



```

repeat
  for each e in examples do
    for each node j in the input layer do  $a_j \leftarrow x_j[e]$ 
    for  $\ell = 2$  to  $M$  do
       $in_i \leftarrow \sum_j W_{j,i} a_j$ 
       $a_i \leftarrow g(in_i)$ 
    for each node i in the output layer do
       $\Delta_i \leftarrow g'(in_i) \times (y_i[e] - a_i)$ 
    for  $\ell = M - 1$  to 1 do
      for each node j in layer  $\ell$  do
         $\Delta_j \leftarrow g'(in_j) \sum_i W_{j,i} \Delta_i$ 
      for each node i in layer  $\ell + 1$  do
         $W_{j,i} \leftarrow W_{j,i} + \alpha \times a_j \times \Delta_i$ 
  until some stopping criterion is satisfied

```

Sigmoid activation function

Learning rate 0.7

Fill in the table independently of prior weight adjustments

https://www.tinkershop.net/ml/sigmoid_calculator.html

XOR FFNet

X1	X2	y	h_1	h_2	h'_1	h'_2	O	O'	E	Δw_{h1-o}	Δw_{h2-o}	w_{h1-o}	w_{h2-o}
0	0	0	0.5	0.5	0.25	0.25	0.7310	0.1966	-0.1437	-0.0503	-0.0503	0.9496	0.9496
0	1	1	0.2689	0.7310	0.1966	0.1966	0.7310	0.1966	0.0528	0.0099	0.0270	1.0099	1.0270
1	0	1	0.7310	0.2689	0.1966	0.1966	0.7310	0.1966	0.0528	0.0270	0.0099	1.0270	1.0099
1	1	0	0.5	0.5	0.25	0.25	0.7310	0.1966	-0.1437	-0.0503	-0.0503	0.9796	0.9796

X1	X2	E_{h1}	E_{h2}	Δw_{x1-h1}	Δw_{x1-h2}	w_{x1-h1}	w_{x1-h2}	Δw_{x2-h1}	Δw_{x2-h2}	w_{x2-h1}	w_{x2-h2}
0	0	-0.0359	-0.0359	0	0	1	-1	0	0	-1	1
0	1	0.0103	0.0103	0	0	1	-1	0.0072	0.0072	-0.9927	1.0072
1	0	0.0103	0.0103	0.0072	0.0072	1.0072	-0.9927	0	0	-1	1
1	1	-0.0359	-0.0359	-0.0251	-0.0251	0.9748	-1.0251	-0.0251	-0.0251	-1.0251	0.9748