```
import math, random

def s(x):
    return 1/(1+math.exp(-x))

def ds(y):
    return y*(1-y)

X=[[0,0],[0,1],[1,0],[1,1]]
Y=[0,1,1,0]

w1=[[random.random(),random.random()],[random.random(),random.random()]]
w2=[random.random(),random.random()]
b1=[random.random(),random.random()]
b2=random.random()

lr=0.5

for _ in range(5000):
    for x,y in zip(X,Y):
        h=[s(x[0]*w1[0][i]+x[1]*w1[1][i]+b1[i]) for i in range(2)]
        o=s(h[0]*w2[0]+h[1]*w2[1]+b2)
        d_o=(y-o)*ds(o)
        d_h=[d_o*w2[i]*ds(h[i]) for i in range(2)]
        for i in range(2):
            w2[i]+=lr*d_o*h[i]
            w1[0][i]+=lr*d_h[i]*x[0]
            w1[1][i]+=lr*d_h[i]*x[1]
            b1[i]+=lr*d_h[i]
        b2+=lr*d_o
```

```
for x in X:
    h=[s(x[0]*w1[0][i]+x[1]*w1[1][i]+b1[i]) for i in range(2)]
    o=s(h[0]*w2[0]+h[1]*w2[1]+b2)
    print(x,round(o))
```

OUTPUT: