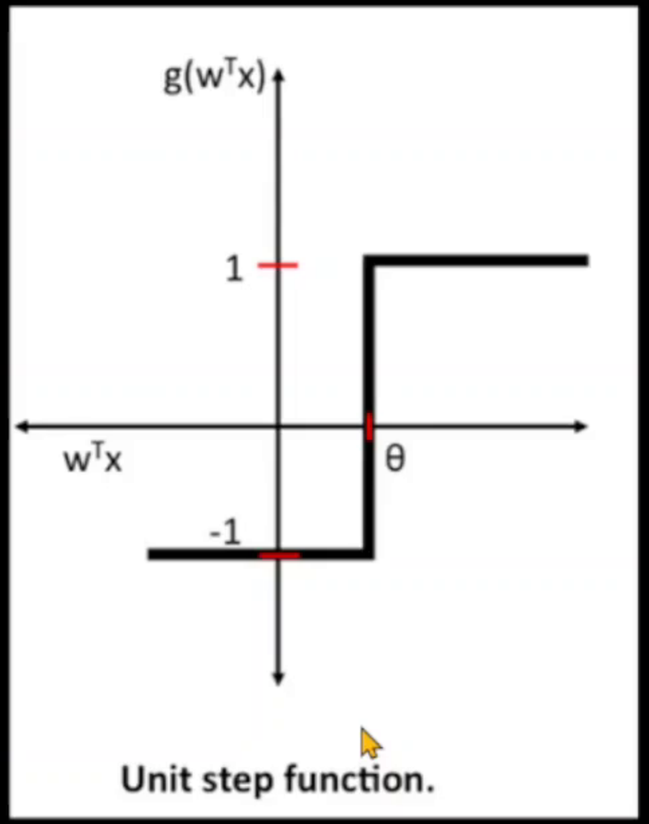
ACTIVATION FUNCTIONS



Unit step function.

STEP ACTIVATION

Step Function

ML For Nerds

Step Function

ML For Nerds

Step Function

ML For Nerds

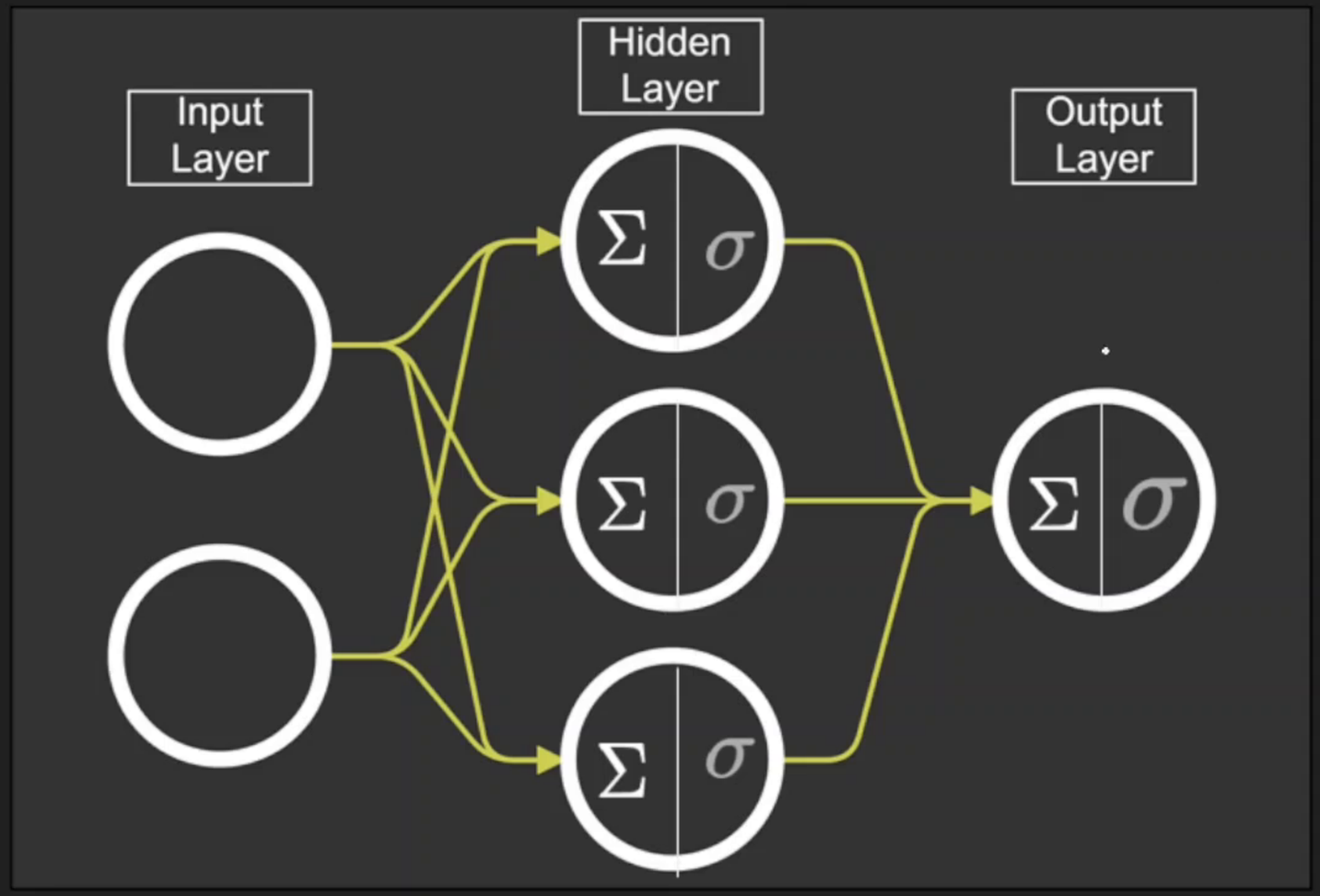
Step Function

ML For Nerds

Step Function

ML For Nerds

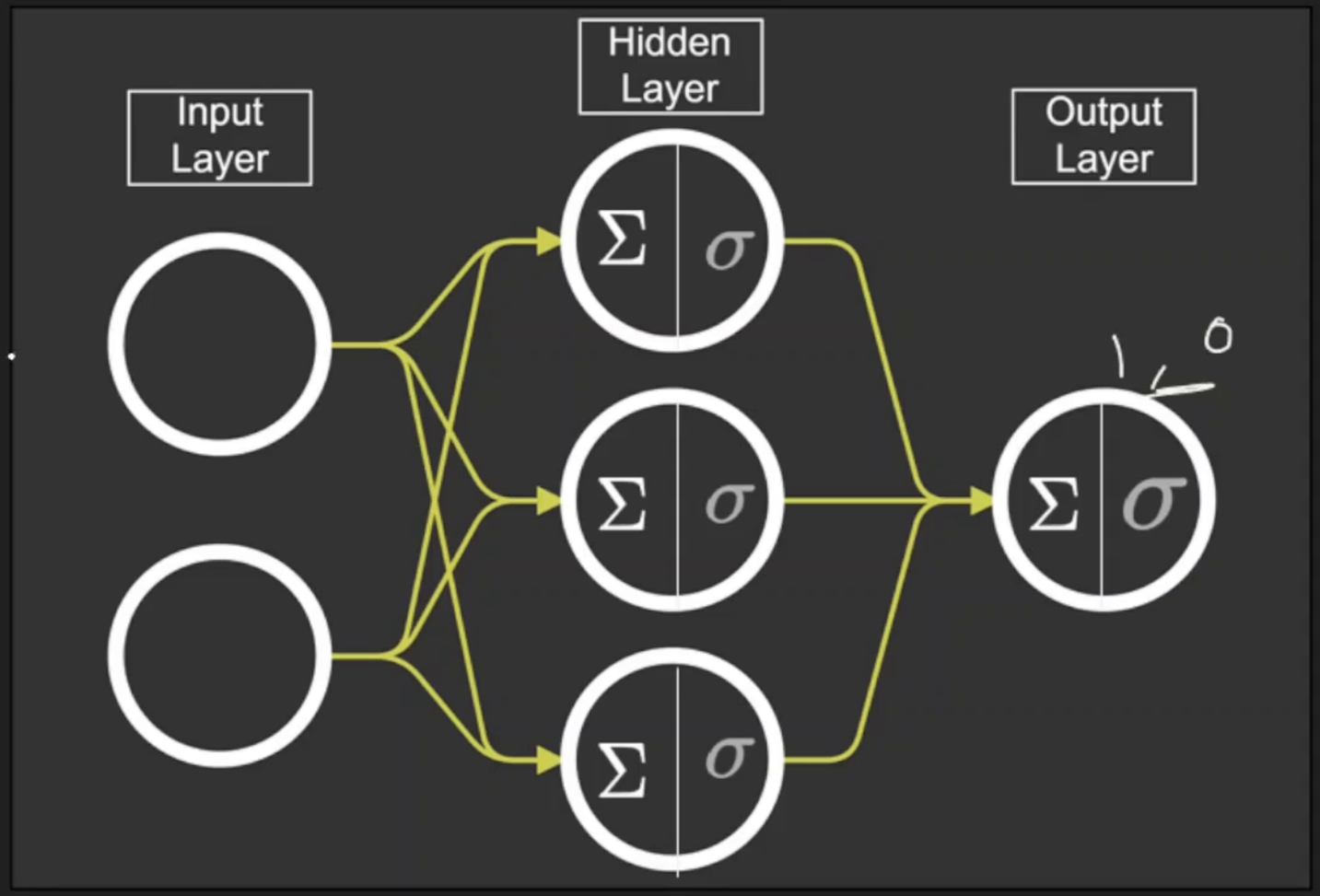
Binary Classification



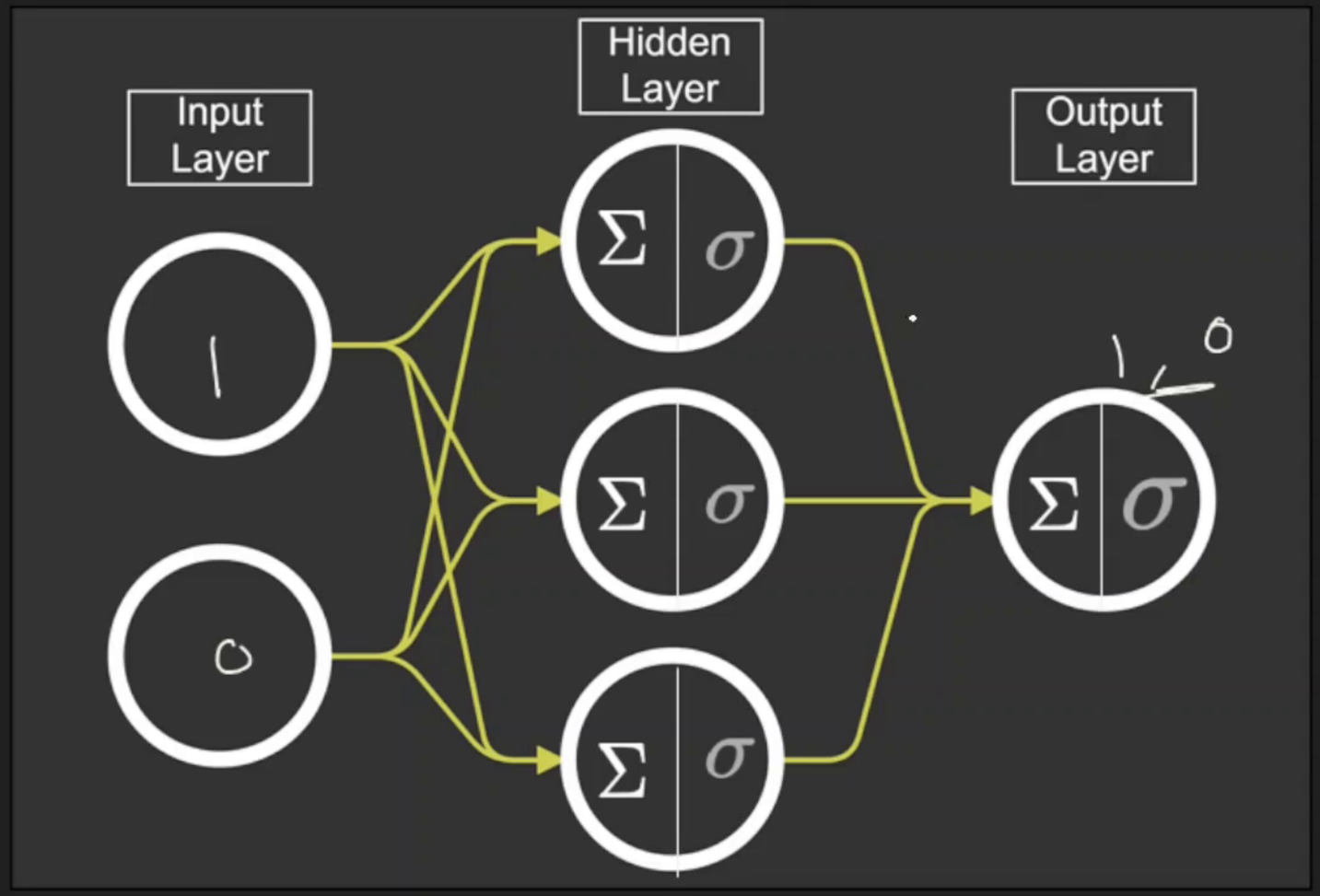
Inputs: [1,0]
Weights-1: [[1,2],
[2,3],
[3,4]]
Weights-2: [1,2,3]

Binary Classification

Inputs: [1,0]
Weights-1: [[1,2],
[2,3],
[3,4]]
Weights-2: [1,2,3]



Binary Classification

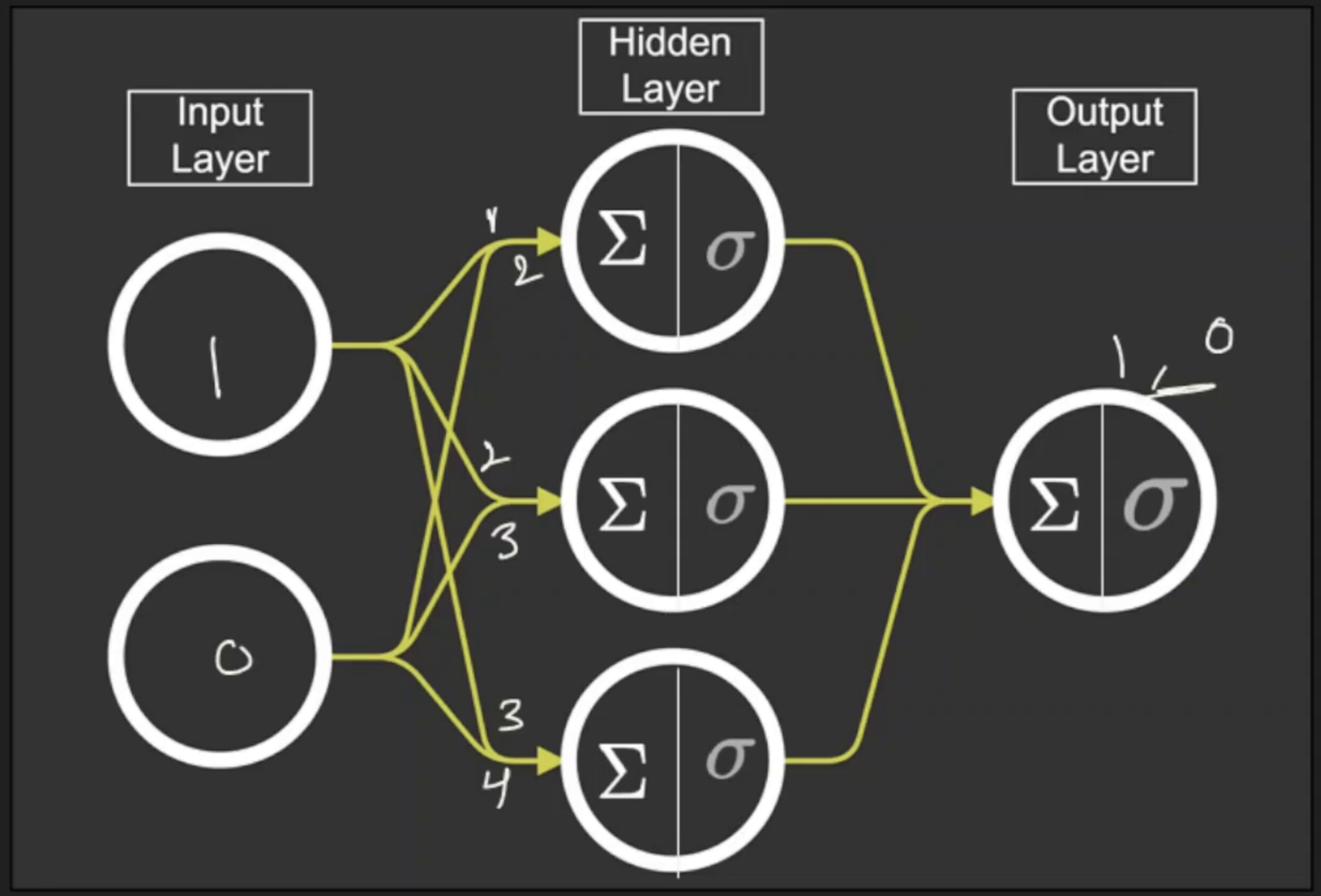


Inputs: [1,0]

Weights-1: [[1,2],
[2,3],
[3,4]]

Weights-2: [1,2,3]

Binary Classification



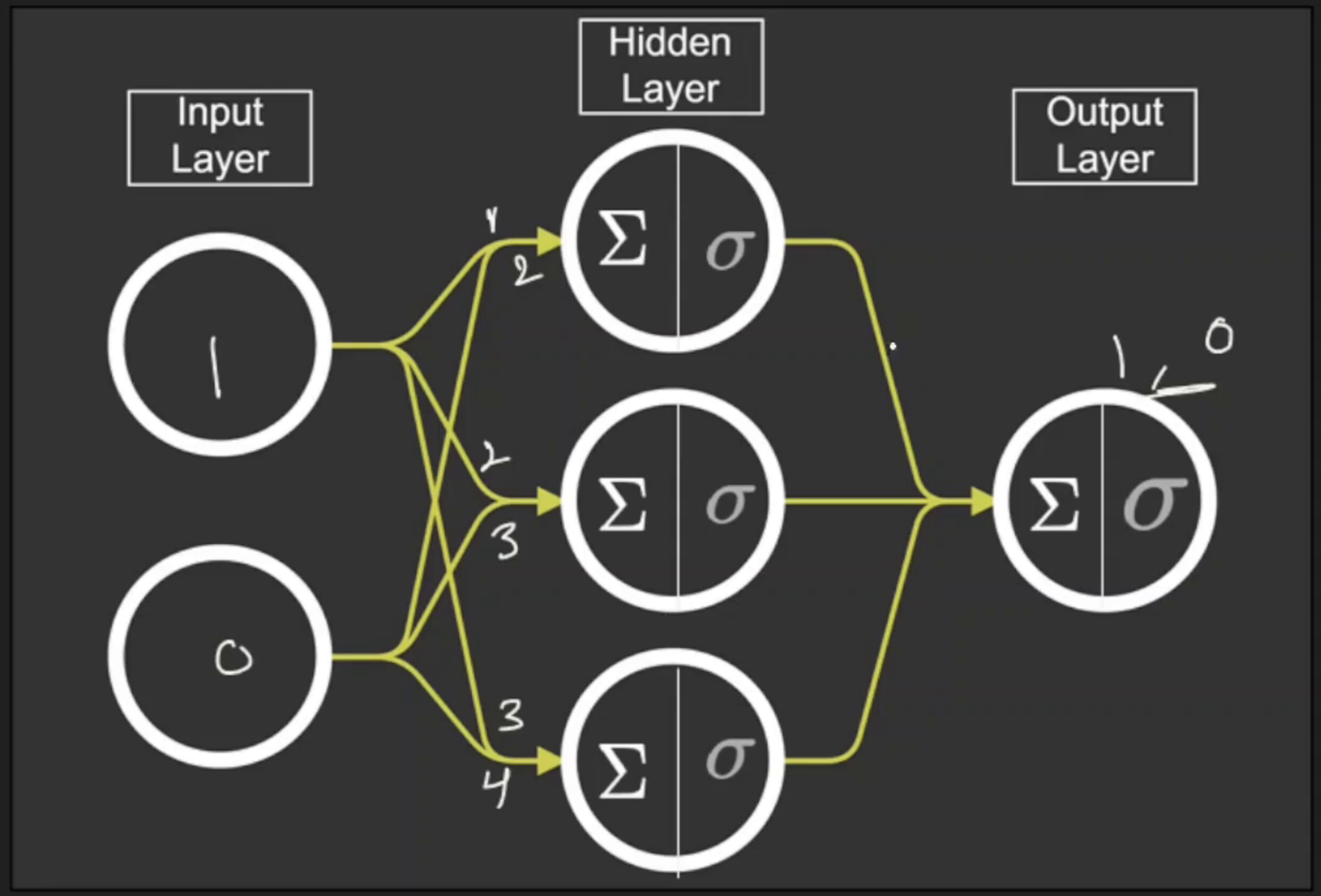
Inputs: [1,0]

Weights-1: [[1,2],
[2,3],
[3,4]]

Weights-2: [1,2,3]

$1 \times 1 + 0 \times 2$

Binary Classification



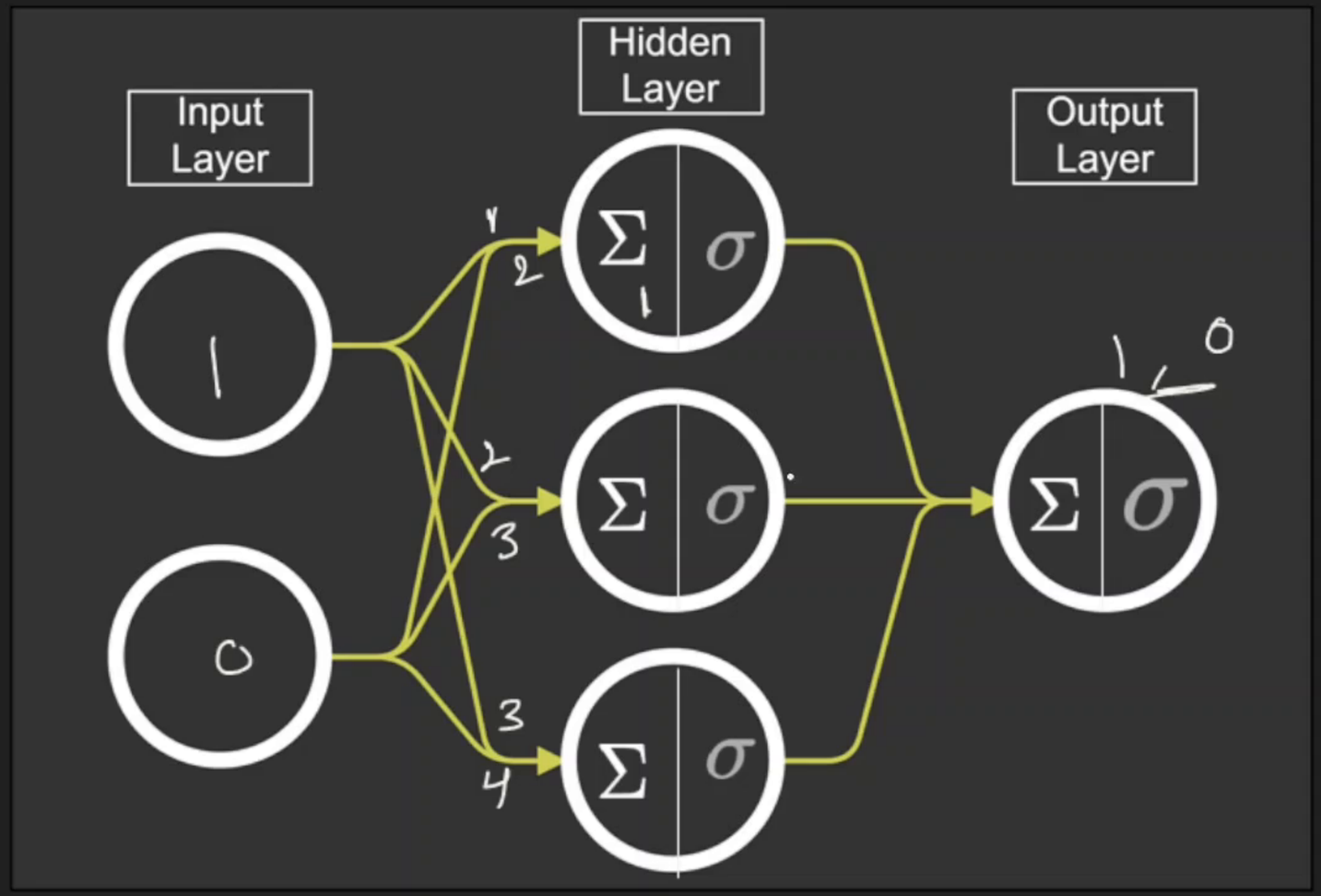
Inputs: [1,0]

Weights-1: [[1,2],
[2,3],
[3,4]]

Weights-2: [1,2,3]

$1 \times 1 + 0 \times 2 \rightarrow 1$

Binary Classification



Inputs: [1,0]

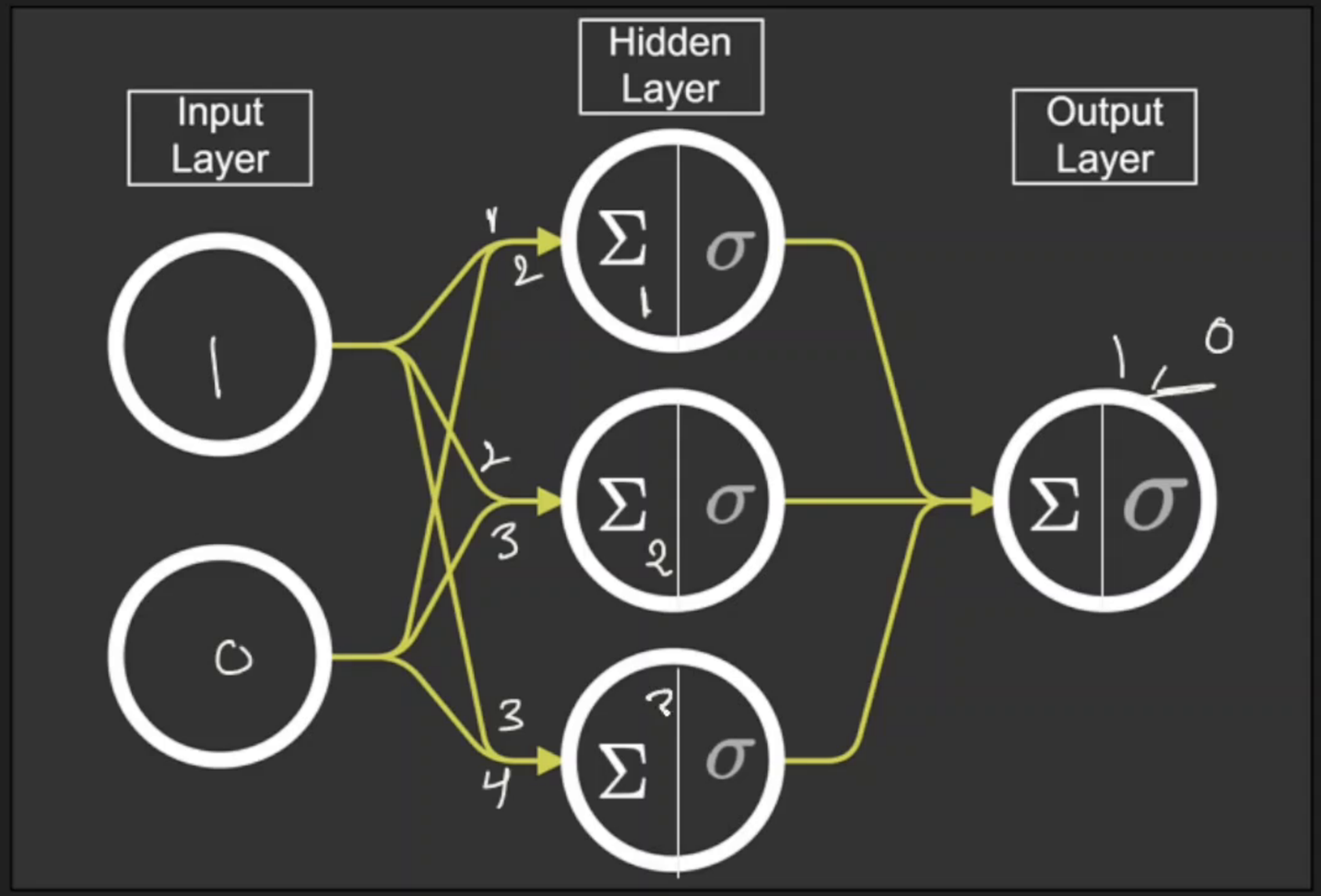
Weights-1: [[1,2],
[2,3],
[3,4]]

Weights-2: [1,2,3]

$1 \times 1 + 0 \times 2 \rightarrow 1$

$1 \times 2 + 0 \times 3 \rightarrow 2$

Binary Classification



Inputs: [1,0]

Weights-1: [[1,2],
[2,3],
[3,4]]

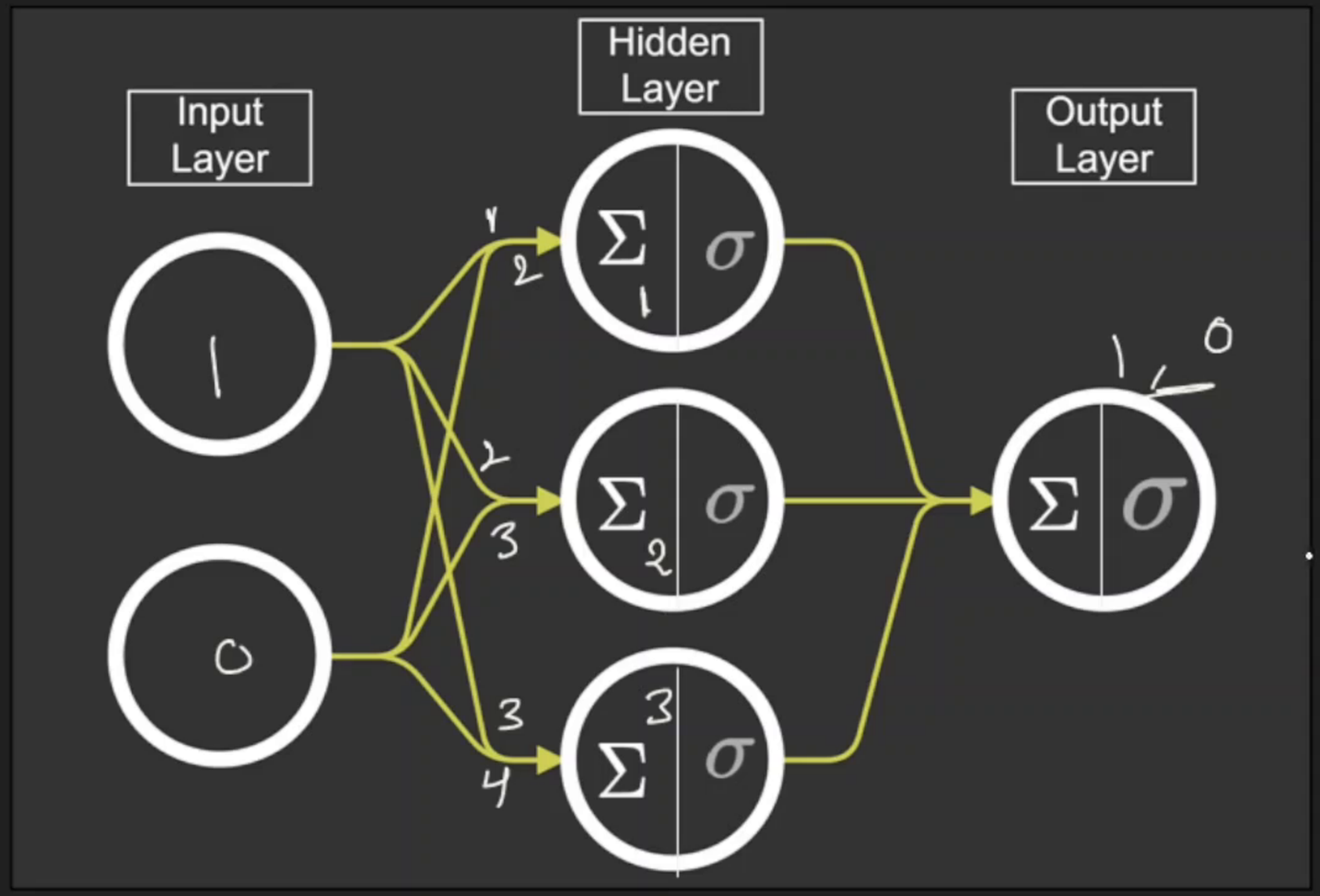
Weights-2: [1,2,3]

$1 \times 1 + 0 \times 2 \rightarrow 1$

$1 \times 2 + 0 \times 3 \rightarrow 2$

$1 \times 3 + 0 \times 4 \rightarrow 3$

Binary Classification



Inputs: [1,0]

Weights-1: [[1,2],
[2,3],
[3,4]]

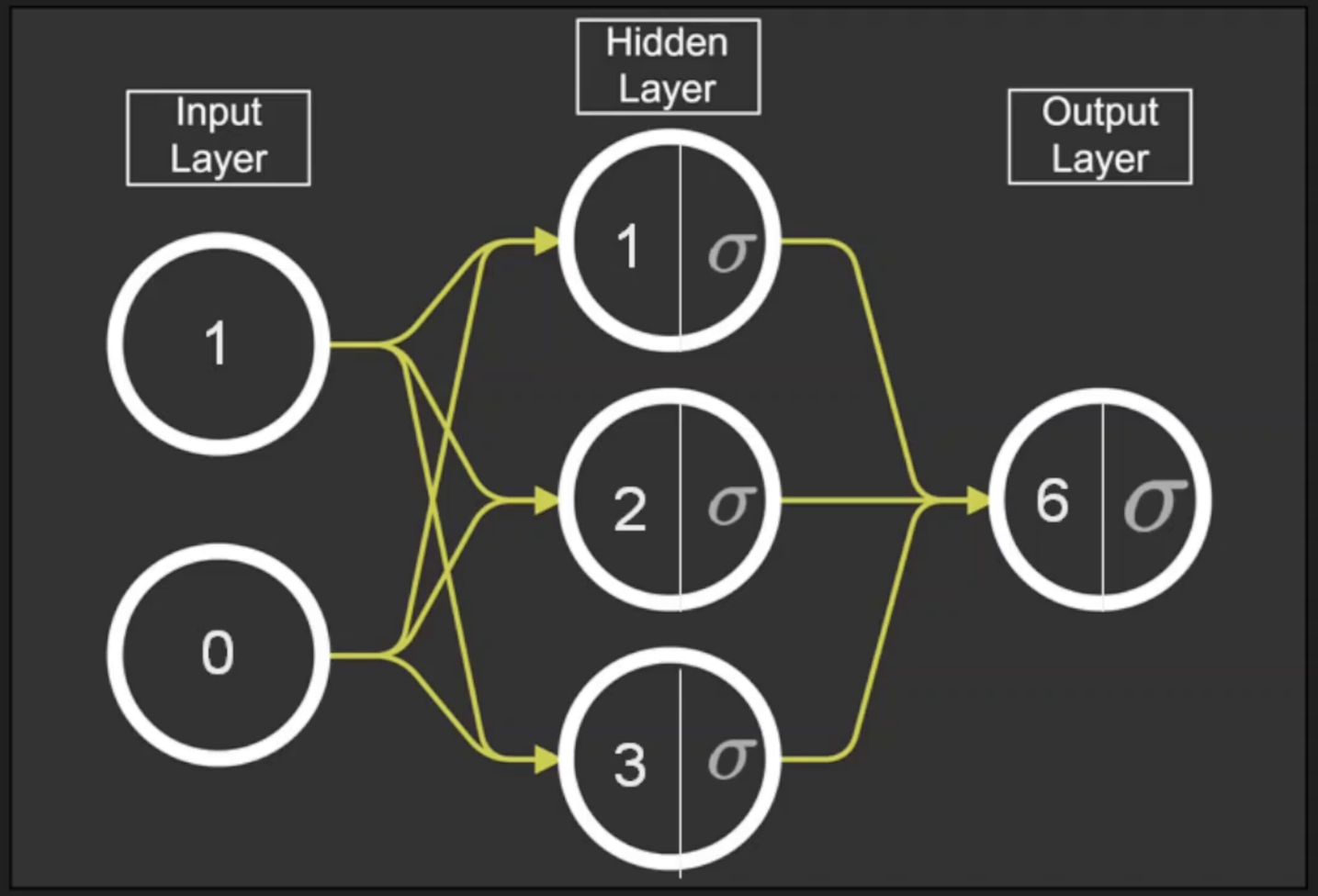
Weights-2: [1,2,3]

$1 \times 1 + 0 \times 2 \rightarrow 1$

$1 \times 2 + 0 \times 3 \rightarrow 2$

$1 \times 3 + 0 \times 4 \rightarrow 3$

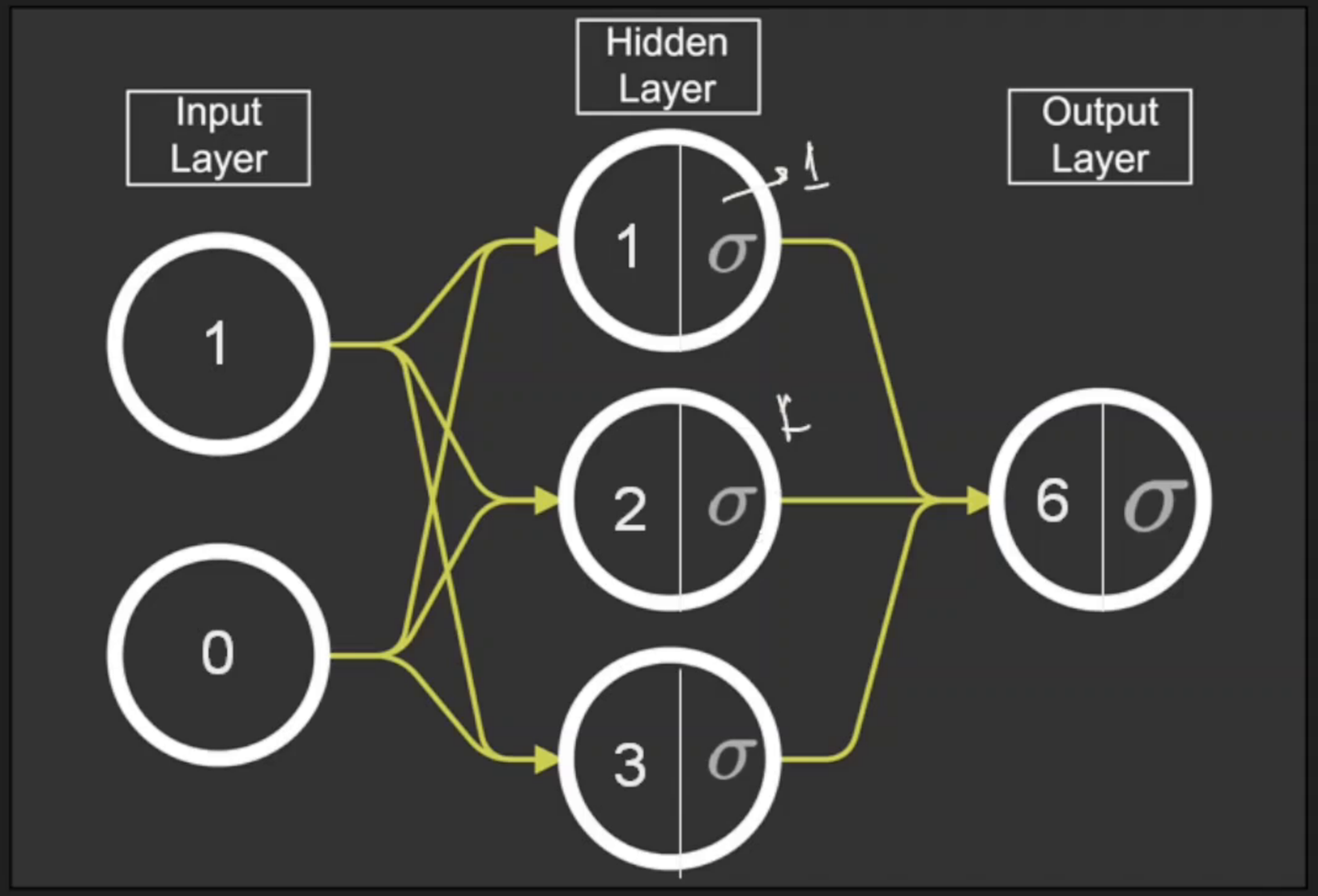
Binary Classification



Binary step

$$f(x) = \begin{cases} 0 & for\ x < 0 \\ 1 & for\ x \geqslant 0 \end{cases}$$

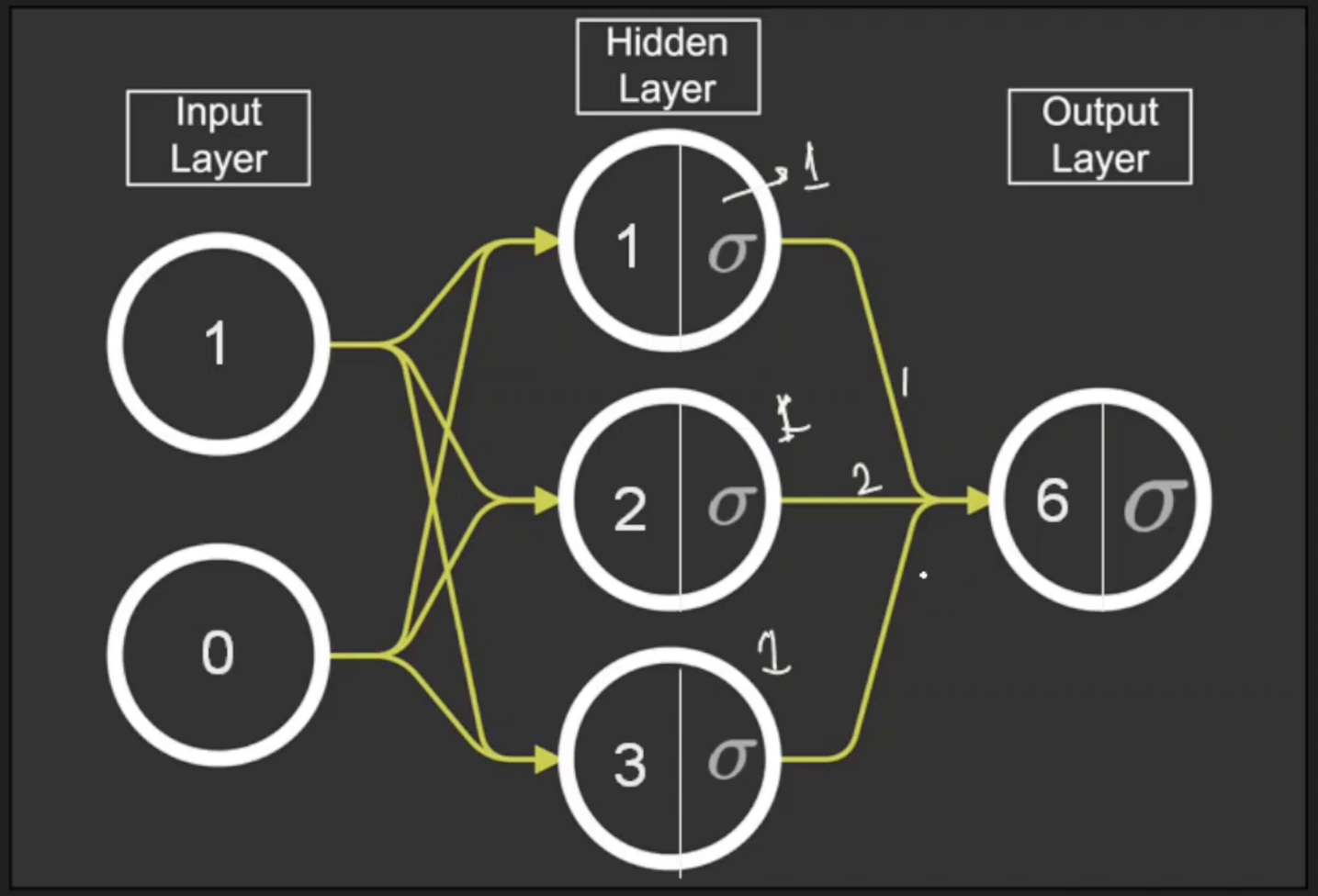
Binary Classification



Binary step

$$f(x) = \begin{cases} 0 & for\ x < 0 \\ 1 & for\ x \geqslant 0 \end{cases}$$

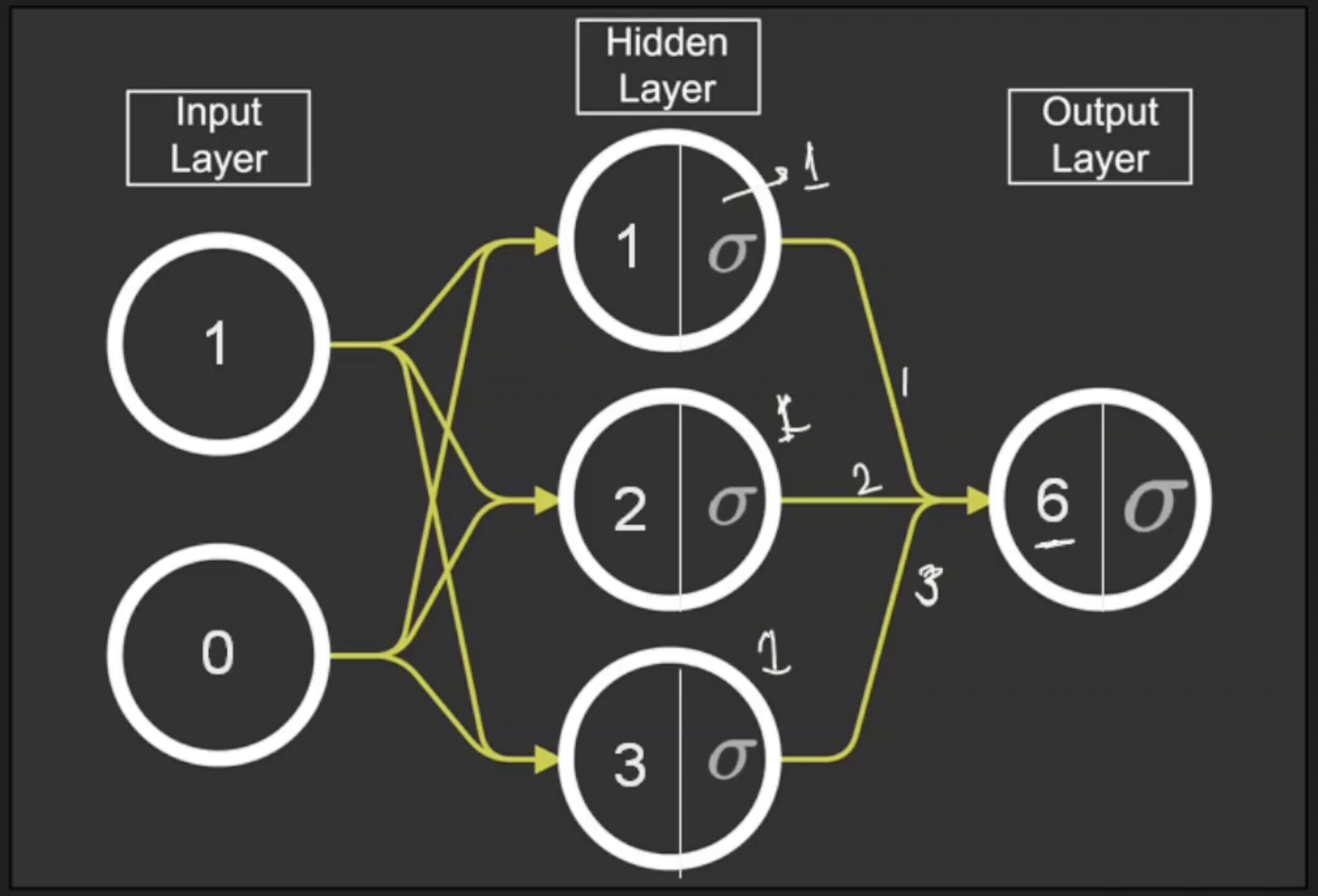
Binary Classification



Binary step

$$f(x) = \begin{cases} 0 & for\ x < 0 \\ 1 & for\ x \geqslant 0 \end{cases}$$

Binary Classification



Binary step

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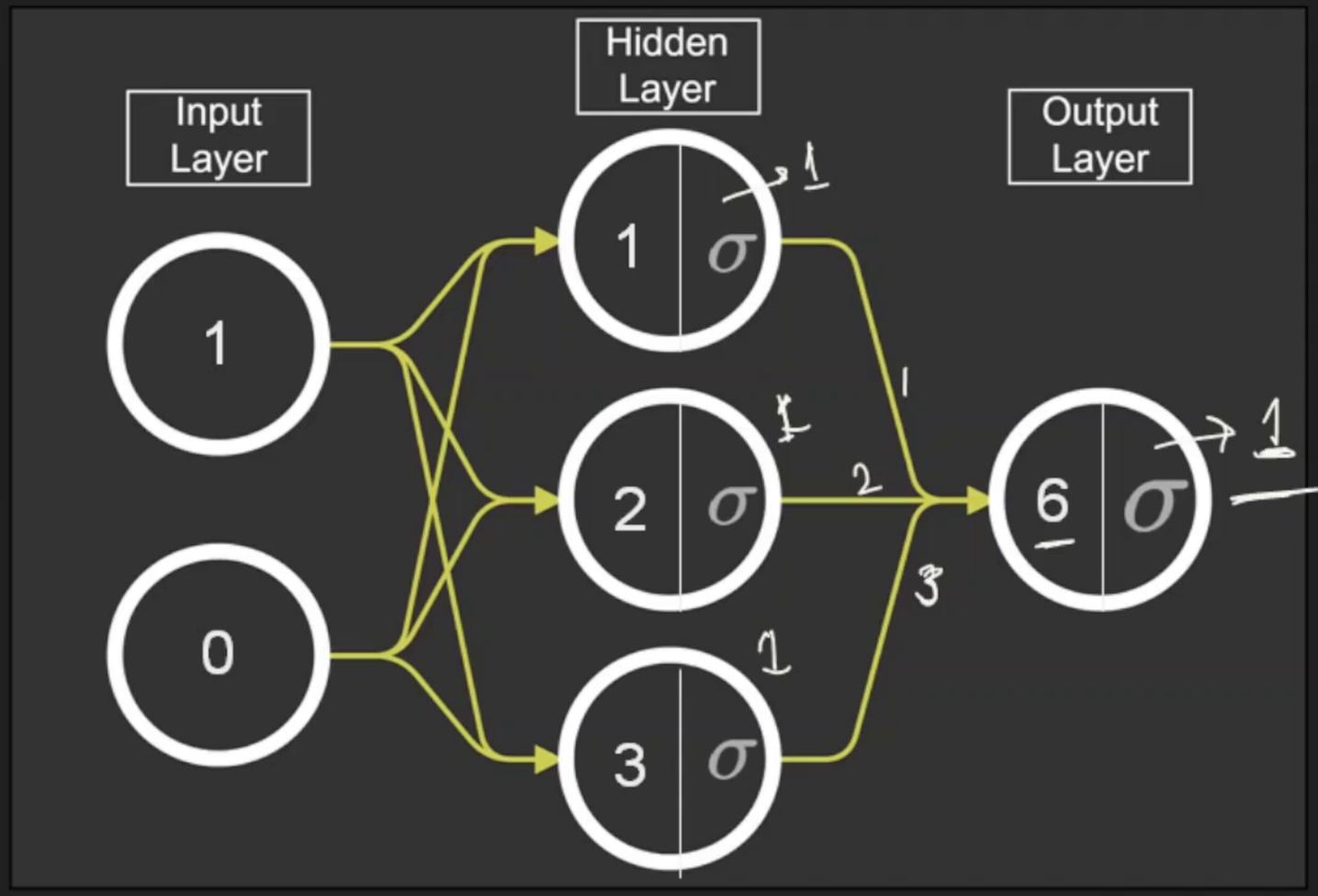
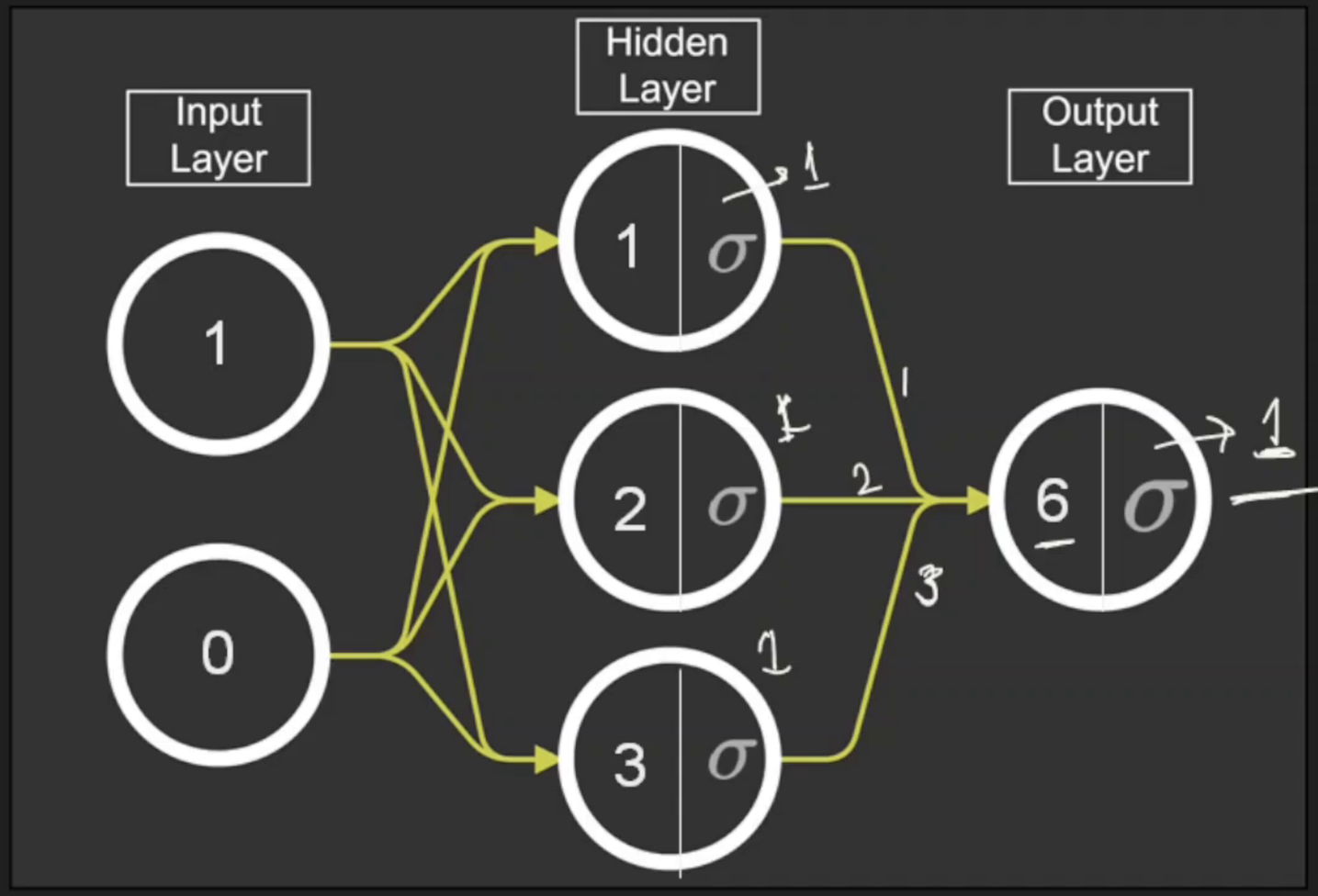
Binary Classification



Binary step

$$f(x) = \begin{cases} 0 & for\ x < 0 \\ 1 & for\ x \geqslant 0 \end{cases}$$

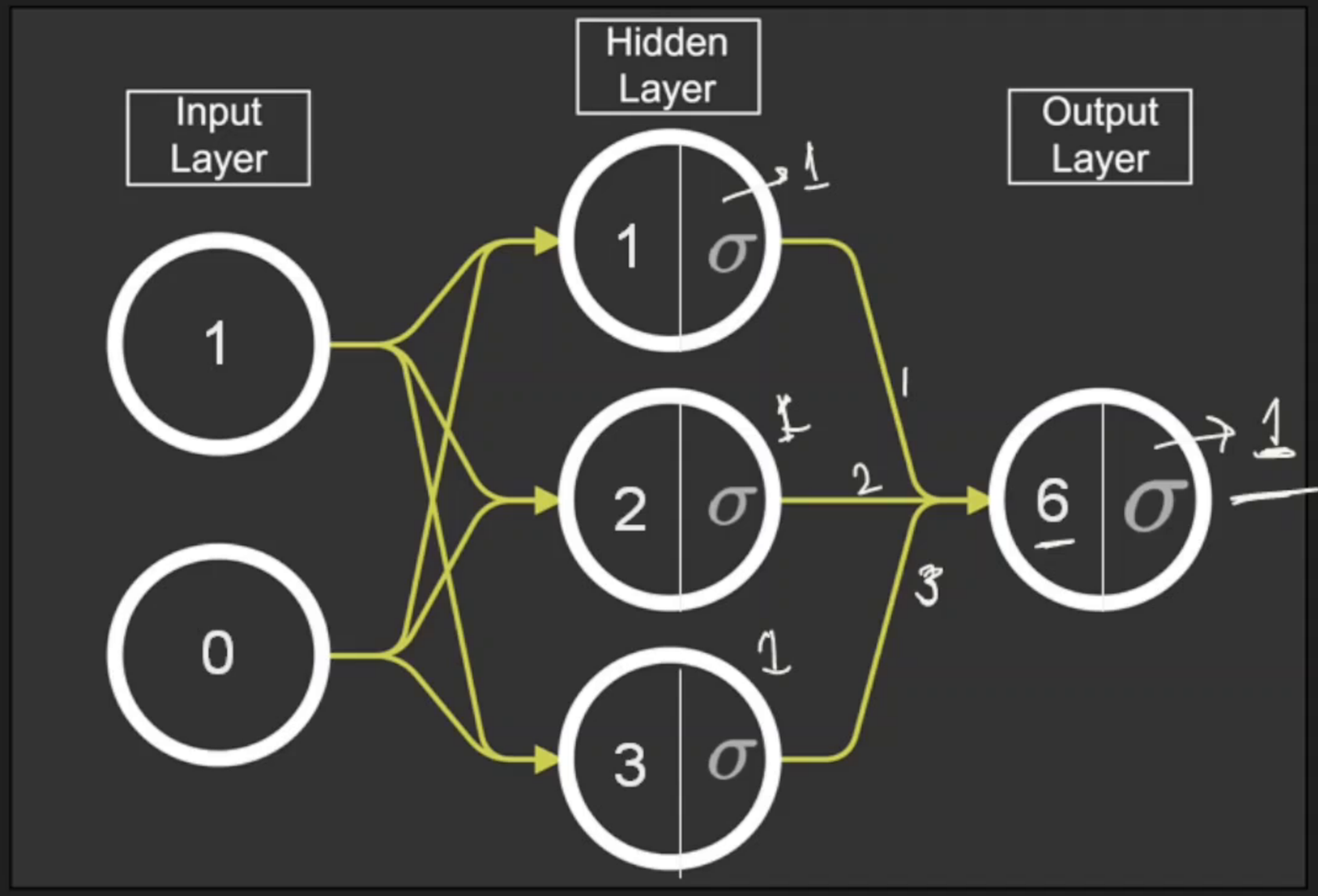
Binary Classification



Binary step

$$f(x) = \begin{cases} 0 & for\ x < 0 \\ 1 & for\ x \geqslant 0 \end{cases}$$

Binary Classification



'0'.

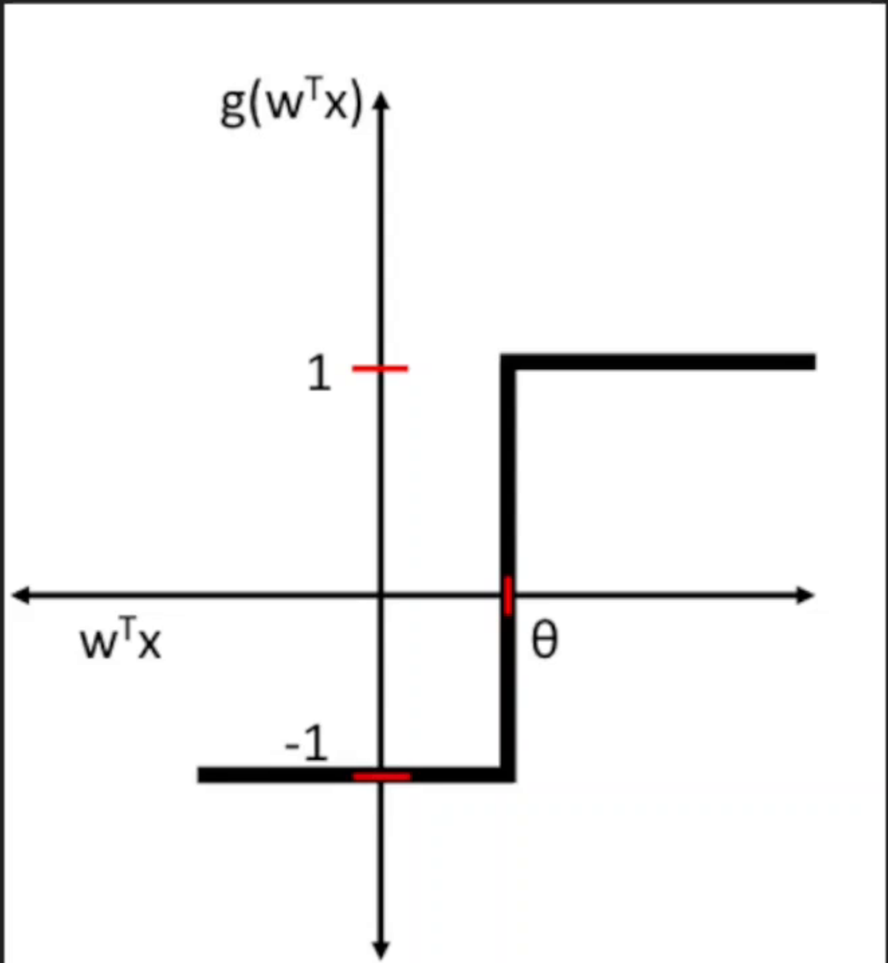
Binary

1

$$\textit{Binary step}$$

$$f(x) = \begin{cases} 0 & \textit{for } x < 0 \\ 1 & \textit{for } x \geqslant 0 \end{cases}$$

Step Activation



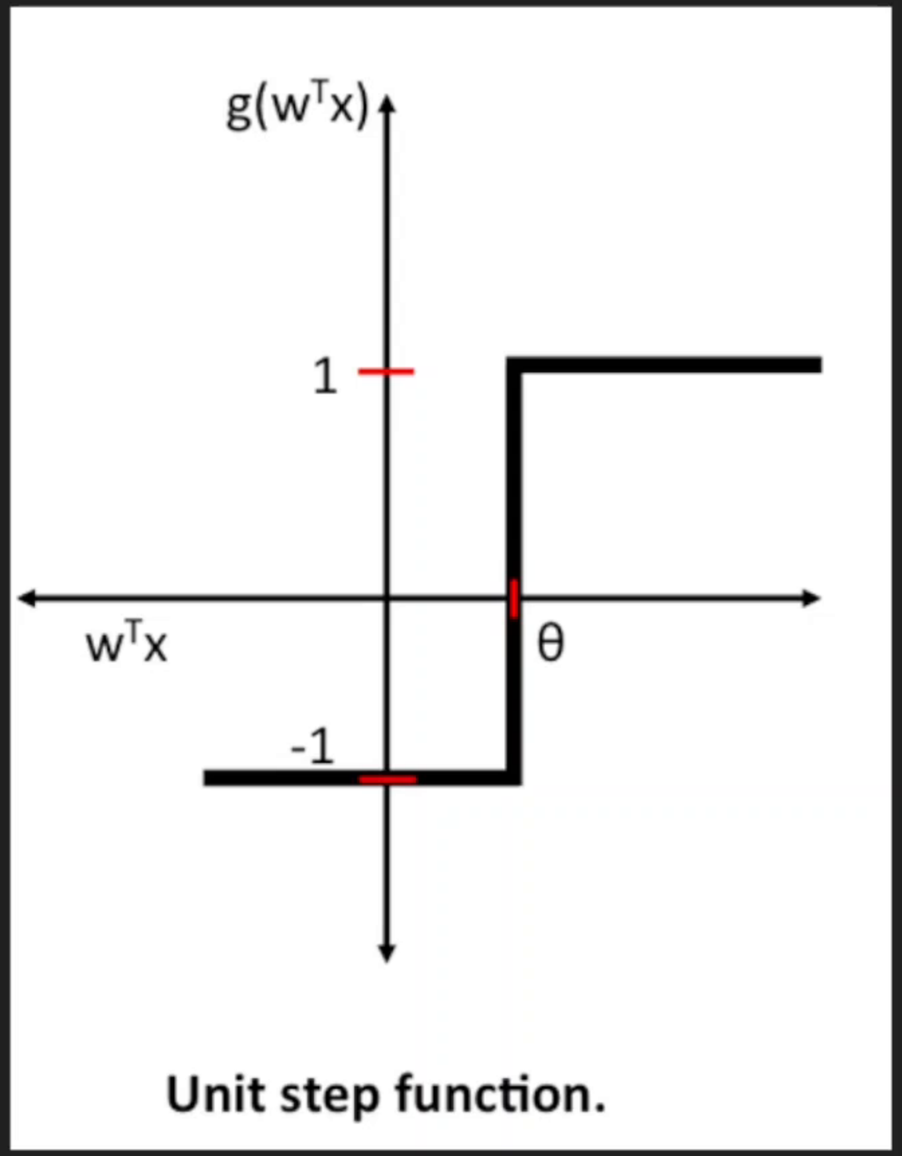
Unit step function.

$-\theta$ - threshold

↳ r

$y = \begin{cases} \cdot \end{cases}$

Step Activation



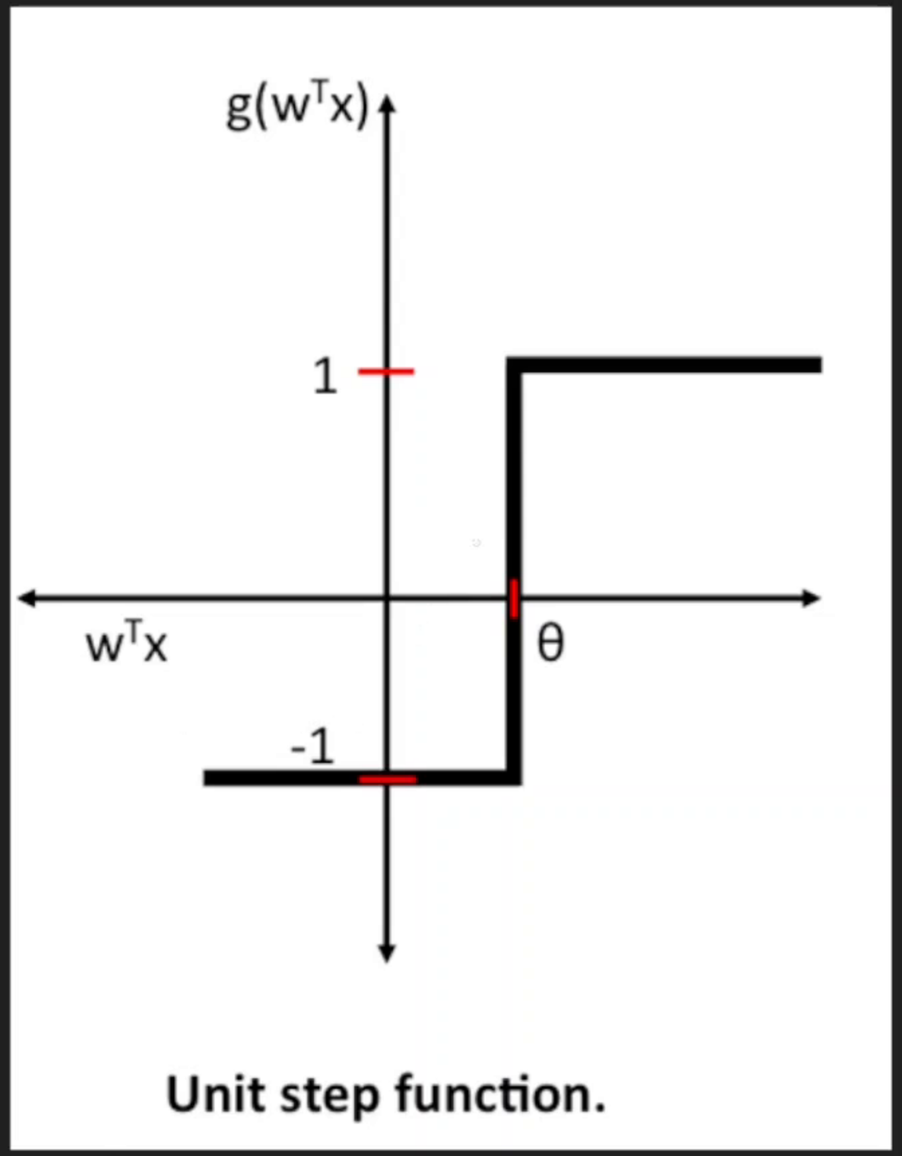
Unit step function.

$-\theta$ - threshold

↳ z

$$y = \begin{cases} 1 & x \geq z \\ 0 & x < z \end{cases}$$

Step Activation



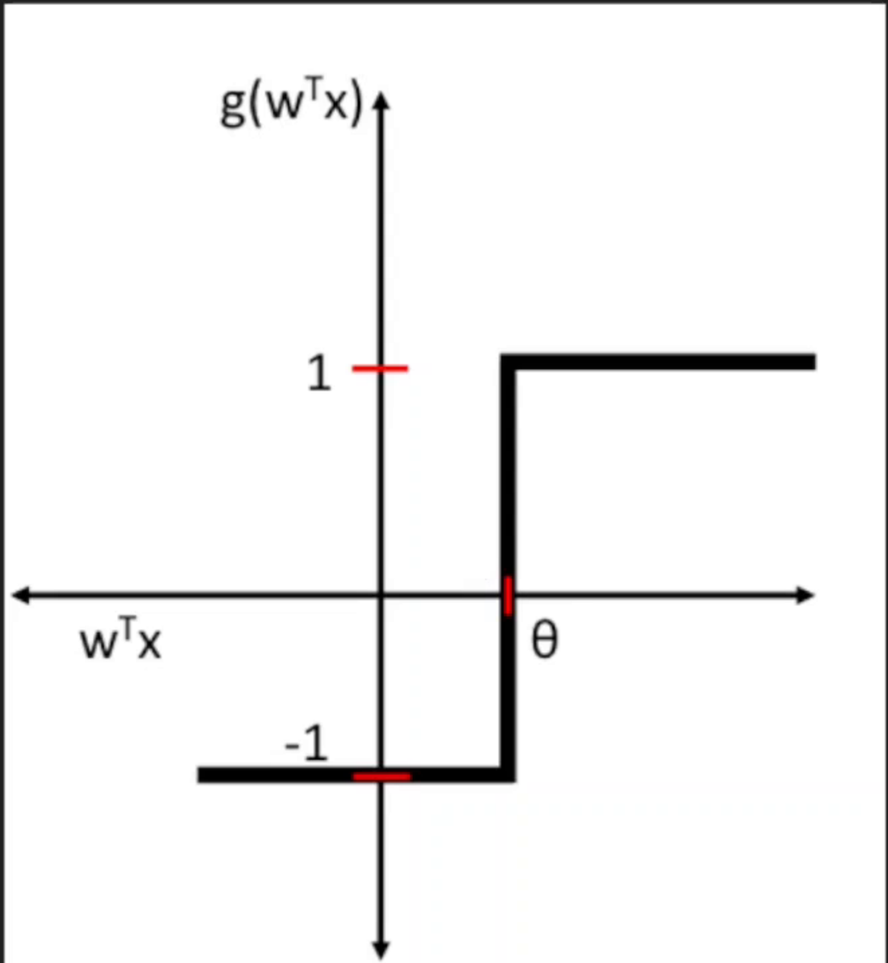
Unit step function.

θ — threshold

↳ τ

$$y = \begin{cases} 1 & x \geq \tau \\ 0 & x < \tau \end{cases}$$

Step Activation



Unit step function.

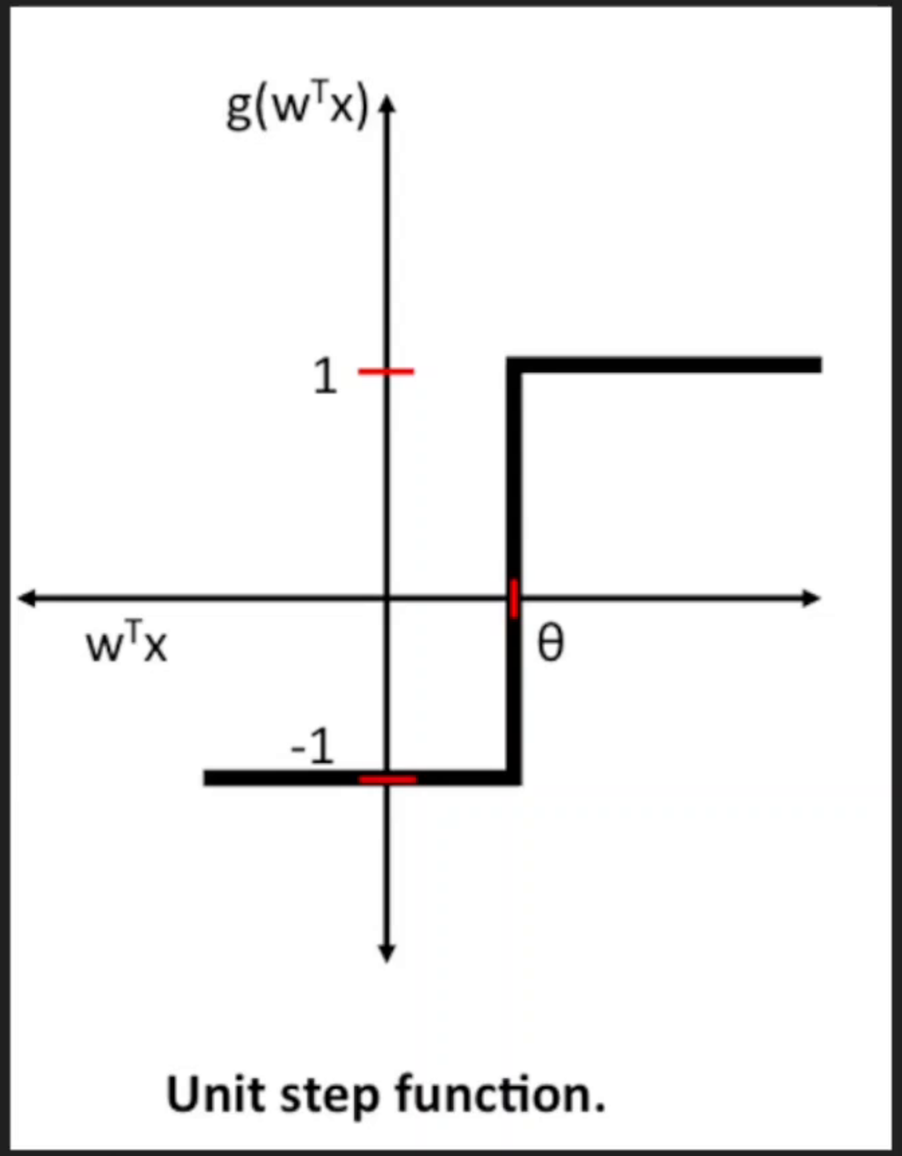
→ Diffe

θ — threshold

↳ T

$$y = \begin{cases} 1 & x \geq T \\ 0 & x < T \end{cases}$$

Step Activation



Unit step function.

→ Differentiable

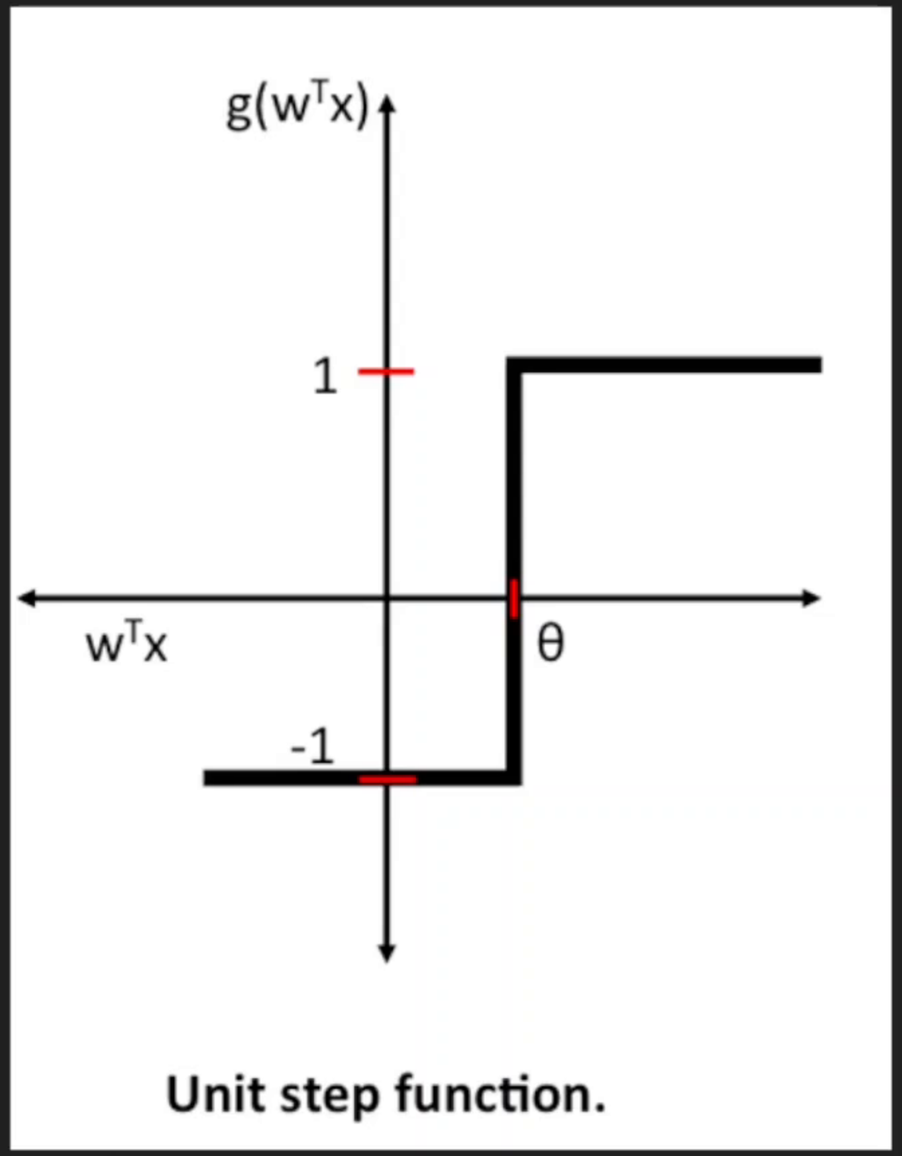
"θ" – threshold

↳ r

$$y = \begin{cases} 1 & x \geq r \\ 0 & x < r \end{cases}$$

Yes, → "0"

Step Activation



→ Differentiable

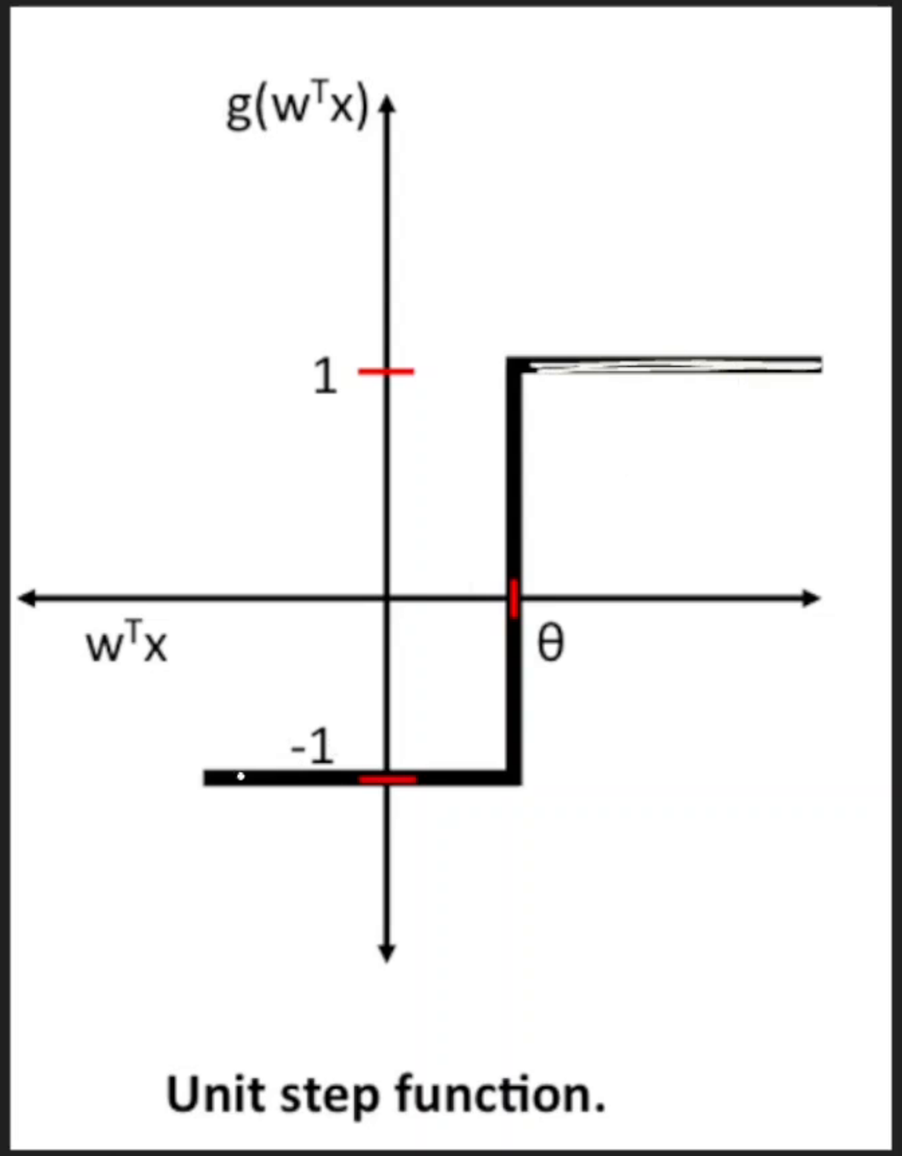
"θ" – threshold

↳ r

$$y = \begin{cases} 1 & x \geq r \\ 0 & x < r \end{cases}$$

Yes, → "0"

Step Activation



Unit step function.

→ Differentable → rate of change

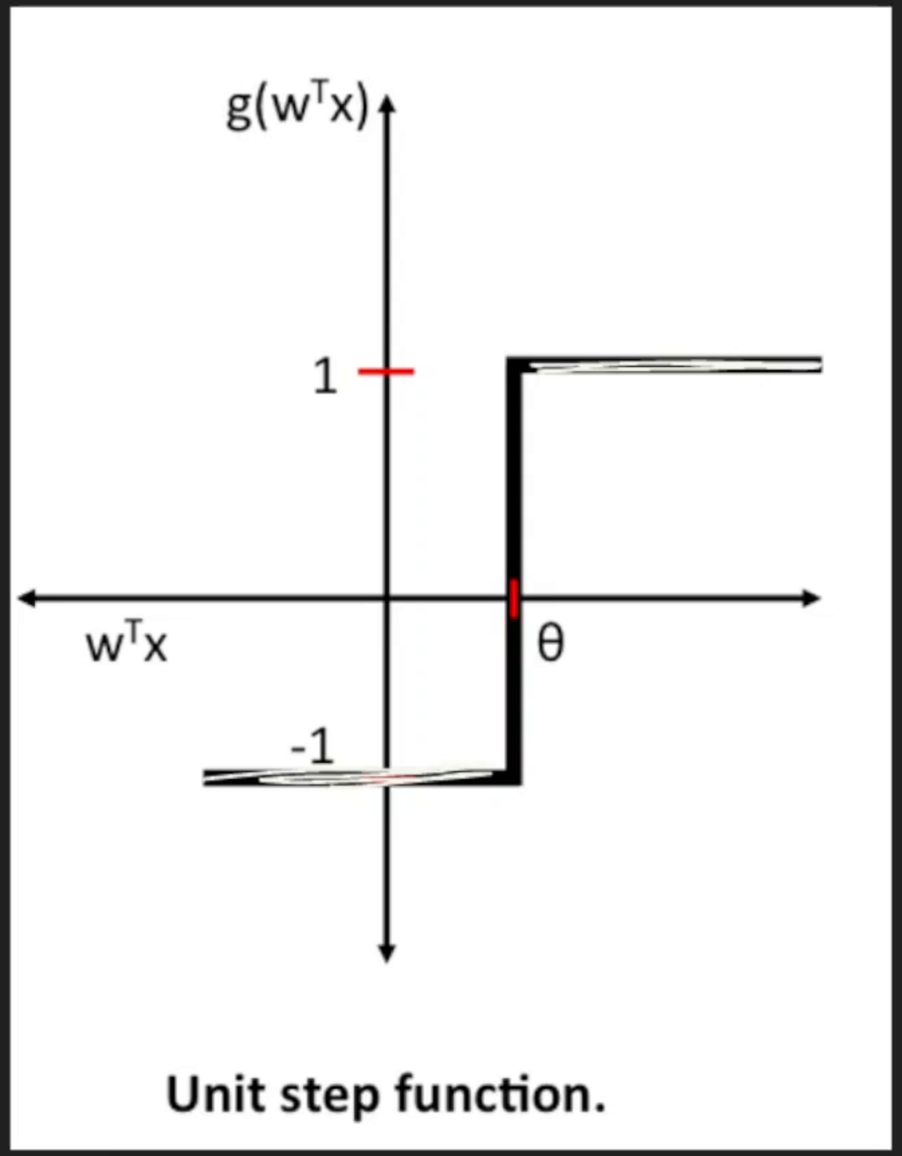
"θ" – threshold

↳ r

$$y = \begin{cases} 1 & x \geq r \\ 0 & x < r \end{cases}$$

Yes, → "0"

Step Activation



Unit step function.

→ Differentable → rate of change

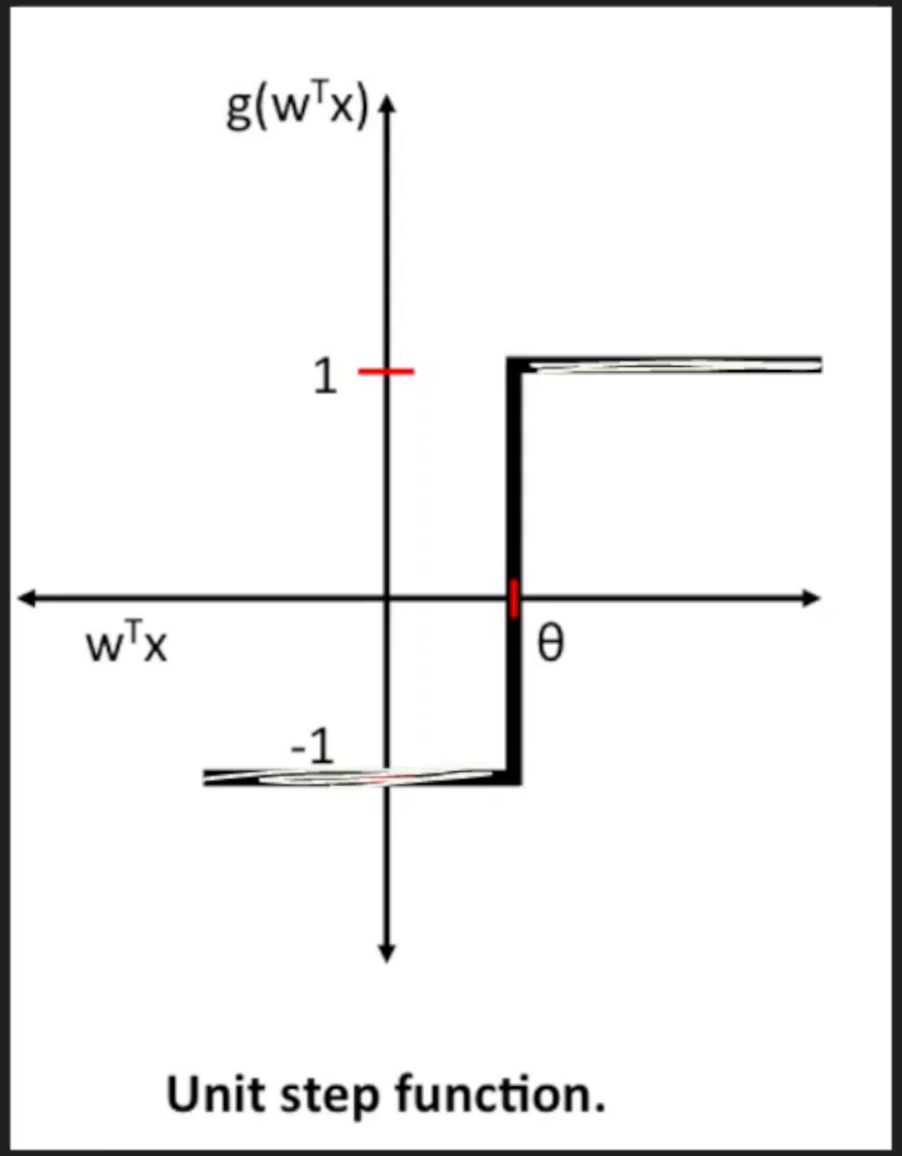
"θ" – threshold

↳ J

$$y = \begin{cases} 1 & x \geq J \\ 0 & x < J \end{cases}$$

Yes, → "0"

Step Activation



Unit step function.

→ Differentable → rate of change

"θ" – threshold

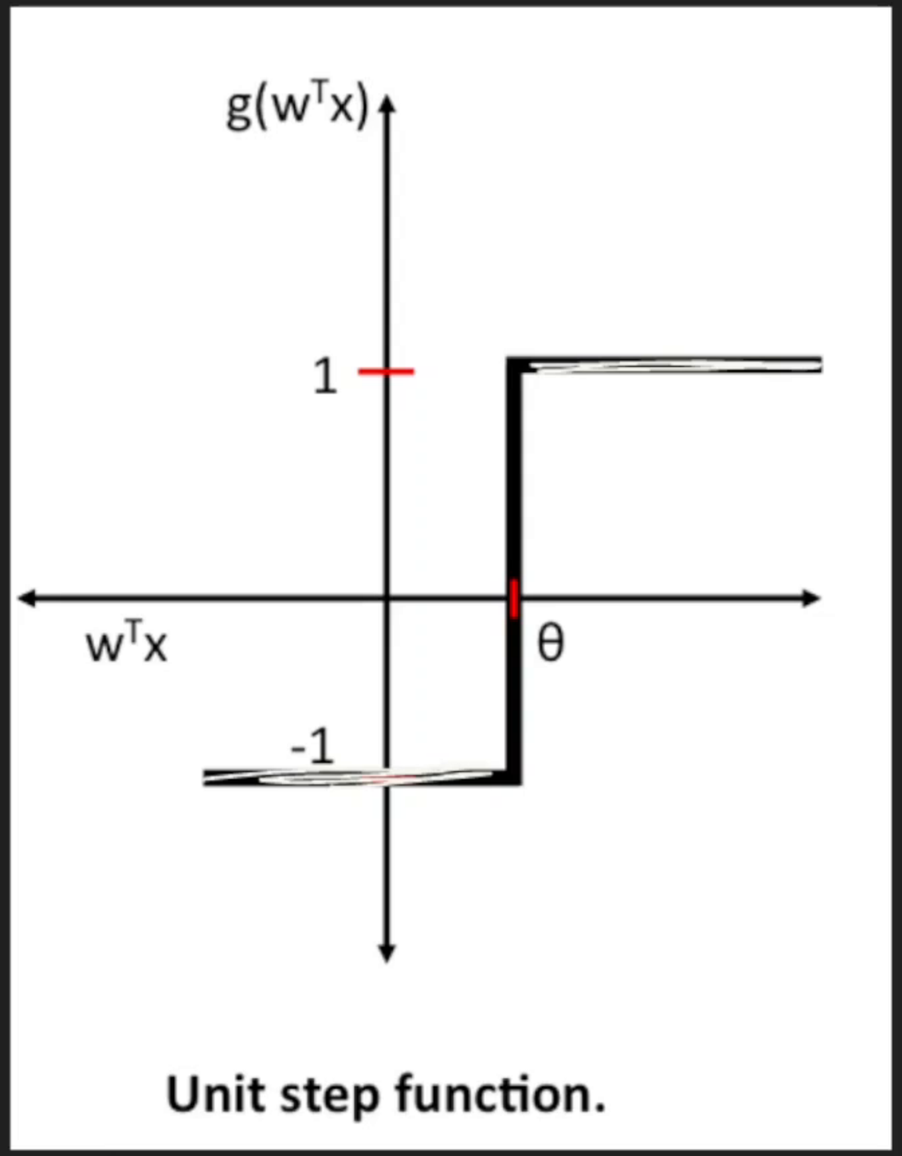
↳ I

$$y = \begin{cases} 1 & x \geq I \\ 0 & x < I \end{cases}$$

Yes, → "0"

w →

Step Activation



Unit step function.

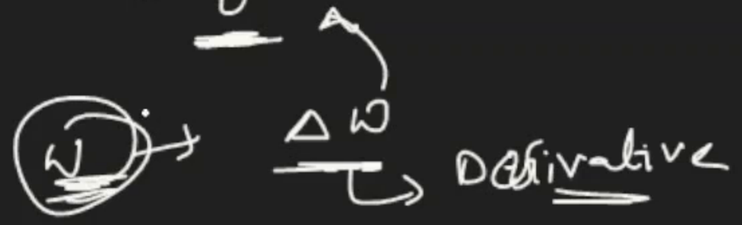
→ Differentable → rate of change

"θ" – threshold

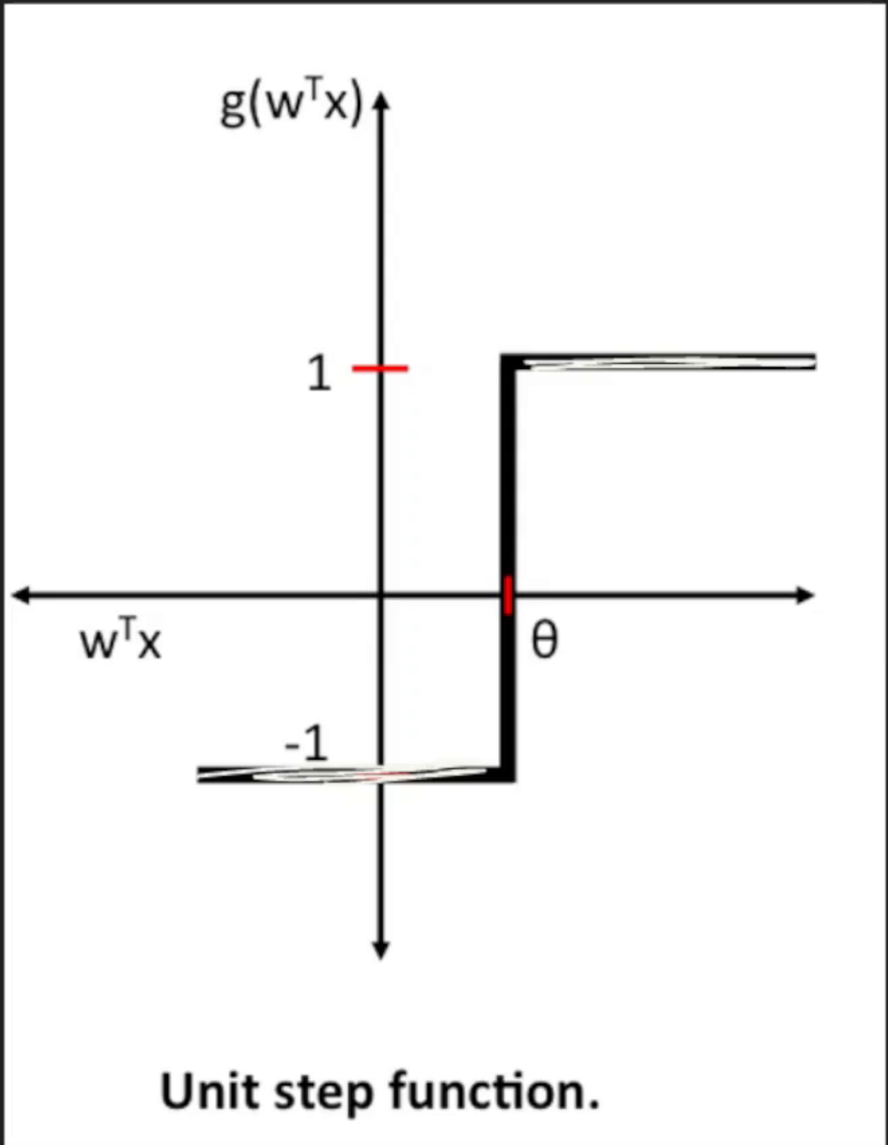
↳ J

$$y = \begin{cases} 1 & x \geq J \\ 0 & x < J \end{cases}$$

Yes, → "0"



Step Activation



Unit step function.

→ Differentable → rate of change

"θ" – threshold

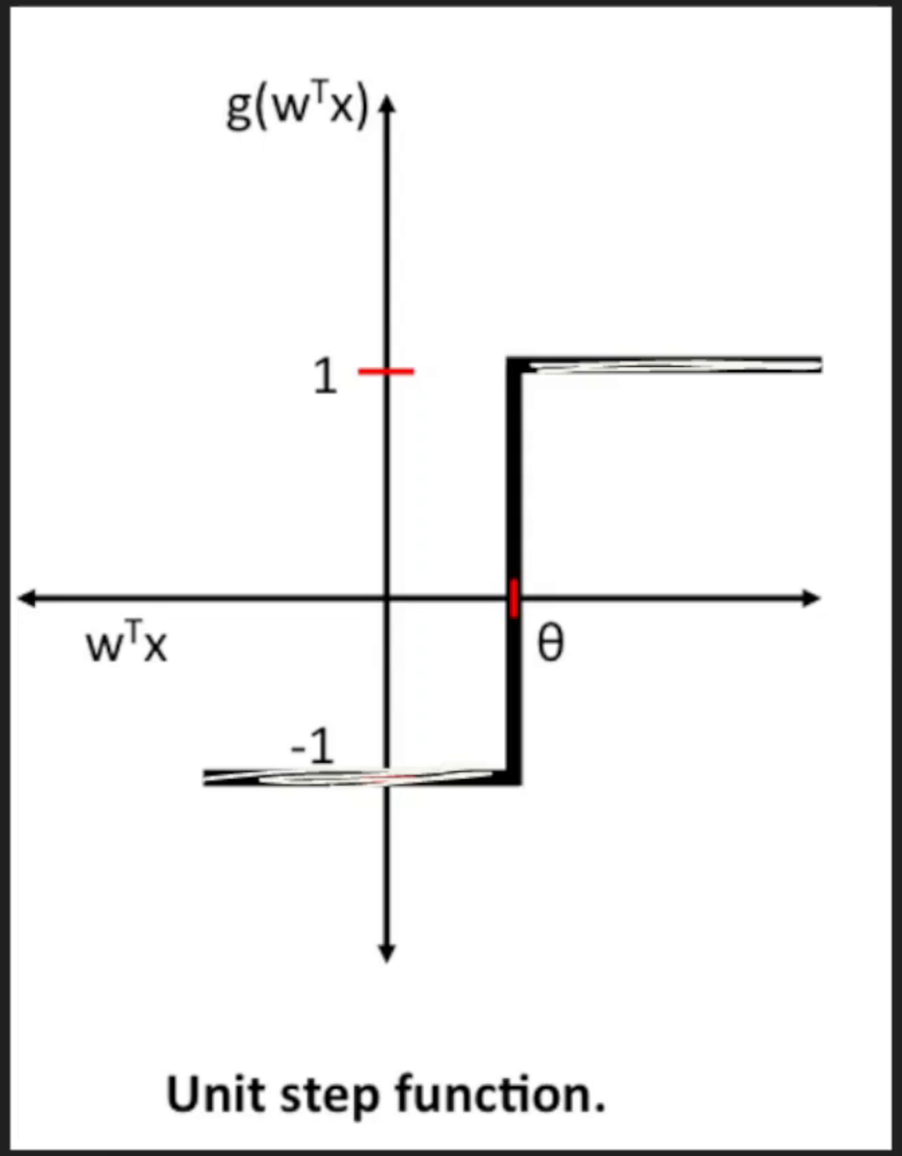
↳ J

$$y = \begin{cases} 1 & x \geq J \\ 0 & x < J \end{cases}$$

Yes, → "0"

w → Δw → Derivative

Step Activation



Unit step function.

→ Differentable → rate of change

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Yes, → "0"

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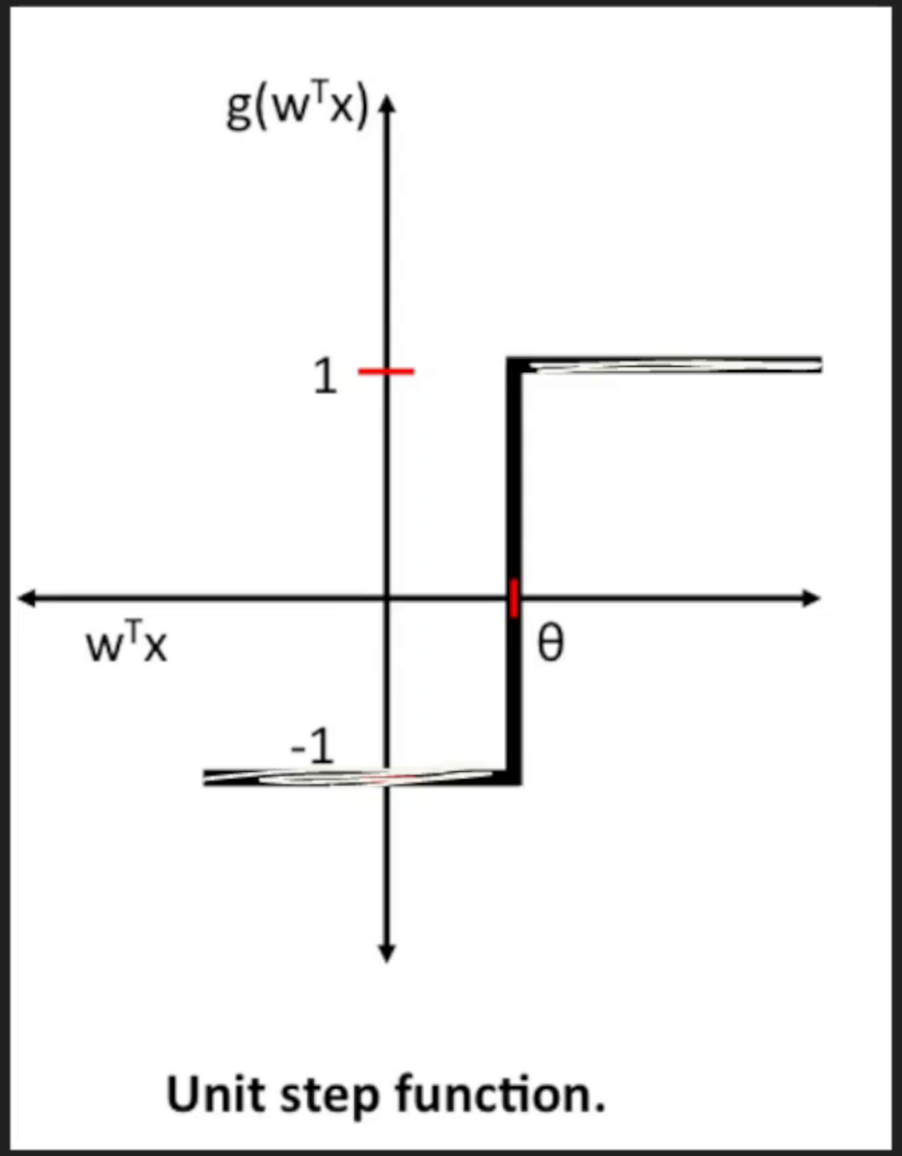
Step Activation



Unit step function.

→ Differentable → rate of change

"θ" – threshold

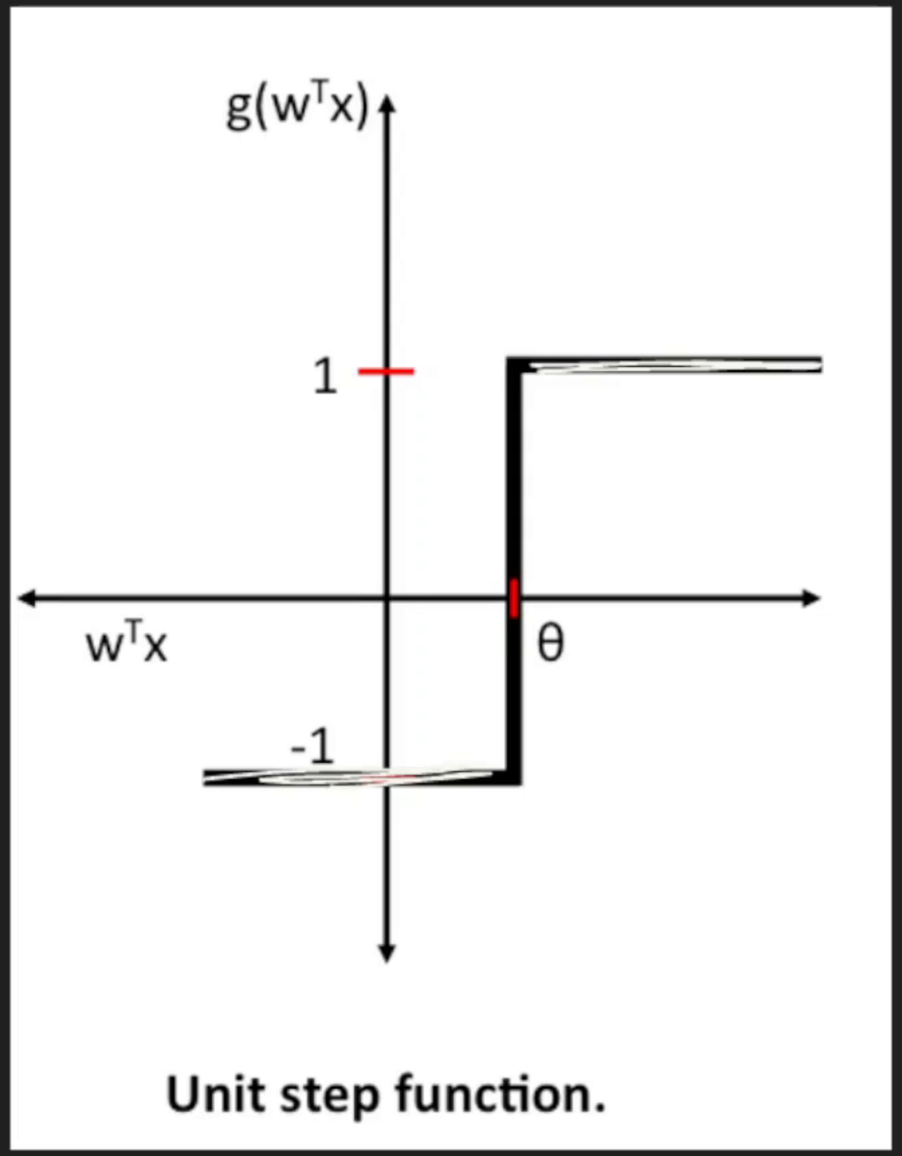
↳ r

$$y = \begin{cases} 1 & x \geq r \\ 0 & x < r \end{cases}$$

Yes, → "0"

w → Δw → Derivative

Step Activation



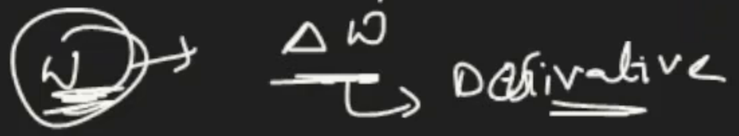
→ Differentiable → rate of change

"θ" – threshold

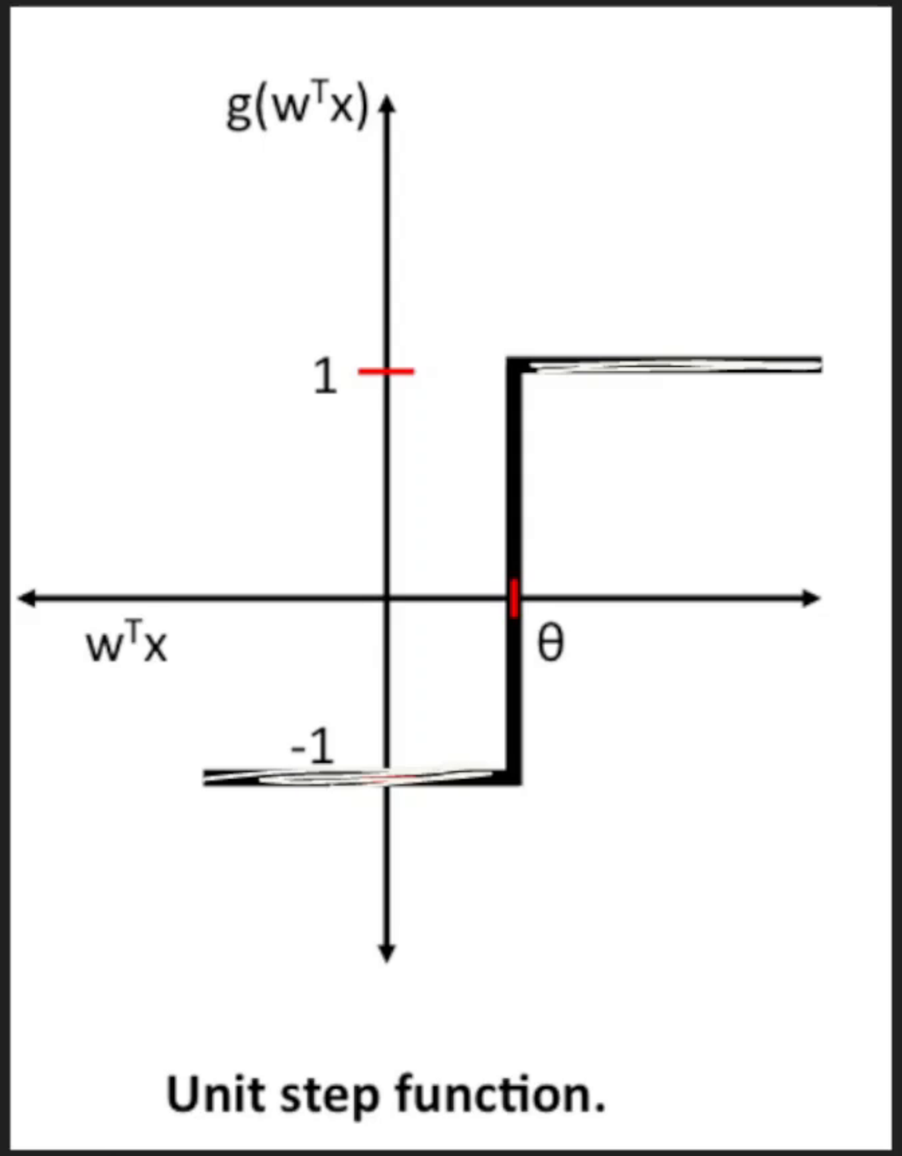
↳ J

$$y = \begin{cases} 1 & x \geq J \\ 0 & x < J \end{cases}$$

Yes, → "0"



Step Activation



Unit step function.

→ Differentiable → rate of change

"θ" – threshold

↳ J

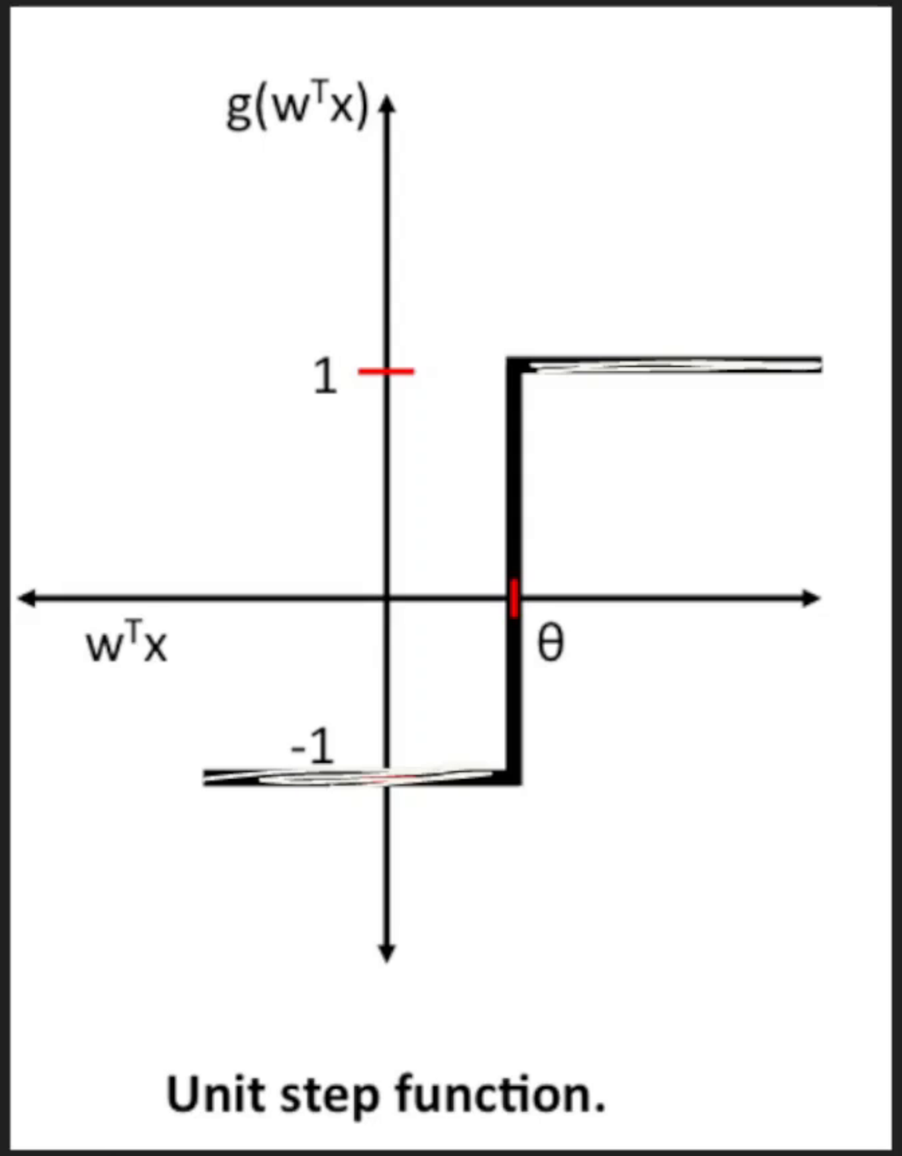
'0' ⇒

$$y = \begin{cases} 1 & x \geq J \\ 0 & x < J \end{cases}$$

Yes, → "0"

w → Δw → Derivative

Step Activation



Unit step function.

$x = 1$
$x = 10$
$x = 100$
→ y

→ Differentiable → rate of change

→ "0" — threshold

↳ 5

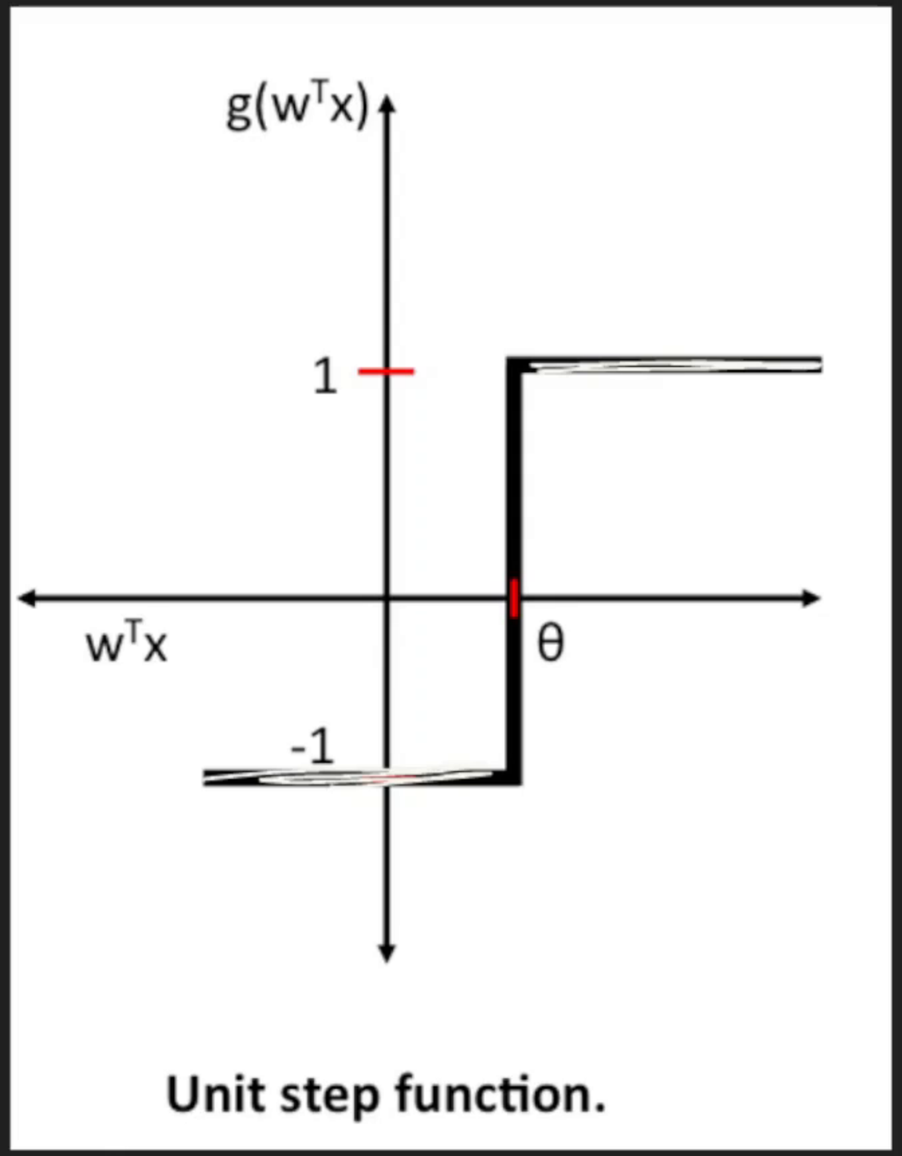
"0" ⇒

$$y = \begin{cases} 1 & x \geq 5 \\ 0 & x < 5 \end{cases}$$

Yes, → "0"

w → Δw → Derivative

Step Activation



Unit step function.

$x = 1$
$x = 10$
$x = 100$
$\rightarrow y = 1$

→ Differentiable → rate of change

"θ" – threshold

↳ 5

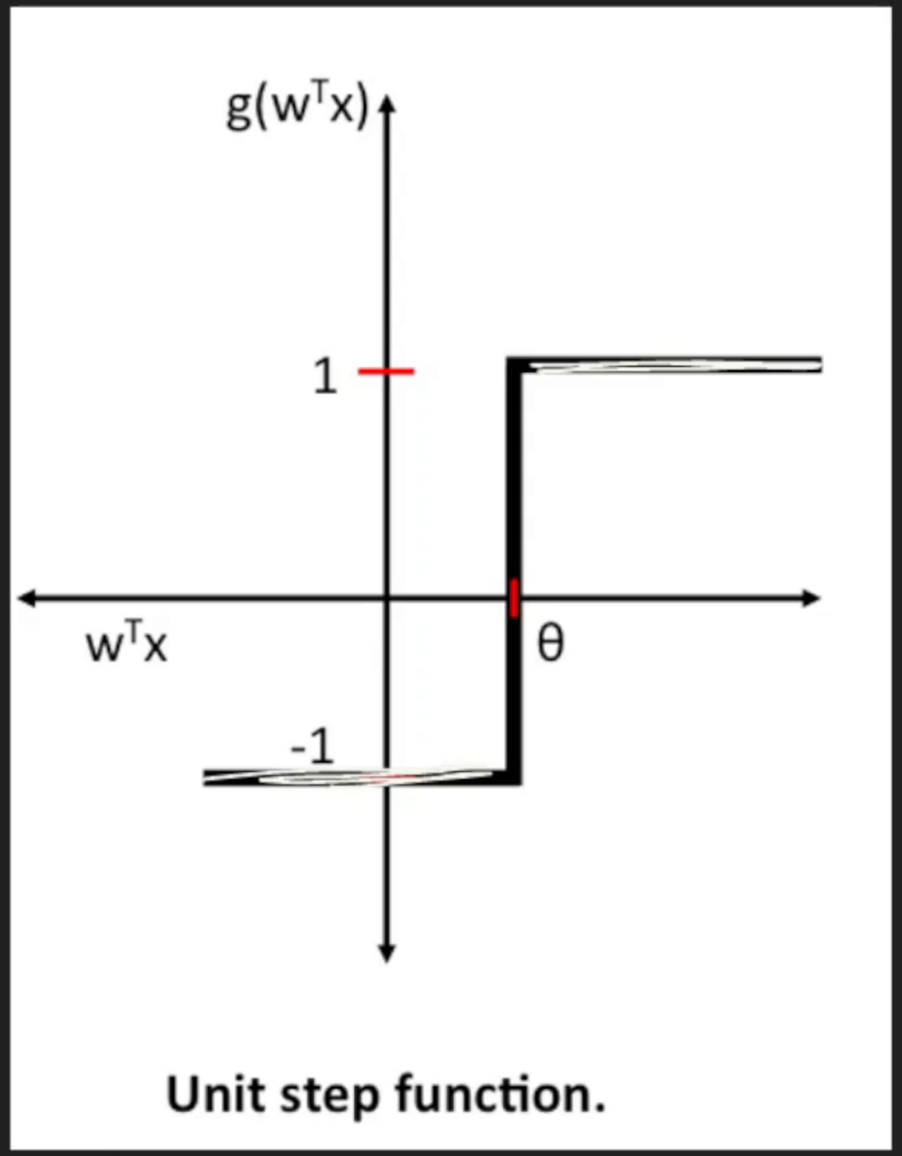
'0' ⇒

$$y = \begin{cases} 1 & x \geq 5 \\ 0 & x < 5 \end{cases}$$

Yes, → '0'

w → Δw → Derivative

Step Activation



Unit step function.

$x = 1$
$x = 10$
$x = 100$
$\rightarrow y = 1$

→ Differentiable → rate of change

"θ" – threshold

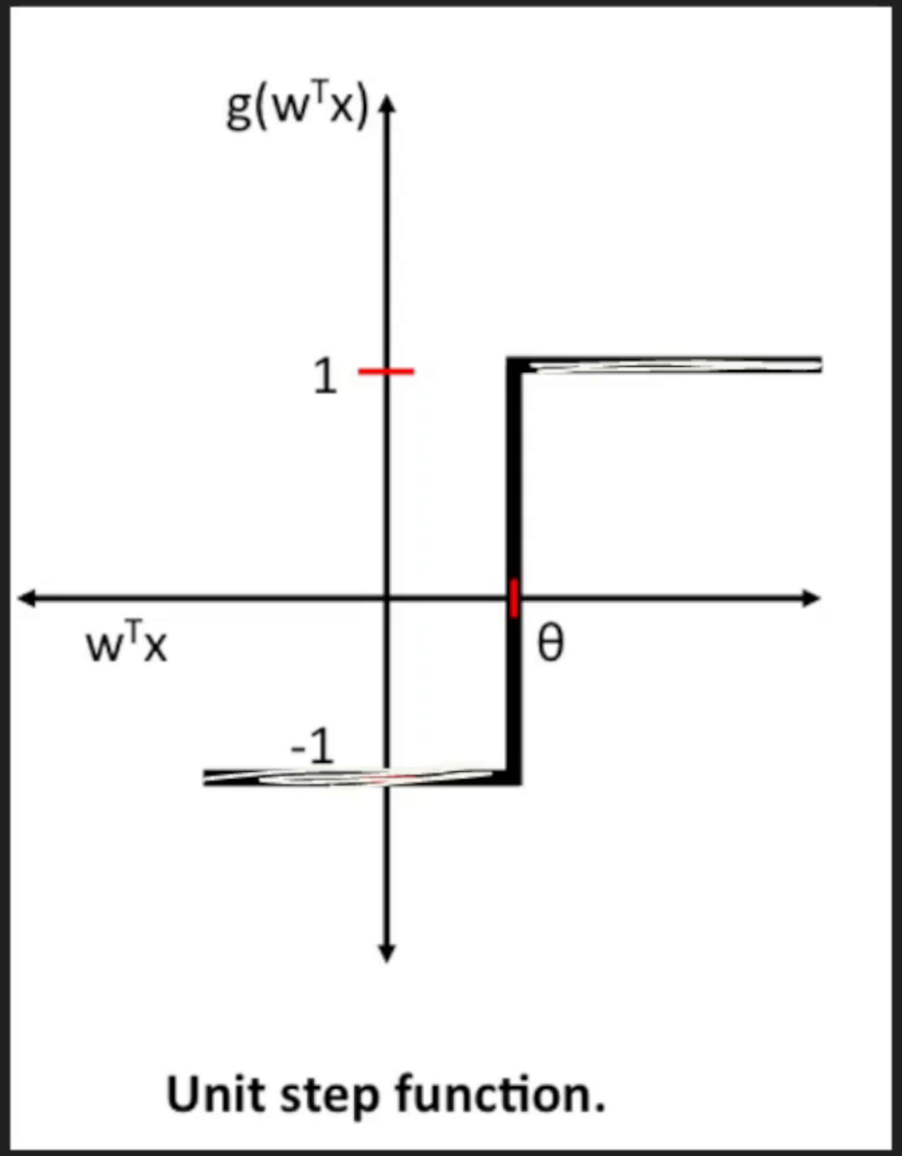
"0" ⇒

$y = \begin{cases} 1 & x \geq \theta \\ 0 & x < \theta \end{cases}$

Yes, → "0"

$w \rightarrow \Delta w$ → Derivative

Step Activation



Unit step function.

$x = 1$
$x = 10$
$x = 100$
$\rightarrow y = 1$

→ Differentable → rate of change

"θ" – threshold

"0" ⇒

$y = \begin{cases} 1 & x \geq \theta \\ 0 & x < \theta \end{cases}$

Yes, → "0"

$w \rightarrow \Delta w$ → Derivative

Python code

```
def binary_step(x):
    if x<0:
        return 0
    else:
        return 1
```

$$f'(x) = 0, \text{ for all } x$$

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