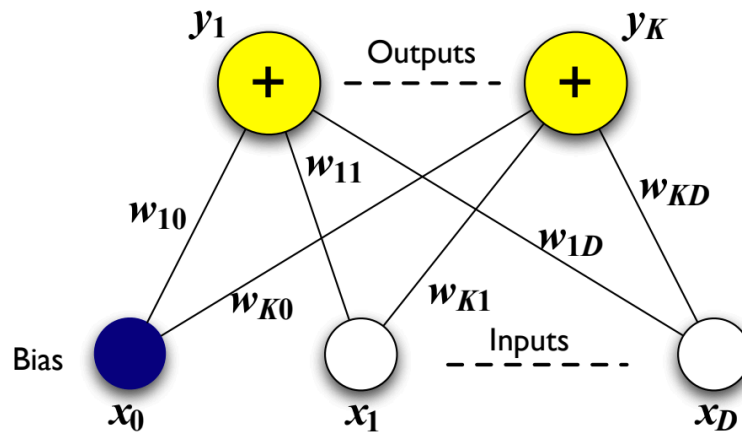


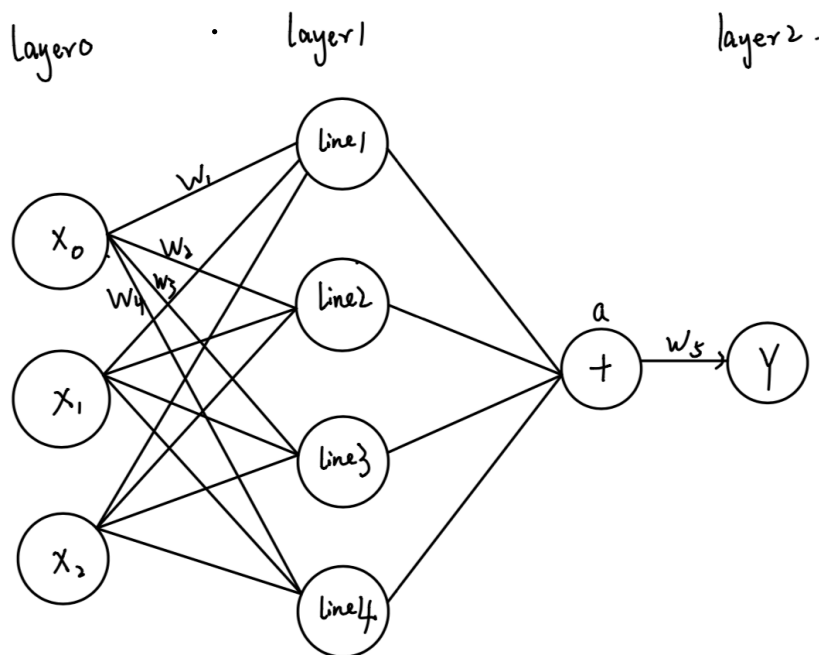
## 2.3

The structure of the network

This is the sample single layer neural network graph from note11.



for this this problem.



How to find the weight?

We know the area that inside and periphery of Polygon\_A as class1, and the outside as class 0. We know the 4 vertex node of polygon, so that we could draw four lines and they will cross each other and form a polygon. We could get a function like  $y = kx + b$  by each two vertex node. the weight is  $[-b \ -k \ 1]$  or  $[b \ k \ -1]$ , which depend on the line above the class1 node or below class 1 node. if the line above the class1 node,  $kx + b - y > 0$ , so weight is  $[b, k, -1]$ , if

the line below the class 1 node,  $y - kx - b > 0$ , weight is  $[-b, -k, 1]$ . So we could get 4 weight base on four line function and then we should think one more weight(perceptron), this weight could help network output 1 if the input is 1111 and other output 0.

#### Task2.10

The different between sNN\_AB and hNN\_AB:

The output of sNN\_AB() is real number but hNN\_AB() will output only 1 or 0. So we should increase the weight to let  $1/(1+e^{-a})$  close to  $a$ , which could make the real number output by sNN\_AB() change to 0 or 1. The graph of sNN and hNN will be same.

