

# Not, And, and Or

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## 1 Not

$$y = \frac{1}{1 + e^{100x-36}}$$

## 2 And

$$y = \frac{1}{1 + e^{-66(x_1+x_2)+100}}$$

## 3 Or

$$y = \frac{1}{1 + e^{-100(x_1+x_2)+63}}$$

## 4 Code

*#Expected to use Python 3!!*

```
from math import e
```

```
def f(w, b, x):  
    return 1 / (1 + (e ** (-w * x + b)))
```

```
def g(w,b,x,y):  
    return 1 / (1 + (e ** (-w * (x+y) + b)))
```

*# not*

*# [0,1]*

*# [1,0]*

```
def singleValueHillClimbing(xs, ys):  
    bestW = 0  
    bestB = 0
```

```

bestError = 100000000
w = 100
b = 100
while w > -100:
    while b > -100:
        # print(w,b)
        currError = 0
        for i in range(len(xs)):
            currError += (ys[i] - f(w, b, xs[i])) ** 2
        # print(w,b,currError)
        if(currError < bestError):
            bestError = currError
            bestW = w
            bestB = b
            print(bestW, bestB, currError)

        b -= .1
    b = 100
    w -= .1

# # AND
# # 0 -> 0 -> 0
# # 0 -> 1 -> 0
# # 1 -> 0 -> 0
# # 1 -> 1 -> 1
# [0,0,1,1]
# [0,1,0,1]
# [0,0,0,1]

# # OR
# # 0 -> 0 -> 0
# # 0 -> 1 -> 1
# # 1 -> 0 -> 1
# # 1 -> 1 -> 1
# [0,0,1,1]
# [0,1,0,1]
# [0,1,1,1]
def doubleValueHillClimbing(xs, ys, zs):
    bestW = 0
    bestB = 0
    bestError = 100000000
    w = 100
    b = 100
    while w > -100:
        while b > -100:
            # print(w,b)
            currError = 0

```

```

for i in range(len(xs)):
    currError += (zs[i] - g(w, b, xs[i], ys[i])) ** 2
# print(w,b,currError)
if(currError < bestError):
    bestError = currError
    bestW = w
    bestB = b
    print(bestW, bestB, currError)
b -= .1
b = 100
w -= .1

```