

```
from google.colab import drive
drive.mount('/content/drive')
```

Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.m



```
## nt: Code piece to mount my Google Drive
from google.colab import drive
drive.mount("/content/drive") # my Google Drive root directory will be
```

Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.m



```
# nt: Change the working directory to the work directory (where the code file is).
import os
thisdir = '/content/drive/My Drive/hw3_CodeData'
os.chdir(thisdir)
# Ensure the files are there (in the folder)
!pwd
```

/content/drive/My Drive/hw3\_CodeData

```
# First install this library so that we can import code from other Notebooks
!pip install import-ipynb
import import_ipynb
```

```
↳ Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/r
Requirement already satisfied: import-ipynb in /usr/local/lib/python3.7/dist-packages
Requirement already satisfied: IPython in /usr/local/lib/python3.7/dist-packages (from import-ipynb)
Requirement already satisfied: nbformat in /usr/local/lib/python3.7/dist-packages (from import-ipynb)
Requirement already satisfied: prompt-toolkit<2.1.0,>=2.0.0 in /usr/local/lib/python3.7/dist-packages (from IPython)
Requirement already satisfied: traitlets>=4.2 in /usr/local/lib/python3.7/dist-packages (from IPython)
Requirement already satisfied: setuptools>=18.5 in /usr/local/lib/python3.7/dist-packages (from IPython)
Requirement already satisfied: decorator in /usr/local/lib/python3.7/dist-packages (from IPython)
Requirement already satisfied: backcall in /usr/local/lib/python3.7/dist-packages (from IPython)
Requirement already satisfied: pickleshare in /usr/local/lib/python3.7/dist-packages (from IPython)
Requirement already satisfied: pygments in /usr/local/lib/python3.7/dist-packages (from IPython)
Requirement already satisfied: pexpect in /usr/local/lib/python3.7/dist-packages (from IPython)
Requirement already satisfied: jedi>=0.10 in /usr/local/lib/python3.7/dist-packages (from IPython)
Requirement already satisfied: parso<0.9.0,>=0.8.0 in /usr/local/lib/python3.7/dist-packages (from IPython)
Requirement already satisfied: six>=1.9.0 in /usr/local/lib/python3.7/dist-packages (from IPython)
Requirement already satisfied: wcwidth in /usr/local/lib/python3.7/dist-packages (from IPython)
Requirement already satisfied: jsonschema>=2.6 in /usr/local/lib/python3.7/dist-packages (from nbformat)
Requirement already satisfied: jupyter-core in /usr/local/lib/python3.7/dist-packages (from nbformat)
Requirement already satisfied: importlib-metadata>=3.6 in /usr/local/lib/python3.7/dist-packages (from jupyter-core)
Requirement already satisfied: fastjsonschema in /usr/local/lib/python3.7/dist-packages (from jupyter-core)
Requirement already satisfied: typing-extensions>=3.6.4 in /usr/local/lib/python3.7/dist-packages (from jupyter-core)
Requirement already satisfied: zipp>=0.5 in /usr/local/lib/python3.7/dist-packages (from importlib-metadata)
Requirement already satisfied: importlib-resources>=1.4.0 in /usr/local/lib/python3.7/dist-packages (from importlib-metadata)
Requirement already satisfied: attrs>=17.4.0 in /usr/local/lib/python3.7/dist-packages (from traitlets)
```

Requirement already satisfied: pyrsistent!=0.17.0,!0.17.1,!0.17.2,>=0.14.0 in /usr/  
Requirement already satisfied: ptyprocess>=0.5 in /usr/local/lib/python3.7/dist-packa

```
import NN578_network_nb as network
import numpy as np
from sklearn.model_selection import train_test_split
import matplotlib.pyplot as plt
```

```
importing Jupyter notebook from NN578_network_nb.ipynb
```

```
import NN578_network_nb as network_nb
```

```
iris_data=network_nb.my_load_csv('iris.csv',4,3)
```

```
train_data,test_data=train_test_split(iris_data,test_size=0.30,random_state=None)
```

```
net2=network.Network([4,7,3])
```

```
data_set=net2.SGD(training_data=train_data,epochs=100,mini_batch_size=8,eta=0.2,test_data=
```

```
[Epoch 81] Train: ACC=0.9619, MSE=0.0703, CE=0.6135, LL:0.2830
Valid: ACC=0.9556, MSE=0.0640, CE=0.5859, LL:0.2721
```

```
[Epoch 82] Train: ACC=0.9619, MSE=0.0696, CE=0.6090, LL:0.2808
Valid: ACC=0.9556, MSE=0.0633, CE=0.5814, LL:0.2699
```

```
[Epoch 83] Train: ACC=0.9619, MSE=0.0689, CE=0.6045, LL:0.2786
Valid: ACC=0.9556, MSE=0.0626, CE=0.5770, LL:0.2677
```

```
[Epoch 84] Train: ACC=0.9619, MSE=0.0682, CE=0.6001, LL:0.2765
Valid: ACC=0.9556, MSE=0.0620, CE=0.5727, LL:0.2656
```

```
[Epoch 85] Train: ACC=0.9619, MSE=0.0676, CE=0.5958, LL:0.2744
Valid: ACC=0.9556, MSE=0.0613, CE=0.5684, LL:0.2636
```

```
[Epoch 86] Train: ACC=0.9619, MSE=0.0669, CE=0.5915, LL:0.2724
Valid: ACC=0.9556, MSE=0.0607, CE=0.5643, LL:0.2615
```

```
[Epoch 87] Train: ACC=0.9619, MSE=0.0663, CE=0.5873, LL:0.2704
Valid: ACC=0.9556, MSE=0.0601, CE=0.5602, LL:0.2595
```

```
[Epoch 88] Train: ACC=0.9619, MSE=0.0656, CE=0.5832, LL:0.2684
Valid: ACC=0.9556, MSE=0.0595, CE=0.5561, LL:0.2576
```

```
[Epoch 89] Train: ACC=0.9619, MSE=0.0650, CE=0.5791, LL:0.2665
Valid: ACC=0.9556, MSE=0.0589, CE=0.5522, LL:0.2557
```

```
[Epoch 90] Train: ACC=0.9619, MSE=0.0644, CE=0.5752, LL:0.2646
Valid: ACC=0.9556, MSE=0.0583, CE=0.5483, LL:0.2538
```

```
[Epoch 91] Train: ACC=0.9619, MSE=0.0638, CE=0.5712, LL:0.2627
```

Valid: ACC=0.9556, MSE=0.0577, CE=0.5445, LL:0.2519

[Epoch 92] Train: ACC=0.9619, MSE=0.0632, CE=0.5674, LL:0.2609  
Valid: ACC=0.9556, MSE=0.0572, CE=0.5407, LL:0.2501

[Epoch 93] Train: ACC=0.9619, MSE=0.0627, CE=0.5636, LL:0.2591  
Valid: ACC=0.9556, MSE=0.0566, CE=0.5370, LL:0.2483

[Epoch 94] Train: ACC=0.9619, MSE=0.0621, CE=0.5599, LL:0.2573  
Valid: ACC=0.9556, MSE=0.0561, CE=0.5334, LL:0.2466

[Epoch 95] Train: ACC=0.9619, MSE=0.0616, CE=0.5562, LL:0.2555  
Valid: ACC=0.9556, MSE=0.0556, CE=0.5298, LL:0.2448

[Epoch 96] Train: ACC=0.9619, MSE=0.0611, CE=0.5526, LL:0.2538  
Valid: ACC=0.9556, MSE=0.0551, CE=0.5263, LL:0.2432

[Epoch 97] Train: ACC=0.9619, MSE=0.0605, CE=0.5490, LL:0.2521  
Valid: ACC=0.9556, MSE=0.0546, CE=0.5229, LL:0.2415

[Epoch 98] Train: ACC=0.9619, MSE=0.0600, CE=0.5455, LL:0.2505  
Valid: ACC=0.9556, MSE=0.0541, CE=0.5195, LL:0.2399

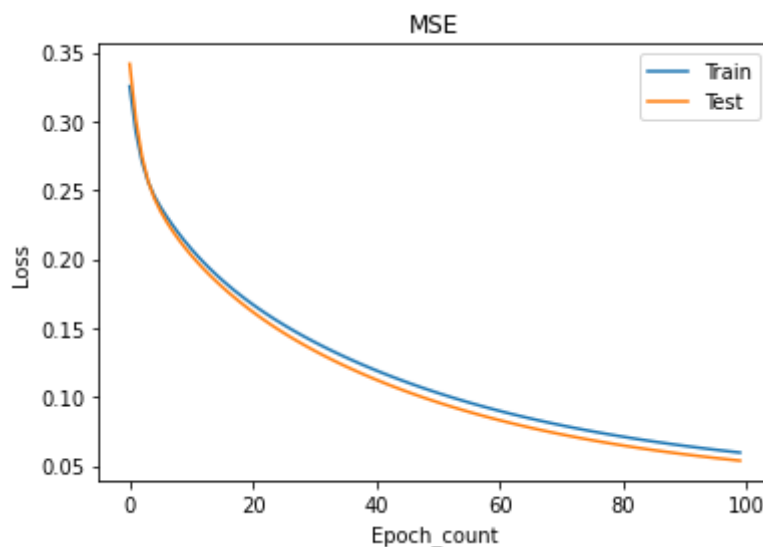
[Epoch 99] Train: ACC=0.9619, MSE=0.0595, CE=0.5421, LL:0.2489  
Valid: ACC=0.9556, MSE=0.0537, CE=0.5161, LL:0.2383

Epoch 99 complete

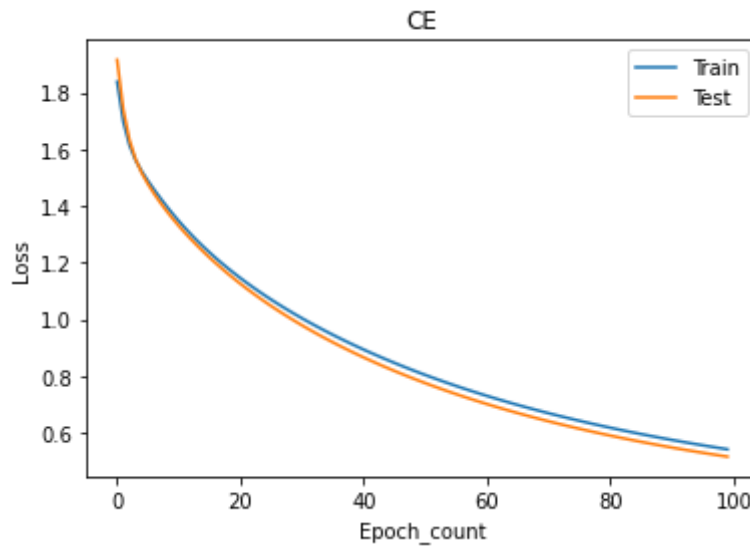
```
data_set=np.array(data_set)
data_set.shape
```

```
(2, 100, 5)
```

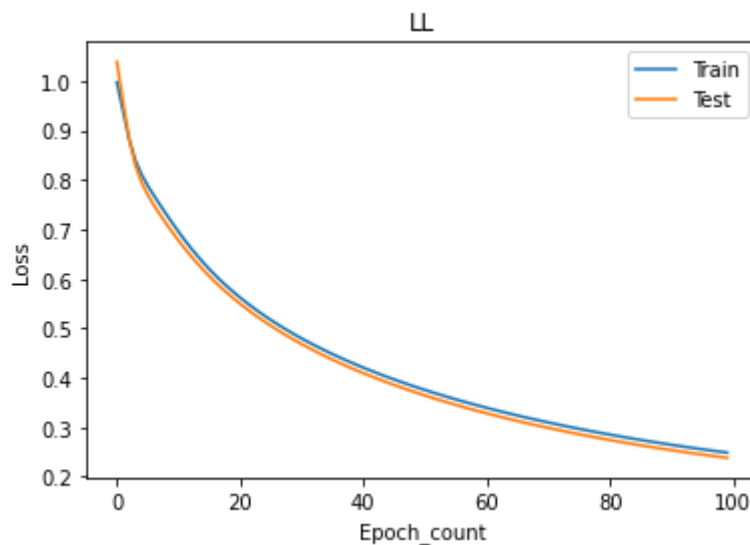
```
plt.plot(data_set[0,:,2],label="Train")
plt.plot(data_set[1,:,2],label="Test")
plt.xlabel("Epoch_count")
plt.ylabel("Loss")
plt.title("MSE")
plt.legend()
plt.show()
```



```
plt.plot(data_set[0,:,3],label="Train")
plt.plot(data_set[1,:,3],label="Test")
plt.xlabel("Epoch_count")
plt.ylabel("Loss")
plt.title("CE")
plt.legend()
plt.show()
```

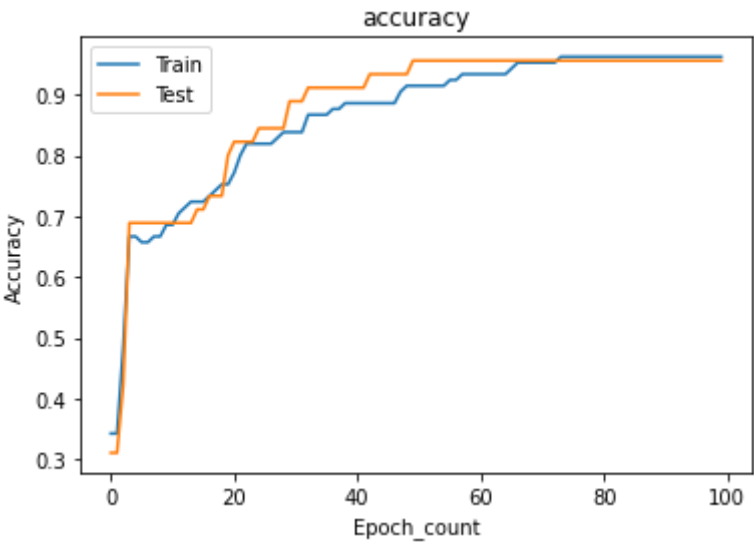


```
plt.plot(data_set[0,:,4],label="Train")
plt.plot(data_set[1,:,4],label="Test")
plt.xlabel("Epoch_count")
plt.ylabel("Loss")
plt.title("LL")
plt.legend()
plt.show()
```



```
plt.plot(data_set[0,:,1],label="Train")
plt.plot(data_set[1,:,1],label="Test")
plt.xlabel("Epoch_count")
plt.ylabel("Accuracy")
plt.title("accuracy")
```

```
plt.legend()  
plt.show()
```



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