1.編譯結果

```
root@LAPTOP-Q66SLPHM:/mnt/d/st/109501549_assignment_1# cd src/
root@LAPTOP-Q66SLPHM:/mnt/d/st/109501549_assignment_1/src# gcc -o main main.c neuron.c neuron.h
 layer.c layer.h backprop.h -lm
```

2.執行結果

```
root@LAPTOP-Q66SLPHM:/mnt/d/st/109501549_assignment_1# cd src/
root@LAPTOP-Q66SLPHM:/mnt/d/st/109501549_assignment_1/src# gcc -o main main.c neuron.c neuron.h
 layer.c layer.h backprop.h -lm
root@LAPTOP-Q66SLPHM:/mnt/d/st/109501549_assignment_1/src# ./main
Enter the number of Layers in Neural Network:
```

```
Enter the number of Layers in Neural Network:
4
Enter number of neurons in layer[1]:
2
Enter number of neurons in layer[2]:
4
Enter number of neurons in layer[3]:
4
Enter number of neurons in layer[4]:
1

Neuron 1 in Layer 1 created
Neuron 2 in Layer 1 created

Neuron 1 in Layer 2 created
Neuron 2 in Layer 2 created
Neuron 3 in Layer 2 created
Neuron 4 in Layer 2 created

Neuron 1 in Layer 3 created
Neuron 2 in Layer 3 created
Neuron 3 in Layer 3 created
Neuron 4 in Layer 3 created

Neuron 1 in Layer 4 created
```

```
Neural Network Created Successfully...

Enter the learning rate (Usually 0.15):
0.15

Enter the number of training examples:
4

Enter the Inputs for training example[0]:
0 0

Enter the Inputs for training example[1]:
0 1

Enter the Inputs for training example[2]:
1 0

Enter the Inputs for training example[3]:
1 1

Enter the Desired Outputs (Labels) for training example[0]:
0

Enter the Desired Outputs (Labels) for training example[1]:
1

Enter the Desired Outputs (Labels) for training example[2]:
1
```

```
Enter the Desired Outputs (Labels) for training example[3]:
0

Training......

Enter input to test:
0 0
Output: 0

Enter input to test:
0 1
Output: 1

Enter input to test:
1 0
Output: 1

Enter input to test:
1 1
Output: 0
```

3.分析

　　數據結果和 XOR 的真值表吻合，訓練成功。

XOR Truth Table		
Input X1	Input X2	Output Y
0	0	0
0	1	1
1	0	1
1	1	0

　　下圖說明 XOR 並非以線性模型就可預測輸出結果，無法用一條線劃分成兩類(0 和 1)，所以需要 NN，並透過 activation function 非線性函數和 loss function 的配合，反覆訓練成非線性模型。

Linear Inseparable case (XOR)