

Meta Pitts Neuron (AND & OR Gates)

```
import numpy as np
def mp_neuron(x,w,theta):
    return 1 if np.dot(x, w) >= theta else 0

print("-----AND GATE-----")

# AND Gate
w_and = np.array ([1,1])
theta_and = 2
for x in [(0,0), (0,1), (1,0), (1,1)]:
    print(x, mp_neuron(np.array(x), w_and, theta_and))

print("-----OR GATE-----")

# OR Gate
w_or = np.array ([1,1])
theta_or = 1
for x in [(0,0), (0,1), (1,0), (1,1)]:
    print(x, mp_neuron(np.array(x), w_or, theta_or))

print("+"-----+")
print("Gaurav Mehra, 1/23/SET/BCS/423")
print("22 January 2026")

*** -----AND GATE-----
(0, 0) 0
(0, 1) 0
(1, 0) 0
(1, 1) 1
-----OR GATE-----
(0, 0) 0
(0, 1) 1
(1, 0) 1
(1, 1) 1
+-----+
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```

AND & OR GATE(3-inputs)

```
import numpy as np
def mp_neuron(x,w,theta):
    return 1 if np.dot(x, w) >= theta else 0

print("-----AND GATE(3-inputs)-----")

w_and = np.array ([1,1,1])
theta_and = 3
for x in [(0,0,0), (0,0,1), (0,1,0), (0,1,1), (1,0,0), (1,0,1), (1,1,0), (1,1,1)]:
    print(x, mp_neuron(np.array(x), w_and, theta_and))

print("-----OR GATE(3-inputs)-----")

w_or = np.array ([1,1,1])
theta_or = 1
for x in [(0,0,0), (0,0,1), (0,1,0), (0,1,1), (1,0,0), (1,0,1), (1,1,0), (1,1,1)]:
    print(x, mp_neuron(np.array(x), w_or, theta_or))

print("+"-----+")
print("Gaurav Mehra, 1/23/SET/BCS/423")
print("22 January 2026")

*** -----AND GATE(3-inputs)-----
(0, 0, 0) 0
(0, 0, 1) 0
(0, 1, 0) 0
(0, 1, 1) 0
(1, 0, 0) 0
(1, 0, 1) 0
(1, 1, 0) 0
(1, 1, 1) 1
-----OR GATE(3-inputs)-----
(0, 0, 0) 0
(0, 0, 1) 1
(0, 1, 0) 1
(0, 1, 1) 1
(1, 0, 0) 1
(1, 0, 1) 1
(1, 1, 0) 1
(1, 1, 1) 1
+-----+
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22 January 2026
```

Artificial Neuron

```
| import numpy as np
2
3
4     def art_neuron(x, w, b, activation='step'):
5         z = np.dot(x, w) + b
6
7             if activation == 'step':
8                 return 1 if z >= 0 else 0
9             elif activation == 'sigmoid':
10                 return 1 / (1 + np.exp(-z))
11             elif activation == 'relu':
12                 return max(0, z)
13             else:
14                 return "Invalid Activation Function"
15
16 x = np.array([1,2])
17 w = np.array([0.5,1.5])
18 b = -1
19
20 print("-----")
21 print("Step Output      : ", art_neuron(x, w, b, activation='step'))
22 print("-----")
23 print("Sigmoid Output   : ", art_neuron(x, w, b, activation='sigmoid'))
24 print("-----")
25 print("ReLU Output      : ", art_neuron(x, w, b, activation='relu'))
26
27 print("-----+-----+")
28 print("Gaurav Mehra, 1/23/SET/BCS/423")
29 print("22 January 2026")
30
31
32 *** -----
33 Step Output      : 1
34 -----
35 Sigmoid Output   : 0.9241418199787566
36 -----
37 ReLU Output      : 2.5
38 -----+-----+
39 Gaurav Mehra, 1/23/SET/BCS/423
40 22 January 2026
```