

# 資料結構 HW1

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## A. 編譯結果

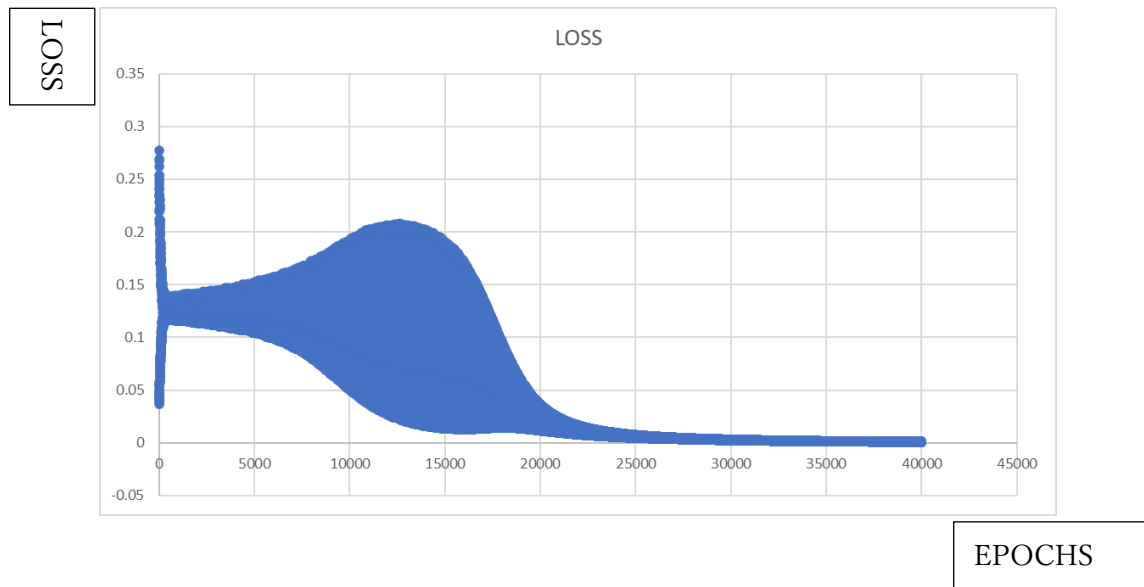
```
penguin@LAPTOP-NP8CU4V0:~/test/.vscode$ gcc -o 108501025_assignmentout_1 108501025_assignment_1.c -lm
penguin@LAPTOP-NP8CU4V0:~/test/.vscode$
```

## B. 執行結果

```
Input:1 1 Output:0.083815 Expected Output:0 Epochs:7754 Loss:0.002820
Input:1 0 Output:0.924866 Expected Output:1 Epochs:7754 Loss:0.003512
Input:0 0 Output:0.077072 Expected Output:0 Epochs:7754 Loss:0.002823
Input:1 0 Output:0.924955 Expected Output:1 Epochs:7755 Loss:0.002970
Input:0 0 Output:0.077066 Expected Output:0 Epochs:7755 Loss:0.002816
Input:0 1 Output:0.924974 Expected Output:1 Epochs:7755 Loss:0.002970
Input:1 1 Output:0.083909 Expected Output:0 Epochs:7755 Loss:0.002814
Input:0 0 Output:0.077006 Expected Output:0 Epochs:7756 Loss:0.003520
Input:0 1 Output:0.924883 Expected Output:1 Epochs:7756 Loss:0.002965
Input:1 0 Output:0.925024 Expected Output:1 Epochs:7756 Loss:0.002821
Input:1 1 Output:0.083890 Expected Output:0 Epochs:7756 Loss:0.002811
Input:0 0 Output:0.076994 Expected Output:0 Epochs:7757 Loss:0.003519
Input:1 1 Output:0.083553 Expected Output:0 Epochs:7757 Loss:0.002964
Input:0 1 Output:0.924719 Expected Output:1 Epochs:7757 Loss:0.003491
Input:1 0 Output:0.924860 Expected Output:1 Epochs:7757 Loss:0.002834
Input:0 0 Output:0.076982 Expected Output:0 Epochs:7758 Loss:0.002823
Input:1 0 Output:0.924949 Expected Output:1 Epochs:7758 Loss:0.002963
Input:0 1 Output:0.925016 Expected Output:1 Epochs:7758 Loss:0.002816
Input:1 1 Output:0.083856 Expected Output:0 Epochs:7758 Loss:0.002811
Input:1 1 Output:0.083567 Expected Output:0 Epochs:7759 Loss:0.003516
Input:0 0 Output:0.076918 Expected Output:0 Epochs:7759 Loss:0.003492
Input:1 0 Output:0.924785 Expected Output:1 Epochs:7759 Loss:0.002958
Input:0 1 Output:0.924852 Expected Output:1 Epochs:7759 Loss:0.002829
Input:0 0 Output:0.076958 Expected Output:0 Epochs:7760 Loss:0.002824
Input:1 1 Output:0.083504 Expected Output:0 Epochs:7760 Loss:0.002961
Input:1 0 Output:0.924801 Expected Output:1 Epochs:7760 Loss:0.003486
Input:0 1 Output:0.924868 Expected Output:1 Epochs:7760 Loss:0.002827
Input:1 0 Output:0.925041 Expected Output:1 Epochs:7761 Loss:0.002822
Input:0 1 Output:0.925107 Expected Output:1 Epochs:7761 Loss:0.002809
Input:1 1 Output:0.083855 Expected Output:0 Epochs:7761 Loss:0.002804
Input:0 0 Output:0.083821 Expected Output:0 Epochs:7768 Loss:0.001717
Input:1 1 Output:0.059434 Expected Output:0 Epochs:9998 Loss:0.001712
Input:1 0 Output:0.945297 Expected Output:1 Epochs:9998 Loss:0.001766
Input:0 1 Output:0.945317 Expected Output:1 Epochs:9998 Loss:0.001496
Input:1 1 Output:0.059447 Expected Output:0 Epochs:9999 Loss:0.001495
Input:0 1 Output:0.945303 Expected Output:1 Epochs:9999 Loss:0.001767
Input:1 0 Output:0.945365 Expected Output:1 Epochs:9999 Loss:0.001496
Input:0 0 Output:0.058533 Expected Output:0 Epochs:9999 Loss:0.001492
Final Hidden Weights
[ [ 3.672178 3.670992 ] [ 5.874518 5.867958 ] ]
Final Hidden Biases
[ -5.610872 -2.422974 ]
Final Output Weights[ -8.068997 7.451116 ]
Final Output Biases
[ -3.355662 ]
Please type 2 inputs (If you want to exit, just press 5) :
0 0
The result is 0!
0 1
The result is 1!
1 0
The result is 1!
1 1
The result is 0!
5
```

## C. 各項分析

### 1. 圖表分析



由上圖表可以發現 LOSS 在一開始很大，經過中間程式之調節(震盪)後，到最後趨近於 0，因此有符合收斂。

### 2. 程式輸出分析

```
Input:0 0 Output:0.058521 Expected Output:0 Epochs:9998 Loss:0.001714
Input:1 1 Output:0.059434 Expected Output:0 Epochs:9998 Loss:0.001712
Input:1 0 Output:0.945297 Expected Output:1 Epochs:9998 Loss:0.001766
Input:0 1 Output:0.945317 Expected Output:1 Epochs:9998 Loss:0.001496
Input:1 1 Output:0.059447 Expected Output:0 Epochs:9999 Loss:0.001495
Input:0 1 Output:0.945303 Expected Output:1 Epochs:9999 Loss:0.001767
Input:1 0 Output:0.945365 Expected Output:1 Epochs:9999 Loss:0.001496
Input:0 0 Output:0.058533 Expected Output:0 Epochs:9999 Loss:0.001492

Final Hidden Weights
[ [ 3.672178 3.670992 ] [ 5.874518 5.867958 ] ]
Final Hidden Biases
[ -5.610872 -2.422974 ]
Final Output Weights[ -8.068997 7.451116 ]
Final Output Biases
[ -3.355662 ]

Please type 2 inputs (If you want to exit, just press 5) :
0 0
The result is 0!
0 1
The result is 1!
1 0
The result is 1!
1 1
The result is 0!
5
```

模型設定

設定之初值及權重

模型驗證

輸入 5 離開程式

### 3. 遇到之問題

這項作業遇到的問題是我對 2 維矩陣轉成指標不太熟悉，因此要想比較久才知道該怎麼打，但打完整個程式之後，已經熟悉很多了。