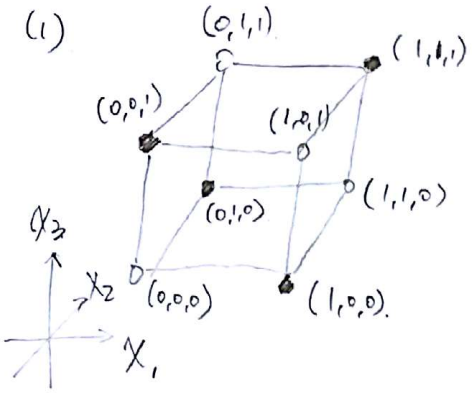
Neural Networks HW1. R06922048 陳柏瑋 資工碩一

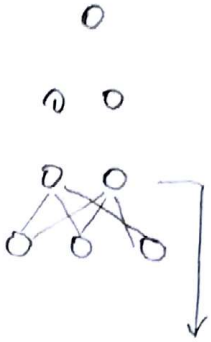
※1.

(1)



X_1	X_2	X_3	XOR
0	0	0	0
1	0	0	1
0	1	0	1
1	1	0	0
0	0	1	1
1	0	1	0
0	1	1	0
1	1	1	1

3-2-2-1

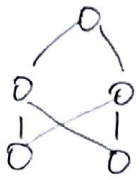


two neural cannot cut 3 hyper plane.

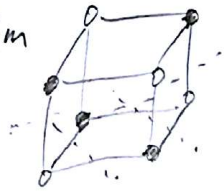
(2)

1°, 2-dim

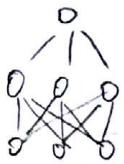
X_1	X_2	XOR
0	0	0
0	1	1
1	0	1
1	1	0



3-dim



X_1	X_2	X_3	XOR
0	0	0	0
1	0	0	1
⋮	⋮	⋮	⋮



we can use 3rd hyper plane to cut 3rd dimension.

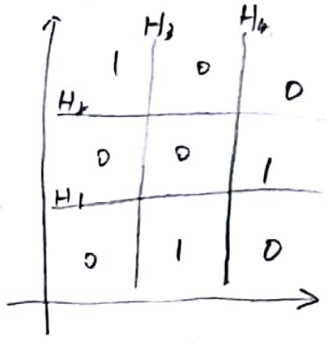
2°. Similar to previous 2-dim & 3-dim description, if k-1 dim (k-1 input) is able to accomplish the k-1 - k-1 -1 network XOR function, we can use kst hyper plane to implement k-dim XOR function.

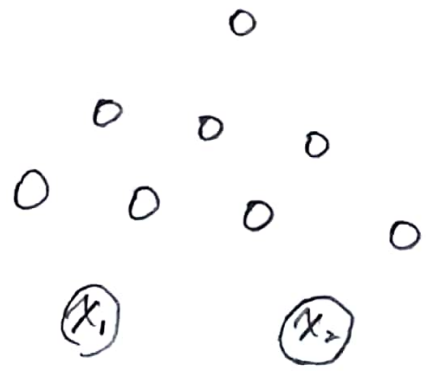
3°. By methamatical reduction, we can prove that N-N-1 network is able to accomplish the N input XOR function.

#2 (1) Let "o" represent 0, "x" represent 1

Thus

(3rd Layer)

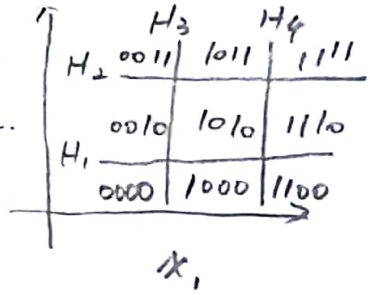




Let H_1, H_2, H_3 & H_4 be the 1st layer's hyperplane

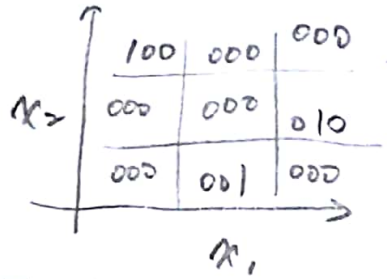
Thus we've got:

(1st Layer)

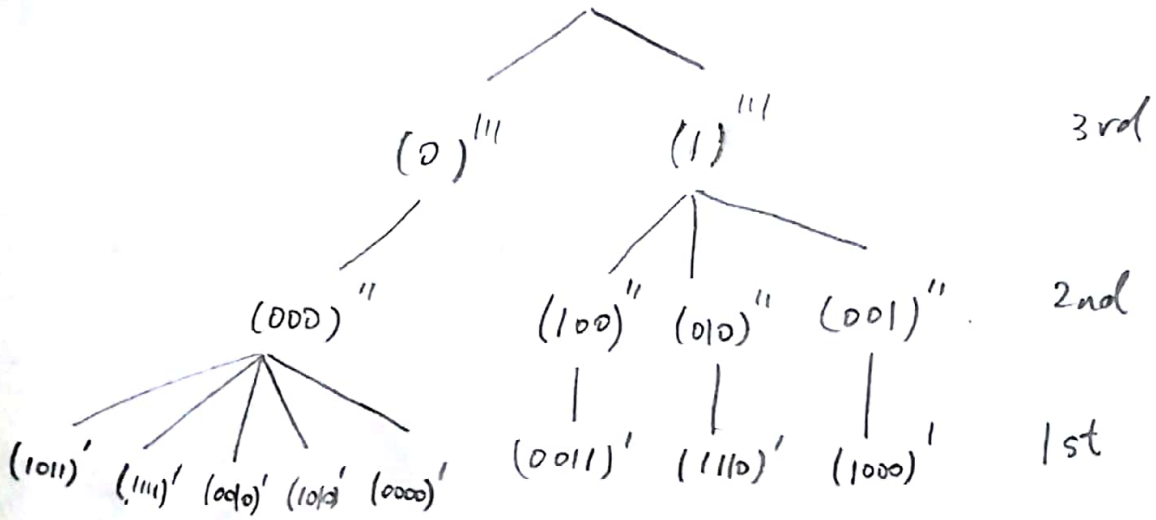


Let 3 nodes in 2nd layer be 2st hyperplane

(2st layer)



So hidden Tree:



(2) (1,3) would be on (0010)', (000)'' and (0)'''

3-2

(2-4-3-1)

Because the output target [-1, 1] so I use tanh function