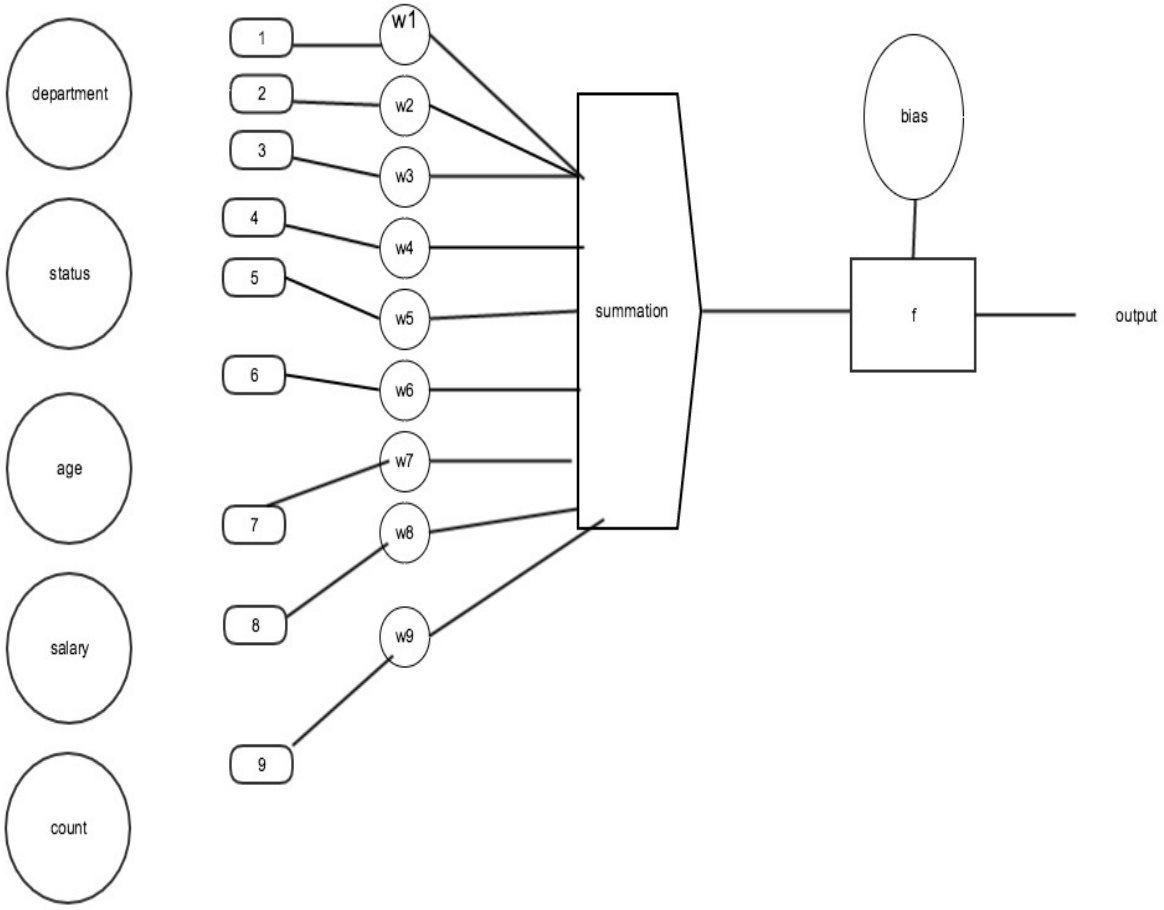
**Data Mining Assignment 5 Shivani Sharma(SHARMSHI)**

1)




B) For calculating the weight according to back propagation algorithm
a)we have to know learning rate (I) of problem.
Input values will be given and we have to calculate output values of hidden layer and output layer. Intial input values ,weight and bias values will be given
b)For calculating $Ij=\Sigma Wij\ Oj + \theta j$
In the given example from book we want to calculate input value of
4= x1w14+x2w24+x3w34+θ4
c)For output we have to calculate Oj=1/1+e-ij

We know Iij from net input then we can easily calculate Oij
d) calculation of error at each node
Errj= Oj(1-Oj)(Tj -Oj)
The above formula is for last node 6
For $5^{th}$ node we have to just modify the error value of 6 will be also included and weight value of W56 will also included.

2)a) The given Hyperplane passing through points( 6,0) and (2,8)
we are considering only two points

ax+by=c
6a=c
2a+8b=c
solving above equations I get
a=c\6
b= c\12
the equation will be
2x+y=12

2x+y-12=0

The equation of second hyperplane is
Ax+by=c
2a=c
5a+5b=c
solving these 2 equations
a=c\2
b=-3c\10
5x-3y=10

b)1) Supporting vectors of one plane
we know that 2x+y-12=0
we apply constraints
2x+y-12=-1
2x+y-12=1

hence supporting vectors for first plane is (3,4) ,(2,6) below the plane
(6,2) above the plane

2) 5x-3y-10=0
supporting vector for second plane is (1,1) ,(2,2.5),(3,4) and ((7,6)

c) which plane has largest margin that plane is better
for h1(x)=0
2\||w|| = 0.896

similarly we have calculated for second plane

from our calculation we have concluded that first hyperplane is better.