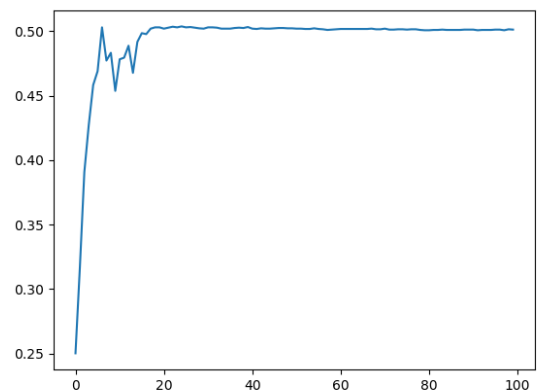
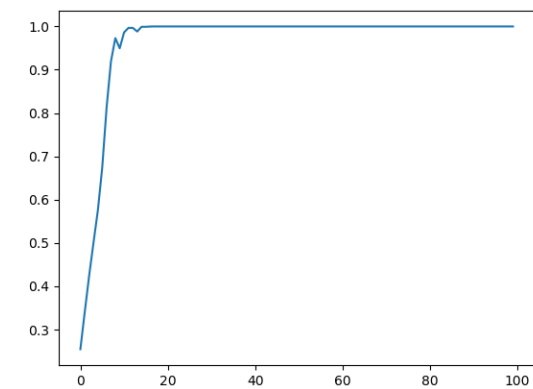
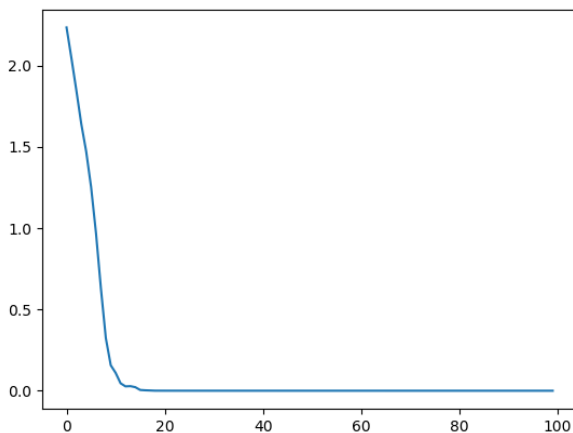


## 1 CNN

- i. Preprocess: resize all picture to 256\*256
- ii. CNN design:
  - batch size: 16
  - learning rate: 0.001
  - optimizer: SGD with momentum=0.9
  - loss function: cross entropy
  - Layers of convolution: 2 (3 channel to 6 channel, 6 to 16)
  - Activation function: RELU
  - Max pooling after both layer
  - kernel size: 5\*5
  - padding: 2
  - stripe: 1
  - DNN fully connection layers: [16\*64\*64, 120, 84, 10]
  - Result:

Learning curve:

training(top) and testing(bottom) accuracy:



## 2 RNN

### i. RNN design

Dictionary: I convert all letter to lower case to reduce the size of dictionary. Result: 2145 words

Input format: one-hot coding for each word, so input size =  $2146 * 10$

Learning rate = 0.005

Batch size = 16

Hidden state size = 128

Output size = 2

Result:

Learning curve:

training(top) and testing(bottom) accuracy:

