.7942486303653986
Pre-training Unit 2:   0.1803894025589253
        0.982846968913512 0.03836012437357575

Changes in Unit 1: -6.449019096521624E-10
        2.47390652408086E-9   9.331466710449376E-10

Changes in Unit 2: -1.0955125695488732E-13
        2.7644553313166398E-14   -1.9389351235687968E-13

Overall change of weight: 2.7618754852576366E-9

>>>>>>>>>>Epoch 16:
Post-training Unit 1:   0.5898331694176845 -
0.14582847295082677   0.7942486315578512
Post-training Unit 2:   0.18038940255880181
        0.9828469689135543 0.03836012437335754

Pre-training Unit 1:   0.589833169597368 -
0.1458284736363577 0.7942486312985453
Pre-training Unit 2:   0.18038940255881575
        0.9828469689135396 0.038360124373381856

Changes in Unit 1: -1.7968349030894615E-10
        6.855309375719543E-10   2.593059100775008E-10

Changes in Unit 2: -1.3933298959045715E-14
        3.3306690738754696E-15   -2.4313884239290928E-14

Overall change of weight: 7.651184408263845E-10

>>>>>>>>>>Epoch 17:
Post-training Unit 1:   0.5898331693676221 -
0.14582847276086366   0.7942486316299073
Post-training Unit 2:   0.18038940255880007
        0.9828469689135435 0.03836012437335454

Pre-training Unit 1:   0.5898331694176845 -
0.14582847295082677   0.7942486315578512
Pre-training Unit 2:   0.18038940255880181
        0.9828469689135543 0.03836012437335754

Changes in Unit 1: -5.0062398671002484E-11
        1.899631008051017E-10   7.205613883343176E-11

Changes in Unit 2: -1.7486012637846216E-15
        5.551115123125783E-16   -3.00454106039183E-15

Overall change of weight: 2.1195264293671912E-10

>>>>>>>>>>Epoch 18:
Post-training Unit 1:   0.5898331693536744 -
0.14582847270822435   0.7942486316499301
Post-training Unit 2:   0.18038940255879984
        0.9828469689135436 0.03836012437335415

Pre-training Unit 1:   0.5898331693676221 -
0.14582847276086366   0.7942486316299073
Pre-training Unit 2:   0.18038940255880007
        0.9828469689135435 0.03836012437335454

Changes in Unit 1: -1.3947731858365842E-11
        5.263930957788432E-11   2.0022761226812236E-11

Changes in Unit 2: -2.220446049250313E-16
        1.1102230246251565E-16   -3.885780586188048E-16

Overall change of weight: 5.871383934596963E-11

>>>>>>>>>Epoch 19:
Post-training Unit 1:   0.5898331693497886 -
0.14582847269363788   0.794248631655494
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.5898331693536744 -
0.14582847270822435   0.7942486316499301
Pre-training Unit 2:   0.18038940255879984
        0.9828469689135436 0.03836012437335415

Changes in Unit 1: -3.885780586188048E-12
        1.458647092000831E-11   5.563882687908972E-12

Changes in Unit 2: -2.7755575615628914E-17   0.0   -
4.163336342344337E-17
Overall change of weight: 1.6264503632790195E-11

>>>>>>>>>Epoch 20:
Post-training Unit 1:   0.5898331693487061 -
0.14582847268959603   0.79424863165704
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.5898331693497886 -
0.14582847269363788   0.794248631655494
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: -1.0824674490095276E-12
        4.041850187874729E-12   1.5459855617905305E-12

Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 4.505368300655732E-12

>>>>>>>>>Epoch 21:
Post-training Unit 1:   0.5898331693484046 -
0.145828472688476 0.7942486316574696
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.5898331693487061 -
0.14582847268959603   0.79424863165704
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: -3.015365734881925E-13
        1.1200207428174735E-12   4.296563105299356E-13

Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 1.2481404798592166E-12

>>>>>>>>>Epoch 22:
Post-training Unit 1:   0.5898331693483205 -
0.14582847268816562   0.794248631657589
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.5898331693484046 -
0.145828472688476 0.7942486316574696
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: -8.404388296412435E-14
        3.1039060210957814E-13   1.1934897514720433E-13

Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 3.456956942926581E-13

>>>>>>>>>Epoch 23:
Post-training Unit 1:   0.589833169348297 -
0.1458284726880796 0.7942486316576222
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.5898331693483205 -
0.14582847268816562   0.794248631657589
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: -2.353672812205332E-14
        8.6014528832834E-14   3.319566843629218E-14

Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 9.567346914707286E-14

>>>>>>>>>Epoch 24:
Post-training Unit 1:   0.5898331693482904 -
0.1458284726880558 0.7942486316576314
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348297 -
0.1458284726880796 0.7942486316576222
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: -6.5503158452884236E-15
        2.3814283878209608E-14   9.2148511043888E-15

Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 2.6478819137309983E-14

>>>>>>>>>Epoch 25:
Post-training Unit 1:   0.5898331693482888 -
0.14582847268804922   0.7942486316576339
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.5898331693482904 -
0.1458284726880558 0.7942486316576314
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: -1.6653345369377348E-15
        6.5780714209040525E-15   2.55351295663786E-15

Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 7.466249840604178E-15

>>>>>>>>>Epoch 26:
Post-training Unit 1:   0.5898331693482882 -
0.14582847268804736   0.7942486316576346
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.5898331693482888 -
0.14582847268804922   0.7942486316576339
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: -5.551115123125783E-16
        1.8596235662471372E-15   6.661338147750939E-16

Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 1.970645868709653E-15

>>>>>>>>>Epoch 27:
Post-training Unit 1:   0.589833169348288 -
0.14582847268804686   0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.5898331693482882 -
0.14582847268804736   0.7942486316576346
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: -2.220446049250313E-16
        4.996003610813204E-16   2.220446049250313E-16

Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 4.996003610813204E-16

>>>>>>>>>Epoch 28:
Post-training Unit 1:   0.589833169348288 -
0.14582847268804672   0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

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Pre-training Unit 1:        0.589833169348288  -
0.14582847268804686    0.7942486316576348
Pre-training Unit 2:        0.18038940255879982
       0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0      1.3877787807814457E-16      0.0

Changes in Unit 2: 0.0      0.0      0.0
Overall change of weight:   1.3877787807814457E-16

>>>>>>>>>>Epoch 29:
Post-training Unit 1:       0.589833169348288  -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:       0.18038940255879982
       0.9828469689135436 0.03836012437335411

Pre-training Unit 1:        0.589833169348288  -
0.14582847268804672    0.7942486316576348
Pre-training Unit 2:        0.18038940255879982
       0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0      2.7755575615628914E-17      0.0

Changes in Unit 2: 0.0      0.0      0.0
Overall change of weight:   2.7755575615628914E-17

>>>>>>>>>>Epoch 30:
Post-training Unit 1:       0.589833169348288  -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:       0.18038940255879982
       0.9828469689135436 0.03836012437335411

Pre-training Unit 1:        0.589833169348288  -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:        0.18038940255879982
       0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0      0.0      0.0
Changes in Unit 2: 0.0      0.0      0.0
Overall change of weight:   0.0

>>>>>>>>>>Epoch 31:
Post-training Unit 1:       0.589833169348288  -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:       0.18038940255879982
       0.9828469689135436 0.03836012437335411

Pre-training Unit 1:        0.589833169348288  -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:        0.18038940255879982
       0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0      0.0      0.0
Changes in Unit 2: 0.0      0.0      0.0
Overall change of weight:   0.0

>>>>>>>>>>Epoch 32:
Post-training Unit 1:       0.589833169348288  -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:       0.18038940255879982
       0.9828469689135436 0.03836012437335411

Pre-training Unit 1:        0.589833169348288  -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:        0.18038940255879982
       0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0      0.0      0.0
Changes in Unit 2: 0.0      0.0      0.0
Overall change of weight:   0.0

>>>>>>>>>>Epoch 33:
Post-training Unit 1:       0.589833169348288  -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:       0.18038940255879982
       0.9828469689135436 0.03836012437335411

Pre-training Unit 1:        0.589833169348288  -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:        0.18038940255879982
       0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0      0.0      0.0
Changes in Unit 2: 0.0      0.0      0.0
Overall change of weight:   0.0
```

```
>>>>>>>>>>Epoch 34:
Post-training Unit 1:       0.589833169348288  -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:       0.18038940255879982
       0.9828469689135436 0.03836012437335411

Pre-training Unit 1:        0.589833169348288  -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:        0.18038940255879982
       0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0      0.0      0.0
Changes in Unit 2: 0.0      0.0      0.0
Overall change of weight:   0.0

>>>>>>>>>>Epoch 35:
Post-training Unit 1:       0.589833169348288  -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:       0.18038940255879982
       0.9828469689135436 0.03836012437335411

Pre-training Unit 1:        0.589833169348288  -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:        0.18038940255879982
       0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0      0.0      0.0
Changes in Unit 2: 0.0      0.0      0.0
Overall change of weight:   0.0

>>>>>>>>>>Epoch 36:
Post-training Unit 1:       0.589833169348288  -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:       0.18038940255879982
       0.9828469689135436 0.03836012437335411

Pre-training Unit 1:        0.589833169348288  -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:        0.18038940255879982
       0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0      0.0      0.0
Changes in Unit 2: 0.0      0.0      0.0
Overall change of weight:   0.0

>>>>>>>>>>Epoch 37:
Post-training Unit 1:       0.589833169348288  -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:       0.18038940255879982
       0.9828469689135436 0.03836012437335411

Pre-training Unit 1:        0.589833169348288  -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:        0.18038940255879982
       0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0      0.0      0.0
Changes in Unit 2: 0.0      0.0      0.0
Overall change of weight:   0.0

>>>>>>>>>>Epoch 38:
Post-training Unit 1:       0.589833169348288  -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:       0.18038940255879982
       0.9828469689135436 0.03836012437335411

Pre-training Unit 1:        0.589833169348288  -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:        0.18038940255879982
       0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0      0.0      0.0
Changes in Unit 2: 0.0      0.0      0.0
Overall change of weight:   0.0

>>>>>>>>>>Epoch 39:
Post-training Unit 1:       0.589833169348288  -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:       0.18038940255879982
       0.9828469689135436 0.03836012437335411

Pre-training Unit 1:        0.589833169348288  -
0.1458284726880467 0.7942486316576348
```

Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 40:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 41:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 42:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 43:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 44:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 45:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348

Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 46:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 47:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 48:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 49:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 50:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0

Overall change of weight: 0.0

>>>>>>>>>>Epoch 51:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 52:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 53:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 54:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 55:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 56:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348

Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 57:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 58:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 59:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 60:
Post-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Post-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Pre-training Unit 1:   0.589833169348288 -
0.1458284726880467 0.7942486316576348
Pre-training Unit 2:   0.18038940255879982
        0.9828469689135436 0.03836012437335411

Changes in Unit 1: 0.0   0.0   0.0
Changes in Unit 2: 0.0   0.0   0.0
Overall change of weight: 0.0

Appendix B (3 Units Training summary)

```
###############Training Result################
>>>>>>>>>>Epoch 1:
Post-training Unit 1:   -0.7115723578788701
        0.557064772999121       0.4281864292409826

Post-training Unit 2:   0.1459849126003831
        0.9881341934625202      0.047741187702373816

Post-training Unit 3:   0.592849830682898       -
0.1322577440093704      0.7943783528072823

Pre-training Unit 1:    -0.7149878353798949
        0.5308243020244674      0.45499225887811484

Pre-training Unit 2:    -0.5499623148376319
        0.7651649597740967      0.3347596699011673

Pre-training Unit 3:    0.6002749026530724      -
0.09681853268597942     0.7939119680250312

Changes in Unit 1:      0.0034154775010247773
        0.02624047097465365     -0.02680582963713224

Changes in Unit 2:      0.695947227438015
        0.22296923368842347     -0.28701848219879345

Changes in Unit 3:      -0.007425071970174391   -
0.03543921132339098     4.663847822511391E-4
Overall change of weight:       0.5923501992548769

>>>>>>>>>>Epoch 2:
Post-training Unit 1:   -0.6959885722258367
        0.5845907632216466      0.4169574881051712

Post-training Unit 2:   0.36653337760172966
        0.9284703213888552      -0.059967869763262335

Post-training Unit 3:   0.5906752070006788      -
0.1420658799647067      0.7943047812927724

Pre-training Unit 1:    -0.7115723578788701
        0.557064772999121       0.4281864292409826

Pre-training Unit 2:    0.1459849126003831
        0.9881341934625202      0.047741187702373816

Pre-training Unit 3:    0.592849830682898       -
0.1322577440093704      0.7943783528072823

Changes in Unit 1:      0.015583785653033422
        0.027525990222525554    -0.01122894113581141

Changes in Unit 2:      0.22054846500134656     -
0.05966387207366497     -0.10770905746563615
Changes in Unit 3:      -0.002174623682219212   -
0.009808135955336306    -7.357151450992916E-5
Overall change of weight:       0.07300003904972756

>>>>>>>>>>Epoch 3:
Post-training Unit 1:   -0.6915814351741255
        0.5920190651013642      0.41379771033562224

Post-training Unit 2:   0.42463607210894777
        0.9009251606223915      -0.0895436274751181

Post-training Unit 3:   0.5900660573929655      -
0.14478478527611022     0.7942665886623158

Pre-training Unit 1:    -0.6959885722258367
        0.5845907632216466      0.4169574881051712
```

```
Pre-training Unit 2:    0.36653337760172966
        0.9284703213888552      -0.059967869763262335

Pre-training Unit 3:    0.5906752070006788      -
0.1420658799647067      0.7943047812927724

Changes in Unit 1:      0.004407137051711141
        0.007428301879717547    -0.003159777769548955

Changes in Unit 2:      0.05810269450721811     -
0.027545516076646374    -0.029575757711855763
Changes in Unit 3:      -6.091496077132996E-4   -
0.0027189053114035078   -3.819263045656829E-5
Overall change of weight:       0.006291189641204967

>>>>>>>>>>Epoch 4:
Post-training Unit 1:   -0.6903641242499187
        0.5940458683258107      0.41292479009339755

Post-training Unit 2:   0.44043894737779915
        0.8924557797199252      -0.09765354513399196

Post-training Unit 3:   0.5898974162188741      -
0.14553893095168377     0.7942540260620259

Pre-training Unit 1:    -0.6915814351741255
        0.5920190651013642      0.41379771033562224

Pre-training Unit 2:    0.42463607210894777
        0.9009251606223915      -0.0895436274751181

Pre-training Unit 3:    0.5900660573929655      -
0.14478478527611022     0.7942665886623158

Changes in Unit 1:      0.0012173109242068492
        0.002026803224446594    -8.72920242224684E-4

Changes in Unit 2:      0.01580287526885138     -
0.008469380902466295    -0.008109917658873866
Changes in Unit 3:      -1.6864117409132184E-4  -
7.541456755735532E-4    -1.256260028992262E-5
Overall change of weight:       6.594211639851799E-4

>>>>>>>>>>Epoch 5:
Post-training Unit 1:   -0.6900299602582775
        0.5946006314989831      0.4126847985654069

Post-training Unit 2:   0.4448077939512562
        0.8900380477850978      -0.0998914407499909

Post-training Unit 3:   0.589850880039376       -
0.145748144683957       0.7942502235680882

Pre-training Unit 1:    -0.6903641242499187
        0.5940458683258107      0.41292479009339755

Pre-training Unit 2:    0.44043894737779915
        0.8924557797199252      -0.09765354513399196

Pre-training Unit 3:    0.5898974162188741      -
0.14553893095168377     0.7942540260620259

Changes in Unit 1:      3.34163991641212E-4
        5.54763173172379E-4     -2.3999152799064616E-4

Changes in Unit 2:      0.004368846573457041    -
0.0024177319348274162   -0.002237895615998936
Changes in Unit 3:      -4.65361794981245E-5    -
2.0921373227322793E-4   -3.802493937721252E-6
Overall change of weight:       1.0260225374456033E-4

>>>>>>>>>>Epoch 6:
Post-training Unit 1:   -0.689938382564929
        0.59475261104688 0.4126189039738829
```

Post-training Unit 2:　0.44602182135031726
　　0.8893605553710808　　-0.10051038468431187

Post-training Unit 3:　0.5898380504400048　　-
0.14580618701072445　0.794249098257296

Pre-training Unit 1:　-0.6900299602582775
　　0.5946006314989831　0.4126847985654069

Pre-training Unit 2:　0.4448077939512562
　　0.8900380477850978　　-0.0998914407499909

Pre-training Unit 3:　0.589850880039376　　-
0.145748144683957　0.7942502235680882

Changes in Unit 1:　9.157769334844357E-5
　　1.519795478969188E-4　-6.589459152400723E-5

Changes in Unit 2:　0.0012140273990610684　-
6.774924140169336E-4　-6.189439343209646E-4
Changes in Unit 3:　-1.2829599371211309E-5　-
5.804232676745458E-5　-1.1253107922160055E-6
Overall change of weight:　2.325646351364341E-5

>>>>>>>>>>Epoch 7:
Post-training Unit 1:　-0.6899132971896125
　　0.5947942565000978　0.4126008177348336

Post-training Unit 2:　0.4463596761465343
　　0.8891716586247311　　-0.1006816815955392

Post-training Unit 3:　0.589834514456725　　-
0.1458222898992883　0.794248767908473

Pre-training Unit 1:　-0.689938382564929
　　0.59475261104688　0.4126189039738829
Pre-training Unit 2:　0.44602182135031726
　　0.8893605553710808　　-0.10051038468431187

Pre-training Unit 3:　0.5898380504400048　　-
0.14580618701072445　0.794249098257296

Changes in Unit 1:　2.5085375316535874E-5
　　4.1645453217720174E-5　-1.8086239049308617E-5

Changes in Unit 2:　3.3785479621706305E-4　-
1.8889674634969822E-4　-1.7129691122733104E-4
Changes in Unit 3:　-3.5359832798453894E-6　-
1.6102888563851447E-5　-3.3034882296334445E-7
Overall change of weight:　6.336507458321039E-6

>>>>>>>>>>Epoch 8:
Post-training Unit 1:　-0.6899064265558837
　　0.5948056689482969　0.412595854055588

Post-training Unit 2:　0.44645373737273136
　　0.8891190636479246　　-0.10072909730439257

Post-training Unit 3:　0.5898335400062549　　-
0.14582675738145043　0.7942486713336707

Pre-training Unit 1:　-0.6899132971896125
　　0.5947942565000978　0.4126008177348336

Pre-training Unit 2:　0.4463596761465343
　　0.8891716586247311　　-0.1006816815955392

Pre-training Unit 3:　0.589834514456725　　-
0.1458222898992883　0.794248767908473

Changes in Unit 1:　6.870633728728315E-6
　　1.1412448199132896E-5　-4.9636792455731715E-6

Changes in Unit 2:　9.406122619703972E-5　-
5.259497680654146E-5　-4.741570885337387E-5

Changes in Unit 3:　　-9.744504700925916E-7　　-
4.4674821621237815E-6　-9.657480226632487E-8
Overall change of weight:　1.8314357849297247E-6

>>>>>>>>>>Epoch 9:
Post-training Unit 1:　-0.6899045448235543
　　0.5948087964527464　0.41259449183700897

Post-training Unit 2:　0.44647992767910116
　　0.8891044251192102　　-0.10074222259362475

Post-training Unit 3:　0.5898332714821227　　-
0.1458279968078544　0.7942486431840503

Pre-training Unit 1:　-0.6899064265558837
　　0.5948056689482969　0.412595854055588

Pre-training Unit 2:　0.44645373737273136
　　0.8891190636479246　　-0.10072909730439257

Pre-training Unit 3:　0.5898335400062549　　-
0.14582675738145043　0.7942486713336707

Changes in Unit 1:　1.8817323294006982E-6
　　3.1275044495293614E-6　-1.362218579048502E-6

Changes in Unit 2:　2.619030636979991E-5　　-
1.4638528714416843E-5　-1.3125289232182591E-5
Changes in Unit 3:　　-2.685241321520593E-7　　-
1.2394264039816694E-6　-2.8149620412420973E-8
Overall change of weight:　5.374064665358835E-7

>>>>>>>>>>Epoch 10:
Post-training Unit 1:　-0.6899040294589378
　　0.594809653528514　0.41259411799686413

Post-training Unit 2:　0.44648722030279736
　　0.889100351277366　　-0.10074585581921293

Post-training Unit 3:　0.5898331974897918　　-
0.145828340664433117　0.7942486349991772

Pre-training Unit 1:　-0.6899045448235543
　　0.5948087964527464　0.41259449183700897

Pre-training Unit 2:　0.44647992767910116
　　0.8891044251192102　　-0.10074222259362475

Pre-training Unit 3:　0.5898332714821227　　-
0.1458279968078544　0.7942486431840503

Changes in Unit 1:　5.153646165378944E-7
　　8.570757675796514E-7　-3.738401448405426E-7

Changes in Unit 2:　7.292623696197875E-6　　-
4.073841844198789E-6　-3.6332255881760256E-6
Changes in Unit 3:　　-7.399233092897362E-8　　-
3.4385647676438147E-7　-8.184873112604407E-9
Overall change of weight:　1.5812282229410446E-7

>>>>>>>>>>Epoch 11:
Post-training Unit 1:　-0.6899038883124666
　　0.5948098884058376　0.4125940154025196

Post-training Unit 2:　0.4464892509303264
　　0.8890992175780965　　-0.10074686151782956

Post-training Unit 3:　0.5898331771019429　　-
0.1458284360607634　0.7942486326245075

Pre-training Unit 1:　-0.6899040294589378
　　0.594809653528514　0.41259411799686413

Pre-training Unit 2:   0.44648722030279736
          0.889100351277366   -0.10074585581921293

Pre-training Unit 3:   0.5898331974897918   -
0.14582834066433117   0.7942486349991772

Changes in Unit 1:   1.4114647117757784E-7
          2.3487732359050995E-7   -1.0259434451986849E-7

Changes in Unit 2:   2.03062752901495E-6   -
1.1336992694621628E-6   -1.0056986166351312E-6
Changes in Unit 3:   -2.0387848853609114E-8   -
9.539643222589156E-8   -2.3746696831139502E-9
Overall change of weight: 4.6500142403260725E-8

>>>>>>>>>Epoch 12:
Post-training Unit 1:   -0.6899038496557518
          0.5948099527728166   0.4125939772472375

Post-training Unit 2:   0.4464898163581613
          0.8890989020864846   -0.10074713989520011

Post-training Unit 3:   0.5898331714845133   -
0.1458284625265918   0.7942486319369089

Pre-training Unit 1:   -0.6899038883124666
          0.5948098884058376   0.4125940154025196

Pre-training Unit 2:   0.4464892509303264
          0.8890992175780965   -0.10074686151782956

Pre-training Unit 3:   0.5898331771019429   -
0.1458284360607634   0.7942486326245075

Changes in Unit 1:   3.8656714829166106E-8
          6.436697896905486E-8   -2.815528210575735E-8

Changes in Unit 2:   5.654278349420672E-7   -
3.15491611946328E-7   -2.783773705439252E-7
Changes in Unit 3:   -5.617429632565063E-9   -
2.646582838994327E-8   -6.875986446885918E-10
Overall change of weight: 1.3656407477080634E-8

>>>>>>>>>Epoch 13:
Post-training Unit 1:   -0.6899038390685894
          0.5948099704122733   0.4125939795205117

Post-training Unit 2:   0.44648997380131245
          0.8890988142901076   -0.1007472169483018

Post-training Unit 3:   0.5898331699368182   -
0.1458284698689789   0.7942486317381711

Pre-training Unit 1:   -0.6899038496557518
          0.5948099527728166   0.4125939772472375

Pre-training Unit 2:   0.4464898163581613
          0.8890989020864846   -0.10074713989520011

Pre-training Unit 3:   0.5898331714845133   -
0.1458284625265918   0.7942486319369089

Changes in Unit 1:   1.058716236901347E-8
          1.7639456784124263E-8   -7.726725814727331E-9

Changes in Unit 2:   1.5744315112753426E-7   -
8.779637694633635E-8   -7.705310169081603E-8
Changes in Unit 3:   -1.5476950832038483E-9   -
7.342387114972482E-9   -1.9873780399137786E-10
Overall change of weight: 4.004745826624578E-9

>>>>>>>>>Epoch 14:
Post-training Unit 1:   -0.6899038361690166
          0.5948099752462808   0.4125939774000505

Post-training Unit 2:   0.4464900176412395
          0.8890987898577756   -0.10074723827561971

Post-training Unit 3:   0.589833169510421   -
0.1458284719059624   0.7942486316808252

Pre-training Unit 1:   -0.6899038390685894
          0.5948099704122733   0.4125939795205117

Pre-training Unit 2:   0.44648997380131245
          0.8890988142901076   -0.1007472169483018

Pre-training Unit 3:   0.5898331699368182   -
0.1458284698689789   0.7942486317381711

Changes in Unit 1:   2.8995728040825952E-9
          4.834007416576469E-9   -2.120461195520562E-9

Changes in Unit 2:   4.383992707746032E-8   -
2.4432332046409044E-8   -2.1327317911712385E-8
Changes in Unit 3:   -4.2639725084114843E-10   -
2.036983498543421E-9   -5.734590580175336E-11
Overall change of weight: 1.1726694892910672E-9

>>>>>>>>>Epoch 15:
Post-training Unit 1:   -0.689903835374893
          0.594809976571017   0.4125939768181291

Post-training Unit 2:   0.44649002984841757
          0.8890987830586512   -0.10074724417861121

Post-training Unit 3:   0.5898331693929517   -
0.14582847247107647   0.7942486316643033

Pre-training Unit 1:   -0.6899038361690166
          0.5948099752462808   0.4125939774000505

Pre-training Unit 2:   0.4464900176412395
          0.8890987898577756   -0.10074723827561971

Pre-training Unit 3:   0.589833169510421   -
0.1458284719059624   0.7942486316808252

Changes in Unit 1:   7.941236557229558E-10
          1.3247362096180382E-9   -5.819213999558315E-10

Changes in Unit 2:   1.2207178046175216E-8   -
6.799124374623489E-9   -5.902991498385468E-9
Changes in Unit 3:   -1.1746925654421148E-10   -
5.651140666529386E-10   -1.652189496326173E-11
Overall change of weight: 3.428954203910095E-10

>>>>>>>>>Epoch 16:
Post-training Unit 1:   -0.6899038351574015
          0.5948099769340545   0.4125939766584318

Post-training Unit 2:   0.4464900332474876
          0.8890987811665653   -0.10074724581240695

Post-training Unit 3:   0.5898331693605912   -
0.1458284726278538   0.79424863165955

Pre-training Unit 1:   -0.689903835374893
          0.594809976571017   0.4125939768181291

Pre-training Unit 2:   0.44649002984841757
          0.8890987830586512   -0.10074724417861121

Pre-training Unit 3:   0.5898331693929517   -
0.14582847247107647   0.7942486316643033

Changes in Unit 1:   2.1749146927874108E-10
          3.630374889596055E-10   -1.596973109307953E-10

Changes in Unit 2:   3.399070025444928E-9   -
1.8920859323756645E-9   -1.6337957375878176E-9
Changes in Unit 3:   -3.236055867716914E-11   -
1.567773411093043E-10   -4.753308857630145E-12
Overall change of weight: 1.0012879414489362E-10

>>>>>>>>>>Epoch 17:
Post-training Unit 1:   -0.6899038350978358
        0.5948099770335431   0.412593976614606

Post-training Unit 2:   0.44649003419395217
        0.8890987806400287   -0.10074724626458861

Post-training Unit 3:   0.5898331693516768   -
0.14582847267134777   0.7942486316581843

Pre-training Unit 1:   -0.6899038351574015
        0.5948099769340545   0.4125939766584318

Pre-training Unit 2:   0.4464900332474876
        0.8890987811665653   -0.10074724581240695

Pre-training Unit 3:   0.5898331693605912   -
0.1458284726278538   0.79424863165955

Changes in Unit 1:   5.95656857171889E-11
        9.948863954889475E-11   -4.38257763413219E-11

Changes in Unit 2:   9.464645733814336E-10   -
5.26536592104776E-10   -4.521816671099188E-10
Changes in Unit 3:   -8.91431373162277E-12   -
4.3493958434837054E-11   -1.365685342591405E-12
Overall change of weight: 2.9200905582449366E-11

>>>>>>>>>>Epoch 18:
Post-training Unit 1:   -0.6899038350815222
        0.5948099770608075   0.41259397660257885

Post-training Unit 2:   0.4464900344574929
        0.8890987804935022   -0.10074724638973474

Post-training Unit 3:   0.5898331693492215   -
0.14582847268341403   0.7942486316577922

Pre-training Unit 1:   -0.6899038350978358
        0.5948099770335431   0.412593976614606

Pre-training Unit 2:   0.44649003419395217
        0.8890987806400287   -0.10074724626458861

Pre-training Unit 3:   0.5898331693516768   -
0.14582847267134777   0.7942486316581843

Changes in Unit 1:   1.631361712384205E-11
        2.7264412949534744E-11   -1.2027157048066783E-
11
Changes in Unit 2:   2.63540744782631E-10   -
1.4652645763391092E-10   -1.2514612957037485E-10
Changes in Unit 3:   -2.4553692412609962E-12   -
1.2066264654109204E-11   -3.9201974999514277E-13
Overall change of weight: 8.505376958289901E-12

>>>>>>>>>>Epoch 19:
Post-training Unit 1:   -0.6899038350770543
        0.5948099770682793   0.4125939765992782

Post-training Unit 2:   0.44649003453087527
        0.8890987804527263   -0.10074724642436948

Post-training Unit 3:   0.589833169348545   -
0.1458284726867615   0.79424863165768

Pre-training Unit 1:   -0.6899038350815222
        0.5948099770608075   0.41259397660257885

Pre-training Unit 2:   0.4464900344574929
        0.8890987804935022   -0.10074724638973474

Pre-training Unit 3:   0.5898331693492215   -
0.14582847268341403   0.7942486316577922

Changes in Unit 1:   4.4678705179990175E-12
        7.471800955727304E-12   -3.300637541059359E-12

Changes in Unit 2:   7.338235574749774E-11   -
4.077593818152536E-11   -3.463473952081131E-11
Changes in Unit 3:   -6.764588889041079E-13   -
3.347461197122925E-12   -1.1224354778960333E-13
Overall change of weight: 2.4745483440113958E-12

>>>>>>>>>>Epoch 20:
Post-training Unit 1:   -0.6899038350758308
        0.5948099770703267   0.4125939765983725

Post-training Unit 2:   0.44649003455130826
        0.8890987804413791   -0.10074724643395455

Post-training Unit 3:   0.5898331693483587   -
0.1458284726876901   0.7942486316576478

Pre-training Unit 1:   -0.6899038350770543
        0.5948099770682793   0.4125939765992782

Pre-training Unit 2:   0.44649003453087527
        0.8890987804527263   -0.10074724642436948

Pre-training Unit 3:   0.589833169348545   -
0.1458284726867615   0.79424863165768

Changes in Unit 1:   1.223576795439385E-12
        2.047362279711251E-12   -9.057199434892027E-13

Changes in Unit 2:   2.043298863441123E-11   -
1.1347145445483875E-11   -9.585068849737866E-12
Changes in Unit 3:   -1.8629542353210127E-13 -
9.286182933720966E-13   -3.219646771412954E-14
Overall change of weight: 7.188832862325967E-13

>>>>>>>>>>Epoch 21:
Post-training Unit 1:   -0.6899038350754956
        0.5948099770708879   0.41259397659812386

Post-training Unit 2:   0.4464900345569978
        0.8890987804382213   -0.10074724643660714

Post-training Unit 3:   0.5898331693483073   -
0.14582847268794774   0.7942486316576387

Pre-training Unit 1:   -0.6899038350758308
        0.5948099770703267   0.4125939765983725

Pre-training Unit 2:   0.44649003455130826
        0.8890987804413791   -0.10074724643395455

Pre-training Unit 3:   0.5898331693483587   -
0.1458284726876901   0.7942486316576478

Changes in Unit 1:   3.3517633113433476E-13
        5.612177389480166E-13   -2.486344463648038E-13

Changes in Unit 2:   5.68955993429654E-12   -
3.1578073489413327E-12   -2.6525864837978474E-12
Changes in Unit 3:   -5.140332604014475E-14   -
2.576272528642676E-13   -9.103828801926284E-15
Overall change of weight: 2.087913175685685E-13

>>>>>>>>>>Epoch 22:
Post-training Unit 1:   -0.6899038350754038
        0.5948099770710417   0.4125939765980557

19

Post-training Unit 2:   0.446490034558582
        0.8890987804373426   -0.10074724643734119

Post-training Unit 3:   0.5898331693482933   -
0.14582847268801918   0.794248631657636

Pre-training Unit 1:   -0.6899038350754956
        0.5948099770708879   0.41259397659812386

Pre-training Unit 2:   0.4464900345569978
        0.8890987804382213   -0.10074724643660714

Pre-training Unit 3:   0.5898331693483073   -
0.14582847268794774   0.7942486316576387

Changes in Unit 1:   9.181544413650045E-14
        1.5376588891058418E-13   -6.816769371198461E-14

Changes in Unit 2:   1.5841772338376359E-12   -
8.787415239908114E-13   -7.340517083065379E-13
Changes in Unit 3:   -1.3988810110276972E-14   -
7.144285163462882E-14   -2.6645352591003757E-15
Overall change of weight: 6.070144387138043E-14

>>>>>>>>>>Epoch 23:
Post-training Unit 1:   -0.6899038350753786
        0.5948099770710839   0.412593976598037

Post-training Unit 2:   0.4464900345590232
        0.889098780437098   -0.10074724643754432

Post-training Unit 3:   0.5898331693482894   -
0.14582847268803903   0.7942486316576353

Pre-training Unit 1:   -0.6899038350754038
        0.5948099770710417   0.4125939765980557

Pre-training Unit 2:   0.446490034558582
        0.8890987804373426   -0.10074724643734119

Pre-training Unit 3:   0.5898331693482933   -
0.14582847268801918   0.794248631657636

Changes in Unit 1:   2.5202062658991053E-14
        4.218847493575595E-14   -1.8707257964933888E-
14
Changes in Unit 2:   4.412026299860372E-13   -
2.44582132324922E-13   -2.031291801429802E-13
Changes in Unit 3:   -3.885780586188048E-15   -
1.9845236565174673E-14   -7.771561172376096E-16
Overall change of weight: 1.7666423879347803E-14

>>>>>>>>>>Epoch 24:
Post-training Unit 1:   -0.6899038350753718
        0.5948099770710954   0.4125939765980319

Post-training Unit 2:   0.446490034559146
        0.88909878043703   -0.10074724643760054
Post-training Unit 3:   0.5898331693482883   -
0.14582847268804458   0.794248631657635

Pre-training Unit 1:   -0.6899038350753786
        0.5948099770710839   0.412593976598037

Pre-training Unit 2:   0.4464900345590232
        0.889098780437098   -0.10074724643754432

Pre-training Unit 3:   0.5898331693482894   -
0.14582847268803903   0.7942486316576353

Changes in Unit 1:   6.772360450213455E-15
        1.1546319456101628E-14   -5.10702591327572E-15

Changes in Unit 2:   1.2279066652354231E-13   -
6.80566714095221E-14   -5.6218918409456364E-14

Changes in Unit 3:   -1.1102230246251565E-15 -
5.551115123125783E-15   -2.220446049250313E-16
Overall change of weight: 4.8433479449272454E-15

>>>>>>>>>>Epoch 25:
Post-training Unit 1:   -0.6899038350753699
        0.5948099770710984   0.41259397659803043

Post-training Unit 2:   0.4464900345591802
        0.8890987804370111   -0.10074724643761611

Post-training Unit 3:   0.5898331693482881   -
0.1458284726880461   0.7942486316576349

Pre-training Unit 1:   -0.6899038350753718
        0.5948099770710954   0.4125939765980319

Pre-training Unit 2:   0.446490034559146
        0.88909878043703   -0.10074724643760054
Pre-training Unit 3:   0.5898331693482883   -
0.14582847268804458   0.794248631657635

Changes in Unit 1:   1.887379141862766E-15
        2.9976021664879227E-15   -1.4432899320127035E-
15
Changes in Unit 2:   3.419486915845482E-14   -
1.887379141862766E-14   -1.557087792036782E-14
Changes in Unit 3:   -2.220446049250313E-16   -
1.5265566588595902E-15   -1.1102230246251565E-16
Overall change of weight: 1.3322676295501878E-15

>>>>>>>>>>Epoch 26:
Post-training Unit 1:   -0.6899038350753693
        0.5948099770710993   0.41259397659803004

Post-training Unit 2:   0.44649003455918973
        0.8890987804370056   -0.10074724643762037

Post-training Unit 3:   0.589833169348288   -
0.14582847268804652   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753699
        0.5948099770710984   0.41259397659803043

Pre-training Unit 2:   0.4464900345591802
        0.8890987804370111   -0.10074724643761611

Pre-training Unit 3:   0.5898331693482881   -
0.1458284726880461   0.7942486316576349

Changes in Unit 1:   5.551115123125783E-16
        8.881784197001252E-16   -3.885780586188048E-16

Changes in Unit 2:   9.547918011776346E-15   -
5.440092820663267E-15   -4.260480856999038E-15
Changes in Unit 3:   -1.1102230246251565E-16 -
4.163336342344337E-16   -1.1102230246251565E-16
Overall change of weight: 2.636779683484747E-16

>>>>>>>>>>Epoch 27:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659802993

Post-training Unit 2:   0.4464900345591924
        0.8890987804370042   -0.10074724643762155

Post-training Unit 3:   0.589833169348288   -
0.14582847268804666   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753693
        0.5948099770710993   0.41259397659803004

Pre-training Unit 2:   0.44649003455918973
        0.8890987804370056   -0.10074724643762037

Pre-training Unit 3:   0.589833169348288   -
0.14582847268804652   0.7942486316576348

Changes in Unit 1:   1.1102230246251565E-16
      4.440892098500626E-16   -1.1102230246251565E-
16
Changes in Unit 2:   2.6645352591003757E-15   -
1.4432899320127035E-15   -1.1796119636642288E-15
Changes in Unit 3:   0.0   -1.3877787807814457E-
16   0.0
Overall change of weight: 3.469446951953614E-16

>>>>>>>>>>Epoch 28:
Post-training Unit 1:   -0.6899038350753692
      0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919317
      0.889098780437004   -0.10074724643762191

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
      0.5948099770710997   0.41259397659802993

Pre-training Unit 2:   0.4464900345591924
      0.8890987804370042   -0.10074724643762155

Pre-training Unit 3:   0.589833169348288   -
0.14582847268804666   0.7942486316576348

Changes in Unit 1:   0.0   0.0
      5.551115123125783E-17
Changes in Unit 2:   7.771561172376096E-16   -
2.220446049250313E-16   -3.608224830031759E-16
Changes in Unit 3:   0.0   -2.7755575615628914E-
17   0.0
Overall change of weight: 2.220446049250313E-16

>>>>>>>>>>Epoch 29:
Post-training Unit 1:   -0.6899038350753692
      0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919334
      0.8890987804370037   -0.10074724643762198

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
      0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919317
      0.889098780437004   -0.10074724643762191

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   1.6653345369377348E-16   -
2.220446049250313E-16   -6.938893903907228E-17
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: -1.249000902703301E-16

>>>>>>>>>>Epoch 30:
Post-training Unit 1:   -0.6899038350753692
      0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
      0.8890987804370037   -0.100747246437622

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
      0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919334
      0.8890987804370037   -0.10074724643762198

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   1.1102230246251565E-16 0.0
      -2.7755575615628914E-17
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 8.326672684688674E-17

>>>>>>>>>>Epoch 31:
Post-training Unit 1:   -0.6899038350753692
      0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
      0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
      0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
      0.8890987804370037   -0.100747246437622

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   -
2.7755575615628914E-17
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: -2.7755575615628914E-
17

>>>>>>>>>>Epoch 32:
Post-training Unit 1:   -0.6899038350753692
      0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
      0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
      0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
      0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 33:
Post-training Unit 1:   -0.6899038350753692
      0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
      0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
      0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
      0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0

Overall change of weight: 0.0

>>>>>>>>>>Epoch 34:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 35:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 36:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 37:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 38:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 39:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 40:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 41:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 42:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 43:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 44:

Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 45:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 46:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0
>>>>>>>>>>Epoch 47:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 48:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 49:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 50:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0

Overall change of weight: 0.0

>>>>>>>>>>Epoch 51:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 52:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 53:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Post-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

Pre-training Unit 3:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 54:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997   0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037   -0.10074724643762203

```
Post-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997      0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037      -0.10074724643762203

Pre-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Changes in Unit 1:     0.0      0.0      0.0
Changes in Unit 2:     0.0      0.0      0.0
Changes in Unit 3:     0.0      0.0      0.0
Overall change of weight:       0.0

>>>>>>>>>>Epoch 55:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997      0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037      -0.10074724643762203

Post-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997      0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037      -0.10074724643762203

Pre-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Changes in Unit 1:     0.0      0.0      0.0
Changes in Unit 2:     0.0      0.0      0.0
Changes in Unit 3:     0.0      0.0      0.0
Overall change of weight:       0.0

>>>>>>>>>>Epoch 56:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997      0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037      -0.10074724643762203

Post-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997      0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037      -0.10074724643762203

Pre-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Changes in Unit 1:     0.0      0.0      0.0
Changes in Unit 2:     0.0      0.0      0.0
Changes in Unit 3:     0.0      0.0      0.0
Overall change of weight:       0.0

>>>>>>>>>>Epoch 57:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997      0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037      -0.10074724643762203

Post-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997      0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037      -0.10074724643762203
```

```
Pre-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Changes in Unit 1:     0.0      0.0      0.0
Changes in Unit 2:     0.0      0.0      0.0
Changes in Unit 3:     0.0      0.0      0.0
Overall change of weight:       0.0

>>>>>>>>>>Epoch 58:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997      0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037      -0.10074724643762203

Post-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997      0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037      -0.10074724643762203

Pre-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Changes in Unit 1:     0.0      0.0      0.0
Changes in Unit 2:     0.0      0.0      0.0
Changes in Unit 3:     0.0      0.0      0.0
Overall change of weight:       0.0

>>>>>>>>>>Epoch 59:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997      0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037      -0.10074724643762203

Post-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997      0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037      -0.10074724643762203

Pre-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Changes in Unit 1:     0.0      0.0      0.0
Changes in Unit 2:     0.0      0.0      0.0
Changes in Unit 3:     0.0      0.0      0.0
Overall change of weight:       0.0

>>>>>>>>>>Epoch 60:
Post-training Unit 1:   -0.6899038350753692
        0.5948099770710997      0.41259397659803
Post-training Unit 2:   0.44649003455919345
        0.8890987804370037      -0.10074724643762203

Post-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Pre-training Unit 1:   -0.6899038350753692
        0.5948099770710997      0.41259397659803
Pre-training Unit 2:   0.44649003455919345
        0.8890987804370037      -0.10074724643762203

Pre-training Unit 3:   0.589833169348288        -
0.1458284726880467     0.7942486316576348

Changes in Unit 1:     0.0      0.0      0.0
Changes in Unit 2:     0.0      0.0      0.0
Changes in Unit 3:     0.0      0.0      0.0
Overall change of weight:       0.0
```

Appendix C (4 Units Training summary)

```
###############Training Result################
>>>>>>>>>>Epoch 1:
Post-training Unit 1:    0.5518068774435748      -
0.1265619079720197      0.8243125945031129
Post-training Unit 2:    0.5138581861552921
        0.5315774339537505      0.6733314163414174

Post-training Unit 3:    0.4779166664257681
        0.8649822134780499      -0.15297526048055687

Post-training Unit 4:    -0.6469817118609187
        0.6219779637701384      0.4410873803475539


Pre-training Unit 1:    0.44597648774829984      -
0.07432941462471664      0.8919529754965997
Pre-training Unit 2:    0.5138581861552921
        0.5315774339537505      0.6733314163414174

Pre-training Unit 3:    0.5492020409064917
        0.7859270585386002      -0.2840700211585302

Pre-training Unit 4:    -0.5238408364207751
        0.683270656201011      0.5086570440607526


Changes in Unit 1:    0.10583038969527497      -
0.05223249334730305      -0.06764038099348679
Changes in Unit 2:    0.0    0.0    0.0
Changes in Unit 3:    -0.07128537448072364
        0.0790551549394497      0.13109476067797332

Changes in Unit 4:    -0.12314087544014363      -
0.06129269243087265      -0.06756966371319872
Overall change of weight:    -0.1271811750930305

>>>>>>>>>>Epoch 2:
Post-training Unit 1:    0.5794447687074035      -
0.14055568270663713      0.802800012504045
Post-training Unit 2:    0.5138581861552921
        0.5315774339537505      0.6733314163414174

Post-training Unit 3:    0.4554456128522748
        0.8827638197777601      -0.11531405909512642

Post-training Unit 4:    -0.6783620973261861
        0.6024636278790498      0.4205501658471102


Pre-training Unit 1:    0.5518068774435748      -
0.1265619079720197      0.8243125945031129
Pre-training Unit 2:    0.5138581861552921
        0.5315774339537505      0.6733314163414174

Pre-training Unit 3:    0.4779166664257681
        0.8649822134780499      -0.15297526048055687

Pre-training Unit 4:    -0.6469817118609187
        0.6219779637701384      0.4410873803475539


Changes in Unit 1:    0.02763789126382865      -
0.013993774734617437      -0.021512581999067915
Changes in Unit 2:    0.0    0.0    0.0
Changes in Unit 3:    -0.02247105357349327
        0.01778160629971015      0.03766120138543046

Changes in Unit 4:    -0.031380385465267446      -
0.01951433589108853      -0.020537214500443712
Overall change of weight:    -0.04632864721500905

>>>>>>>>>>Epoch 3:
```

```
Post-training Unit 1:    0.5869639523328127      -
0.14437703917505582      0.7966357945892765
Post-training Unit 2:    0.5138581861552921
        0.5315774339537505      0.6733314163414174

Post-training Unit 3:    0.44900011276660334
        0.8873651562750934      -0.10479493386827719

Post-training Unit 4:    -0.6867583321361657
        0.5969227903564361      0.414784492953435


Pre-training Unit 1:    0.5794447687074035      -
0.14055568270663713      0.802800012504045
Pre-training Unit 2:    0.5138581861552921
        0.5315774339537505      0.6733314163414174

Pre-training Unit 3:    0.4554456128522748
        0.8827638197777601      -0.11531405909512642

Pre-training Unit 4:    -0.6783620973261861
        0.6024636278790498      0.4205501658471102


Changes in Unit 1:    0.007519183625409265      -
0.0038213564684186907      -0.0061642179147685106
Changes in Unit 2:    0.0    0.0    0.0
Changes in Unit 3:    -0.006445500085671463
        0.004601336497333297      0.010519125226849224

Changes in Unit 4:    -0.00839623480997953      -
0.005540837522613695      -0.005765672893675189
Overall change of weight:    -0.013494174345535292

>>>>>>>>>>Epoch 4:
Post-training Unit 1:    0.5890381935574286      -
0.14542825404022205      0.7949117117374821
Post-training Unit 2:    0.5138581861552921
        0.5315774339537505      0.6733314163414174

Post-training Unit 3:    0.44719049880646305
        0.8886185665107508      -0.10187100190733925

Post-training Unit 4:    -0.6890432511575779
        0.5953901294341896      0.4131948593660551


Pre-training Unit 1:    0.5869639523328127      -
0.14437703917505582      0.7966357945892765
Pre-training Unit 2:    0.5138581861552921
        0.5315774339537505      0.6733314163414174

Pre-training Unit 3:    0.44900011276660334
        0.8873651562750934      -0.10479493386827719

Pre-training Unit 4:    -0.6867583321361657
        0.5969227903564361      0.414784492953435


Changes in Unit 1:    0.002074241224615858      -
0.001051214865166239      -0.001724082851794373
Changes in Unit 2:    0.0    0.0    0.0
Changes in Unit 3:    -0.0018096139601402883
        0.0012534102356573928      0.002923931960937945

Changes in Unit 4:    -0.0022849190214122572    -
0.001532660922246576      -0.0015896335873799017
Overall change of weight:    -0.003740541786928439

>>>>>>>>>>Epoch 5:
Post-training Unit 1:    0.5896127097297957      -
0.1457180648496497      0.7944325635959045
Post-training Unit 2:    0.5138581861552921
        0.5315774339537505      0.6733314163414174
```

Post-training Unit 3:   0.44668527342377146
        0.8889653044092765   -0.10105916120200555

Post-training Unit 4:   -0.6896681324555777
        0.5949690504542571   0.4127586414320061

Pre-training Unit 1:   0.5890381935574286   -
0.14542825404022205   0.7949117117374821
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44719049880646305
        0.8886185665107508   -0.10187100190733925

Pre-training Unit 4:   -0.6890432511575779
        0.5953901294341896   0.4131948593660551

Changes in Unit 1:   5.745161723671455E-4   -
2.898108094276375E-4   -4.791481415775678E-4
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -5.052253826915987E-4
        3.4673789852568415E-4   8.118407053337023E-4

Changes in Unit 4:   -6.248812979997576E-4   -
4.2107897993248766E-4   -4.362179340490213E-4
Overall change of weight: -0.0010232677694515385

>>>>>>>>>>Epoch 6:
Post-training Unit 1:   0.5897720174451867   -
0.1457980112278694   0.7942996332371257
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.4465444350114557
        0.8890616451504334   -0.10083381715825596

Post-training Unit 4:   -0.6898392600901183
        0.5948535766402576   0.4126390887889939

Pre-training Unit 1:   0.5896127097297957   -
0.1457180648496497   0.7944325635959045
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44668527342377146
        0.8889653044092765   -0.10105916120200555

Pre-training Unit 4:   -0.6896681324555777
        0.5949690504542571   0.4127586414320061

Changes in Unit 1:   1.593077153909661E-4   -
7.994637821970296E-5   -1.3293035877881554E-4
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -1.408384123157691E-4
        9.634074115694169E-5   2.253440437495896E-4

Changes in Unit 4:   -1.711276345406354E-4   -
1.15473813999456E-4   -1.1955264301216628E-4
Overall change of weight: -2.788767405690479E-4

>>>>>>>>>>Epoch 7:
Post-training Unit 1:   0.5898162057056265   -
0.1458200682921835   0.794262772116559
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.4465051910241154
        0.8890884460336326   -0.10077127327774844

Post-training Unit 4:   -0.6898861421554664
        0.5948219257568435   0.4126063347802211

Pre-training Unit 1:   0.5897720174451867   -
0.1457980112278694   0.7942996332371257
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.4465444350114557
        0.8890616451504334   -0.10083381715825596

Pre-training Unit 4:   -0.6898392600901183
        0.5948535766402576   0.4126390887889939

Changes in Unit 1:   4.4188260439836924E-5   -
2.2057064314101593E-5   -3.6861120566666905E-5
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -3.924398734028722E-5
        2.6800883199173953E-5   6.254388050751236E-5

Changes in Unit 4:   -4.6882065348086144E-5   -
3.165088341416933E-5   -3.2754008772839516E-5
Overall change of weight: -7.591610560962747E-5

>>>>>>>>>>Epoch 8:
Post-training Unit 1:   0.5898284635320883   -
0.14582615393168083   0.7942525520493275
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649425717025626
        0.8890959042586465   -0.10075391478489028

Post-training Unit 4:   -0.6898989872790666
        0.5948132515732532   0.4125973619694776

Pre-training Unit 1:   0.5898162057056265   -
0.1458200682921835   0.794262772116559
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.4465051910241154
        0.8890884460336326   -0.10077127327774844

Pre-training Unit 4:   -0.6898861421554664
        0.5948219257568435   0.4126063347802211

Changes in Unit 1:   1.225782646174789E-5   -
6.085639497332984E-6   -1.0220067231503371E-5
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -1.0933853859140807E-5
        7.458225013912134E-6   1.735849285816604E-5

Changes in Unit 4:   -1.2845123600224717E-5   -
8.674183590295925E-6   -8.97281074346834E-6
Overall change of weight: -2.065713418814008E-5

>>>>>>>>>>Epoch 9:
Post-training Unit 1:   0.5898318639244007   -
0.14582783296335755   0.7942497185600247
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.4464912109724836
        0.889097979948943   -0.1007490971425262

Post-training Unit 4:   -0.6899025067886062
        0.594810874431531   0.41259490397337

Pre-training Unit 1:   0.5898284635320883   -
0.14582615393168083   0.7942525520493275

Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649425717025626
        0.8890959042586465   -0.10075391478489028

Pre-training Unit 4:   -0.6898989872790666
        0.5948132515732532   0.4125973619694776

Changes in Unit 1:   3.4003923123915314E-6   -
1.679031676721232E-6   -2.833489302855874E-6
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -3.0461977726381484E-6
        2.0756902965324286E-6   4.817642364082775E-6

Changes in Unit 4:   -3.5195095395845755E-6   -
2.3771417221318814E-6   -2.4579961075965606E-6
Overall change of weight: -5.619641148521537E-6

>>>>>>>>>>Epoch 10:
Post-training Unit 1:   0.5898328072159974   -
0.14582829619832055   0.7942489329924156
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649036230462114
        0.8890985576467831   -0.10074776007186484

Post-training Unit 4:   -0.6899034711267878
        0.5948102229875553   0.4125942306391403

Pre-training Unit 1:   0.5898318639244007   -
0.14582783296335755   0.7942497185600247
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.4464912109724836
        0.889097979948943   -0.1007490971425262

Pre-training Unit 4:   -0.6899025067886062
        0.594810874431531   0.41259490397337

Changes in Unit 1:   9.432915967222399E-7   -
4.6323496299960354E-7   -7.855676090740005E-7
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -8.48667862485275E-7
        5.776978401206279E-7   1.3370706613557992E-6

Changes in Unit 4:   -9.643381816415442E-7   -
6.514439757632218E-7   -6.733442297060574E-7
Overall change of weight: -1.5285267234710354E-6

>>>>>>>>>>Epoch 11:
Post-training Unit 1:   0.5898330688909666   -
0.14582842399872864   0.7942487151999122
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649012586782905
        0.8890987184304168   -0.10074738898810631

Post-training Unit 4:   -0.6899037353539629
        0.5948100444630466   0.4125940461888872

Pre-training Unit 1:   0.5898328072159974   -
0.14582829619832055   0.7942489329924156
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649036230462114
        0.8890985576467831   -0.10074776007186484

Pre-training Unit 4:   -0.6899034711267878
        0.5948102229875553   0.4125942306391403

Changes in Unit 1:   2.616749692485598E-7   -
1.2780040808957338E-7   -2.1779250336528833E-7
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -2.3643679208928958E-7
        1.6078363362925785E-7   3.7108375852690223E-7

Changes in Unit 4:   -2.642271750286085E-7   -
1.785245086205478E-7   -1.8445025312674446E-7
Overall change of weight: -4.1568927891533214E-7

>>>>>>>>>>Epoch 12:
Post-training Unit 1:   0.5898331414810161   -
0.14582845925620064   0.7942486548188787
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649005999735536
        0.8890987631794405   -0.10074728599990841

Post-training Unit 4:   -0.6899038077518401
        0.5948099955394602   0.4125939956614241

Pre-training Unit 1:   0.5898330688909666   -
0.14582842399872864   0.7942487151999122
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649012586782905
        0.8890987184304168   -0.10074738898810631

Pre-training Unit 4:   -0.6899037353539629
        0.5948100444630466   0.4125940461888872

Changes in Unit 1:   7.25900494158438E-8   -
3.5257471997507395E-8   -6.038103350647361E-8
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -6.587047368666887E-8
        4.4749023708767766E-8   1.0298819790033331E-7

Changes in Unit 4:   -7.239787724877544E-8   -
4.892358640429251E-8   -5.0527463102412185E-8
Overall change of weight: -1.1303063492118515E-7

>>>>>>>>>>Epoch 13:
Post-training Unit 1:   0.5898331616178195   -
0.14582846898273 0.7942486380788324
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649004164612627
        0.8890987756339115   -0.10074725741736125

Post-training Unit 4:   -0.6899038275887597
        0.5948099821322436   0.41259398182016566

Pre-training Unit 1:   0.5898331414810161   -
0.14582845925620064   0.7942486548188787
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649005999735536
        0.8890987631794405   -0.10074728599990841

Pre-training Unit 4:   -0.6899038077518401
        0.5948099955394602   0.4125939956614241

Changes in Unit 1:   2.0136803446924034E-8   -
9.726529359710412E-9   -1.6740046349106308E-8
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -1.8351229091884136E-8
      1.2454471010059365E-8   2.8582547162425698E-8

Changes in Unit 4:   -1.98369195514303E-8   -
1.3407216670202615E-8   -1.3841258417190971E-8
Overall change of weight: -3.0729377820115644E-8

>>>>>>>>>>Epoch 14:
Post-training Unit 1:   0.5898331672038395   -
0.1458284716659254   0.7942486334378348
Post-training Unit 2:   0.5138581861552921
      0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003653356834
      0.8890987791002168   -0.10074724948481963

Post-training Unit 4:   -0.6899038330240486
      0.5948099784580759   0.41259397802855663

Pre-training Unit 1:   0.5898331616178195   -
0.14582846898273 0.7942486380788324
Pre-training Unit 2:   0.5138581861552921
      0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649004164612627
      0.8890987756339115   -0.10074725741736125

Pre-training Unit 4:   -0.6899038275887597
      0.5948099821322436   0.41259398182016566

Changes in Unit 1:   5.586019979908485E-9   -
2.68319541585349E-9   -4.64099758623604E-9
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -5.112557932562822E-9
      3.4663053538608324E-9   7.932541623567602E-9

Changes in Unit 4:   -5.435288885635714E-9   -
3.6741676368023946E-9   -3.791609026748688E-9
Overall change of weight: -8.352949526502229E-9

>>>>>>>>>>Epoch 15:
Post-training Unit 1:   0.5898331687534154   -
0.14582847240610008   0.7942486321511724
Post-training Unit 2:   0.5138581861552921
      0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.4464900351092402
      0.8890987800649521   -0.10074724728330417

Post-training Unit 4:   -0.68990383451331
      0.5948099774511924   0.4125939769899014

Pre-training Unit 1:   0.5898331672038395   -
0.1458284716659254   0.7942486334378348
Pre-training Unit 2:   0.5138581861552921
      0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003653356834
      0.8890987791002168   -0.10074724948481963

Pre-training Unit 4:   -0.6899038330240486
      0.5948099784580759   0.41259397802855663

Changes in Unit 1:   1.5495759120298658E-9   -
7.401746715540725E-10   -1.286662443256148E-9
Changes in Unit 2:   0.0   0.0   0.0

Changes in Unit 3:   -1.4243281554193743E-9
      9.64735291653085E-10   2.201515456046188E-9

Changes in Unit 4:   -1.4892614919048697E-9   -
1.0068835765153494E-9   -1.0386552173891062E-9
Overall change of weight: -2.2701388963097813E-9

>>>>>>>>>>Epoch 16:
Post-training Unit 1:   0.5898331691832703   -
0.14582847261027548   0.7942486317944613
Post-training Unit 2:   0.5138581861552921
      0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003471243204
      0.8890987803334552   -0.10074724667232127

Post-training Unit 4:   -0.6899038349213658
      0.5948099771752619   0.41259397670537723

Pre-training Unit 1:   0.5898331687534154   -
0.14582847240610008   0.7942486321511724
Pre-training Unit 2:   0.5138581861552921
      0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.4464900351092402
      0.8890987800649521   -0.10074724728330417

Pre-training Unit 4:   -0.68990383451331
      0.5948099774511924   0.4125939769899014

Changes in Unit 1:   4.29854929429041E-10   -
2.0417539881023572E-10   -3.56711105098384E-10
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -3.968081419003511E-10
      2.6850310863579807E-10   6.109829031597513E-10

Changes in Unit 4:   -4.0805570034052607E-10   -
2.7593050067054037E-10   -2.845241819926514E-10
Overall change of weight: -6.168640875880982E-10

>>>>>>>>>>Epoch 17:
Post-training Unit 1:   0.5898331693025123   -
0.14582847266659518   0.794248631695568
Post-training Unit 2:   0.5138581861552921
      0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003460188436
      0.8890987804081844   -0.10074724650275696

Post-training Unit 4:   -0.6899038350331724
      0.5948099770996447   0.4125939766274362

Pre-training Unit 1:   0.5898331691832703   -
0.14582847261027548   0.7942486317944613
Pre-training Unit 2:   0.5138581861552921
      0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003471243204
      0.8890987803334552   -0.10074724667232127

Pre-training Unit 4:   -0.6899038349213658
      0.5948099771752619   0.41259397670537723

Changes in Unit 1:   1.19241949664763046E-10   -
5.631969890451671E-11   -9.889322694078828E-11
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -1.105476821194884E-10
      7.472911178751929E-11   1.6956430703984893E-10

Changes in Unit 4:   -1.1180667502941333E-10   -
7.561717918491695E-11   -7.79410425089111E-11

Overall change of weight: -1.675901362130361E-10

>>>>>>>>>>Epoch 18:
Post-training Unit 1:   0.5898331693355898   -
0.14582847268212992   0.7942486316681513
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.4464900345710866
        0.8890987804289828   -0.10074724645569852

Post-training Unit 4:   -0.6899038350638074
        0.5948099770789222   0.4125939766060853

Pre-training Unit 1:   0.5898331693025123   -
0.14582847266659518   0.794248631695568
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003460188436
        0.8890987804081844   -0.10074724650275696

Pre-training Unit 4:   -0.6899038350331724
        0.5948099770996447   0.4125939766274362

Changes in Unit 1:   3.3077540706472064E-11   -
1.5534740160916272E-11   -2.7416735548513316E-11
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -3.0797753236555536E-11
        2.0798474054117833E-11   4.705844047769858E-11

Changes in Unit 4:   -3.063493902999426E-11   -
2.072242377693101E-11   -2.135086552002008E-11
Overall change of weight: -4.552300203464199E-11

>>>>>>>>>>Epoch 19:
Post-training Unit 1:   0.5898331693447656   -
0.1458284726864148   0.7942486316605505
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.4464900345625067
        0.8890987804347715   -0.10074724644263866

Post-training Unit 4:   -0.6899038350722013
        0.5948099770732432   0.41259397660023656

Pre-training Unit 1:   0.5898331693355898   -
0.14582847268212992   0.7942486316681513
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.4464900345710866
        0.8890987804289828   -0.10074724645569852

Pre-training Unit 4:   -0.6899038350638074
        0.5948099770789222   0.4125939766060853

Changes in Unit 1:   9.175771253921994E-12   -
4.284878007965176E-12   -7.600808871188747E-12
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -8.579914556605672E-12
        5.788702850395566E-12   1.3059858749997488E-11

Changes in Unit 4:   -8.393952199980959E-12   -
5.679012815562601E-12   -5.848765916027787E-12
Overall change of weight: -1.2362999513015893E-
11

>>>>>>>>>>Epoch 20:

Post-training Unit 1:   0.5898331693473109   -
0.1458284726875966   0.7942486316584432
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.4464900345601164
        0.8890987804363824   -0.10074724643901424

Post-training Unit 4:   -0.6899038350745013
        0.5948099770716871   0.41259397659863445

Pre-training Unit 1:   0.5898331693447656   -
0.1458284726864148   0.7942486316605505
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.4464900345625067
        0.8890987804347715   -0.10074724644263866

Pre-training Unit 4:   -0.6899038350722013
        0.5948099770732432   0.41259397660023656

Changes in Unit 1:   2.545297306255634E-12   -
1.1818046541378635E-12   -2.1073143230410096E-12
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -2.390310172017962E-12
        1.6108225864286396E-12   3.6244202084034782E-12

Changes in Unit 4:   -2.2999380178134743E-12   -
1.5560885913146194E-12   -1.6021073356853321E-12
Overall change of weight: -3.3570229929225093E-
12

>>>>>>>>>>Epoch 21:
Post-training Unit 1:   0.5898331693480168   -
0.14582847268792257   0.794248631657859
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.4464900345594505
        0.8890987804368309   -0.1007472464380084

Post-training Unit 4:   -0.6899038350751314
        0.5948099770712607   0.4125939765981955

Pre-training Unit 1:   0.5898331693473109   -
0.1458284726875966   0.7942486316584432
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.4464900345601164
        0.8890987804363824   -0.10074724643901424

Pre-training Unit 4:   -0.6899038350745013
        0.5948099770716871   0.41259397659863445

Changes in Unit 1:   7.058797990566745E-13   -
3.2596148002994596E-13   -5.841993555577574E-13
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -6.658562590189376E-13
        4.4853010194856324E-13   1.0058343047347762E-12

Changes in Unit 4:   -6.301625887772389E-13   -
4.2643666375852263E-13   -4.3892667278555564E-13
Overall change of weight: -9.112988141879441E-13

>>>>>>>>>>Epoch 22:
Post-training Unit 1:   0.5898331693482126   -
0.14582847268801247   0.7942486316576972

Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455926506
        0.8890987804369557   -0.10074724643772924

Post-training Unit 4:   -0.689903835075304
        0.5948099770711439   0.41259397659807534

Pre-training Unit 1:   0.5898331693480168   -
0.14582847268792257   0.794248631657859
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.4464900345594505
        0.8890987804368309   -0.1007472464380084

Pre-training Unit 4:   -0.6899038350751314
        0.5948099770712607   0.4125939765981955

Changes in Unit 1:   1.9584334154387761E-13   -
8.990030941902205E-14   -1.617594946878853E-13
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -1.854627562636324E-13
        1.247890679678676E-13   2.791655795419956E-13

Changes in Unit 4:   -1.7252865802674933E-13   -
1.1679546219056647E-13 -1.201816424156732E-13
Overall change of weight: -2.4683033394978793E-
13

>>>>>>>>>Epoch 23:
Post-training Unit 1:   0.5898331693482671   -
0.14582847268803725   0.7942486316576521
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.4464900345592134
        0.8890987804369903   -0.10074724643765179

Post-training Unit 4:   -0.6899038350753512
        0.5948099770711118   0.4125939765980424

Pre-training Unit 1:   0.5898331693482126   -
0.14582847268801247   0.7942486316576972
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455926506
        0.8890987804369557   -0.10074724643772924

Pre-training Unit 4:   -0.689903835075304
        0.5948099770711439   0.41259397659807534

Changes in Unit 1:   5.4511950509095186E-14   -
2.478572902475662E-14   -4.5075054799781356E-14
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -5.168088179630104E-14
        3.4638958368304884E-14 7.745193375541248E-14

Changes in Unit 4:   -4.729550084903167E-14   -
3.2085445411667024E-14 -3.291811268013589E-14
Overall change of weight: -6.723788192886104E-14

>>>>>>>>>Epoch 24:
Post-training Unit 1:   0.5898331693482822   -
0.14582847268804408   0.7942486316576397
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.446490034559199
        0.889098780437 -0.10074724643763029
Post-training Unit 4:   -0.6899038350753642
        0.5948099770711031   0.4125939765980333

Pre-training Unit 1:   0.5898331693482671   -
0.14582847268803725   0.7942486316576521
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.4464900345592134
        0.8890987804369903   -0.10074724643765179

Pre-training Unit 4:   -0.6899038350753512
        0.5948099770711118   0.4125939765980424

Changes in Unit 1:   1.509903313490213E-14   -
6.827871601444713E-15   -1.2434497875801753E-14
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -1.4377388168895777E-14
        9.658940314238862E-15   2.1496693314304594E-14

Changes in Unit 4:   -1.2989609388114332E-14   -
8.770761894538737E-15   -9.103828801926284E-15
Overall change of weight: -1.824929096727601E-14

>>>>>>>>>Epoch 25:
Post-training Unit 1:   0.5898331693482863   -
0.14582847268804594   0.7942486316576362
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919495
        0.8890987804370026   -0.10074724643762431

Post-training Unit 4:   -0.6899038350753678
        0.5948099770711006   0.41259397659803093

Pre-training Unit 1:   0.5898331693482822   -
0.14582847268804408   0.7942486316576397
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.446490034559199
        0.889098780437 -0.10074724643763029
Pre-training Unit 4:   -0.6899038350753642
        0.5948099770711031   0.4125939765980333

Changes in Unit 1:   4.107825191113079E-15   -
1.8596235662471372E-15 -3.552713678800501E-15
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -4.052314039881821E-15
        2.6645352591003757E-15 5.981326545168031E-15

Changes in Unit 4:   -3.552713678800501E-15   -
2.4424906541753444E-15 -2.3869795029440866E-15
Overall change of weight: -5.093148125467906E-15

>>>>>>>>>Epoch 26:
Post-training Unit 1:   0.5898331693482874   -
0.14582847268804644   0.7942486316576353
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.4464900345591937
        0.8890987804370035   -0.10074724643762265

Post-training Unit 4:   -0.6899038350753689
        0.5948099770711 0.41259397659803027

Pre-training Unit 1:   0.5898331693482863   -
0.14582847268804594   0.7942486316576362
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919495
        0.8890987804370026   -0.10074724643762431

Pre-training Unit 4:   -0.6899038350753678
        0.5948099770711006   0.41259397659803093

Changes in Unit 1:   1.1102230246251565E-15   -
4.996003610813204E-16   -8.881784197001252E-16
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -1.2212453270876722E-15
        8.881784197001252E-16   1.6653345369377348E-15

Changes in Unit 4:   -1.1102230246251565E-15 -
6.661338147750939E-16   -6.661338147750939E-16
Overall change of weight: -1.3877787807814457E-
15

>>>>>>>>>Epoch 27:
Post-training Unit 1:   0.5898331693482879   -
0.14582847268804663   0.794248631657635
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.4464900345591936
        0.8890987804370036   -0.1007472464376222

Post-training Unit 4:   -0.6899038350753691
        0.5948099770710998   0.41259397659803004

Pre-training Unit 1:   0.5898331693482874   -
0.14582847268804644   0.7942486316576353
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.4464900345591937
        0.8890987804370035   -0.10074724643762265

Pre-training Unit 4:   -0.6899038350753689
        0.5948099770711 0.41259397659803027

Changes in Unit 1:   4.440892098500626E-16   -
1.942890293094024E-16   -2.220446049250313E-16
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -1.1102230246251565E-16
        1.1102230246251565E-16   4.440892098500626E-16

Changes in Unit 4:   -2.220446049250313E-16   -
1.1102230246251565E-16   -2.220446049250313E-16
Overall change of weight: -8.326672684688674E-17

>>>>>>>>>Epoch 28:
Post-training Unit 1:   0.589833169348288   -
0.14582847268804666   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.4464900345591935
        0.8890987804370037   -0.10074724643762208

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.5898331693482879   -
0.14582847268804663   0.794248631657635
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.4464900345591936
        0.8890987804370036   -0.1007472464376222

Pre-training Unit 4:   -0.6899038350753691
        0.5948099770710998   0.41259397659803004

Changes in Unit 1:   1.1102230246251565E-16   -
2.7755575615628914E-17   -2.220446049250313E-16
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -1.1102230246251565E-16
        1.1102230246251565E-16   1.249000902703301E-16

Changes in Unit 4:   -1.1102230246251565E-16 -
1.1102230246251565E-16   -5.551115123125783E-17
Overall change of weight: -2.914335439641036E-16

>>>>>>>>>Epoch 29:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.14582847268804666   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.4464900345591935
        0.8890987804370037   -0.10074724643762208

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   -2.7755575615628914E-
17   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   -5.551115123125783E-17   0.0
        2.7755575615628914E-17
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: -5.551115123125783E-17

>>>>>>>>>Epoch 30:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0

Overall change of weight: 0.0

>>>>>>>>>>Epoch 31:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 32:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 33:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 34:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 35:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 36:

Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 37:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 38:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 39:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 40:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 41:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348

Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 42:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 43:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 44:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 45:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>>Epoch 46:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>Epoch 47:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>Epoch 48:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>Epoch 49:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>Epoch 50:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>Epoch 51:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

```
Pre-training Unit 1:     0.589833169348288       -
0.1458284726880467     0.7942486316576348
Pre-training Unit 2:     0.5138581861552921
        0.5315774339537505        0.6733314163414174

Pre-training Unit 3:     0.44649003455919345
        0.8890987804370037       -0.10074724643762205

Pre-training Unit 4:     -0.6899038350753692
        0.5948099770710997        0.41259397659803

Changes in Unit 1:      0.0     0.0     0.0
Changes in Unit 2:      0.0     0.0     0.0
Changes in Unit 3:      0.0     0.0     0.0
Changes in Unit 4:      0.0     0.0     0.0
Overall change of weight:       0.0

>>>>>>>>>>Epoch 52:
Post-training Unit 1:    0.589833169348288       -
0.1458284726880467     0.7942486316576348
Post-training Unit 2:    0.5138581861552921
        0.5315774339537505        0.6733314163414174

Post-training Unit 3:    0.44649003455919345
        0.8890987804370037       -0.10074724643762205

Post-training Unit 4:    -0.6899038350753692
        0.5948099770710997        0.41259397659803

Pre-training Unit 1:     0.589833169348288       -
0.1458284726880467     0.7942486316576348
Pre-training Unit 2:     0.5138581861552921
        0.5315774339537505        0.6733314163414174

Pre-training Unit 3:     0.44649003455919345
        0.8890987804370037       -0.10074724643762205

Pre-training Unit 4:     -0.6899038350753692
        0.5948099770710997        0.41259397659803

Changes in Unit 1:      0.0     0.0     0.0
Changes in Unit 2:      0.0     0.0     0.0
Changes in Unit 3:      0.0     0.0     0.0
Changes in Unit 4:      0.0     0.0     0.0
Overall change of weight:       0.0

>>>>>>>>>>Epoch 53:
Post-training Unit 1:    0.589833169348288       -
0.1458284726880467     0.7942486316576348
Post-training Unit 2:    0.5138581861552921
        0.5315774339537505        0.6733314163414174

Post-training Unit 3:    0.44649003455919345
        0.8890987804370037       -0.10074724643762205

Post-training Unit 4:    -0.6899038350753692
        0.5948099770710997        0.41259397659803

Pre-training Unit 1:     0.589833169348288       -
0.1458284726880467     0.7942486316576348
Pre-training Unit 2:     0.5138581861552921
        0.5315774339537505        0.6733314163414174

Pre-training Unit 3:     0.44649003455919345
        0.8890987804370037       -0.10074724643762205

Pre-training Unit 4:     -0.6899038350753692
        0.5948099770710997        0.41259397659803

Changes in Unit 1:      0.0     0.0     0.0
Changes in Unit 2:      0.0     0.0     0.0
Changes in Unit 3:      0.0     0.0     0.0
Changes in Unit 4:      0.0     0.0     0.0
Overall change of weight:       0.0
```

```
>>>>>>>>>>Epoch 54:
Post-training Unit 1:    0.589833169348288       -
0.1458284726880467     0.7942486316576348
Post-training Unit 2:    0.5138581861552921
        0.5315774339537505        0.6733314163414174

Post-training Unit 3:    0.44649003455919345
        0.8890987804370037       -0.10074724643762205

Post-training Unit 4:    -0.6899038350753692
        0.5948099770710997        0.41259397659803

Pre-training Unit 1:     0.589833169348288       -
0.1458284726880467     0.7942486316576348
Pre-training Unit 2:     0.5138581861552921
        0.5315774339537505        0.6733314163414174

Pre-training Unit 3:     0.44649003455919345
        0.8890987804370037       -0.10074724643762205

Pre-training Unit 4:     -0.6899038350753692
        0.5948099770710997        0.41259397659803

Changes in Unit 1:      0.0     0.0     0.0
Changes in Unit 2:      0.0     0.0     0.0
Changes in Unit 3:      0.0     0.0     0.0
Changes in Unit 4:      0.0     0.0     0.0
Overall change of weight:       0.0

>>>>>>>>>>Epoch 55:
Post-training Unit 1:    0.589833169348288       -
0.1458284726880467     0.7942486316576348
Post-training Unit 2:    0.5138581861552921
        0.5315774339537505        0.6733314163414174

Post-training Unit 3:    0.44649003455919345
        0.8890987804370037       -0.10074724643762205

Post-training Unit 4:    -0.6899038350753692
        0.5948099770710997        0.41259397659803

Pre-training Unit 1:     0.589833169348288       -
0.1458284726880467     0.7942486316576348
Pre-training Unit 2:     0.5138581861552921
        0.5315774339537505        0.6733314163414174

Pre-training Unit 3:     0.44649003455919345
        0.8890987804370037       -0.10074724643762205

Pre-training Unit 4:     -0.6899038350753692
        0.5948099770710997        0.41259397659803

Changes in Unit 1:      0.0     0.0     0.0
Changes in Unit 2:      0.0     0.0     0.0
Changes in Unit 3:      0.0     0.0     0.0
Changes in Unit 4:      0.0     0.0     0.0
Overall change of weight:       0.0

>>>>>>>>>>Epoch 56:
Post-training Unit 1:    0.589833169348288       -
0.1458284726880467     0.7942486316576348
Post-training Unit 2:    0.5138581861552921
        0.5315774339537505        0.6733314163414174

Post-training Unit 3:    0.44649003455919345
        0.8890987804370037       -0.10074724643762205

Post-training Unit 4:    -0.6899038350753692
        0.5948099770710997        0.41259397659803

Pre-training Unit 1:     0.589833169348288       -
0.1458284726880467     0.7942486316576348
```

Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>Epoch 57:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>Epoch 58:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>Epoch 59:

Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

>>>>>>>>>Epoch 60:
Post-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Post-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Post-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Post-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Pre-training Unit 1:   0.589833169348288   -
0.1458284726880467   0.7942486316576348
Pre-training Unit 2:   0.5138581861552921
        0.5315774339537505   0.6733314163414174

Pre-training Unit 3:   0.44649003455919345
        0.8890987804370037   -0.10074724643762205

Pre-training Unit 4:   -0.6899038350753692
        0.5948099770710997   0.41259397659803

Changes in Unit 1:   0.0   0.0   0.0
Changes in Unit 2:   0.0   0.0   0.0
Changes in Unit 3:   0.0   0.0   0.0
Changes in Unit 4:   0.0   0.0   0.0
Overall change of weight: 0.0

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