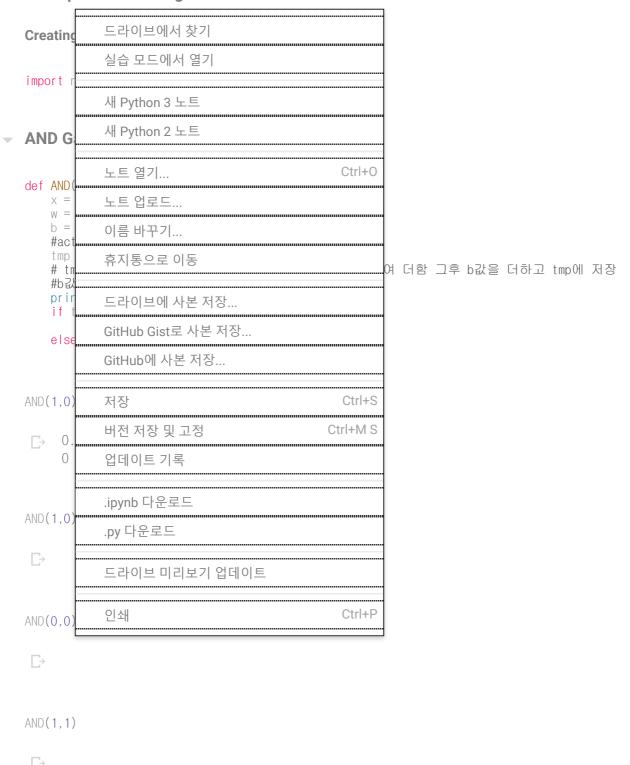
## Perceptrons - Making Predictions



## NAND Gate

```
def NAND(x1, x2):
    x = np.array([x1, x2])
    w = np.array([-0.5, -0.5])
    b = 0.7
    tmp = w[0]*x[0] + w[1]*x[1] + b
    if tmp <= 0:
        return 0
else:</pre>
```

```
return 1
```

```
NAND(0,0)

NAND(1,0)

NAND(0,1)

NAND(1,1)
```

## OR Gate

```
def OR(x1, x2):
    x = np.array([x1, x2])
    w = np.array([0.5, 0.5])
    b = -0.2
    tmp = np.sum(w*x) + b
    if tmp <= 0:
        return 0
    else:
        return 1

OR(0,0)

OR(1,0)

OR(1,1)</pre>
```

## XOR Gate

```
def XOR(x1, x2):
    s1 = NAND(x1, x2)
    s2 = OR(x1, x2)
    y = AND(s1, s2)
    return y

XOR(0,0)

XOR(1,1)

XOR(0,1)
```

XOR cannot be expressed as a single layer Perceptron.