Neural Networks: Introduction

Elsayed Issa

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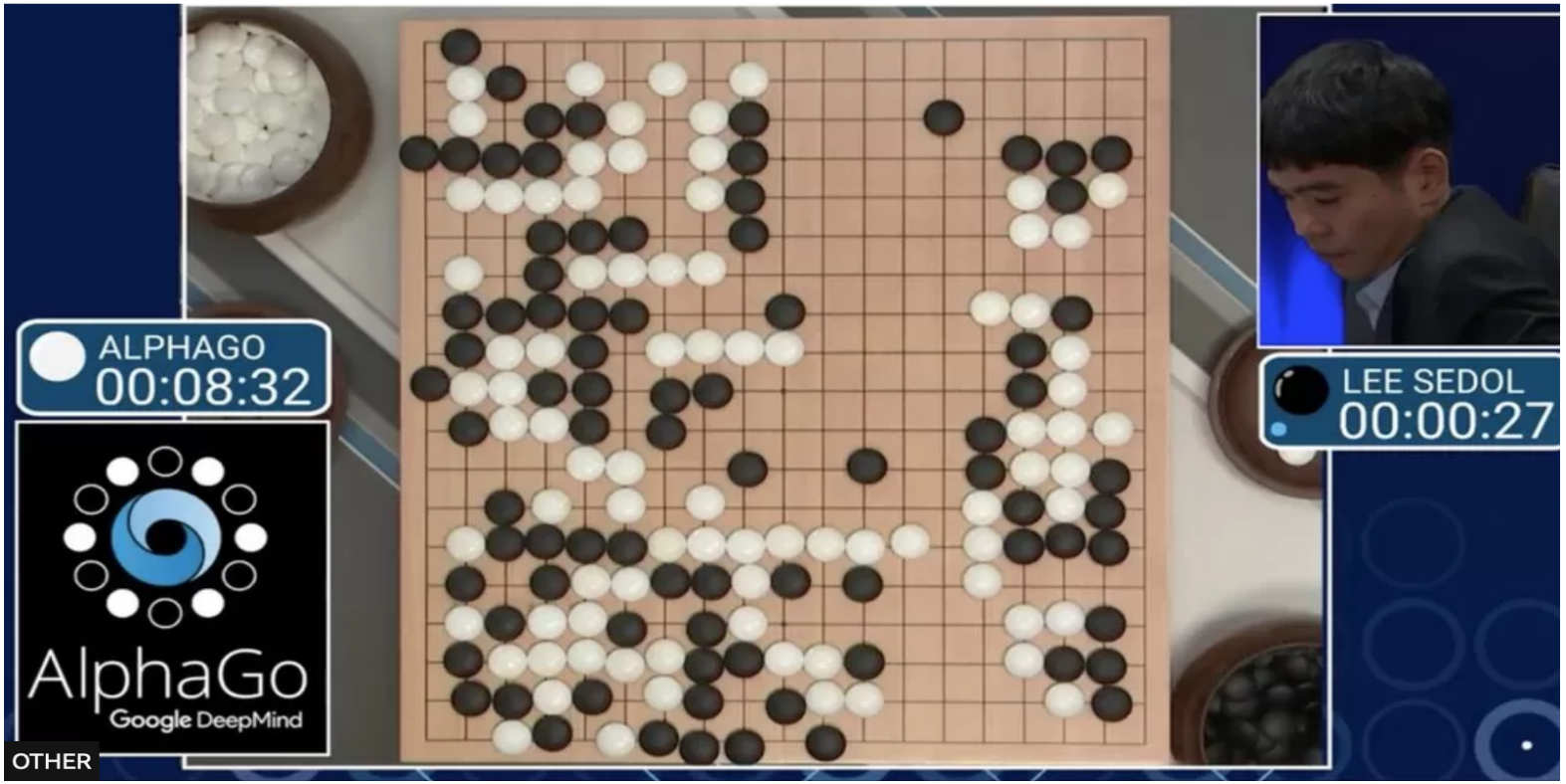
DeepMind's Alpha Go

The first program to beat the World champion at the game of Go.



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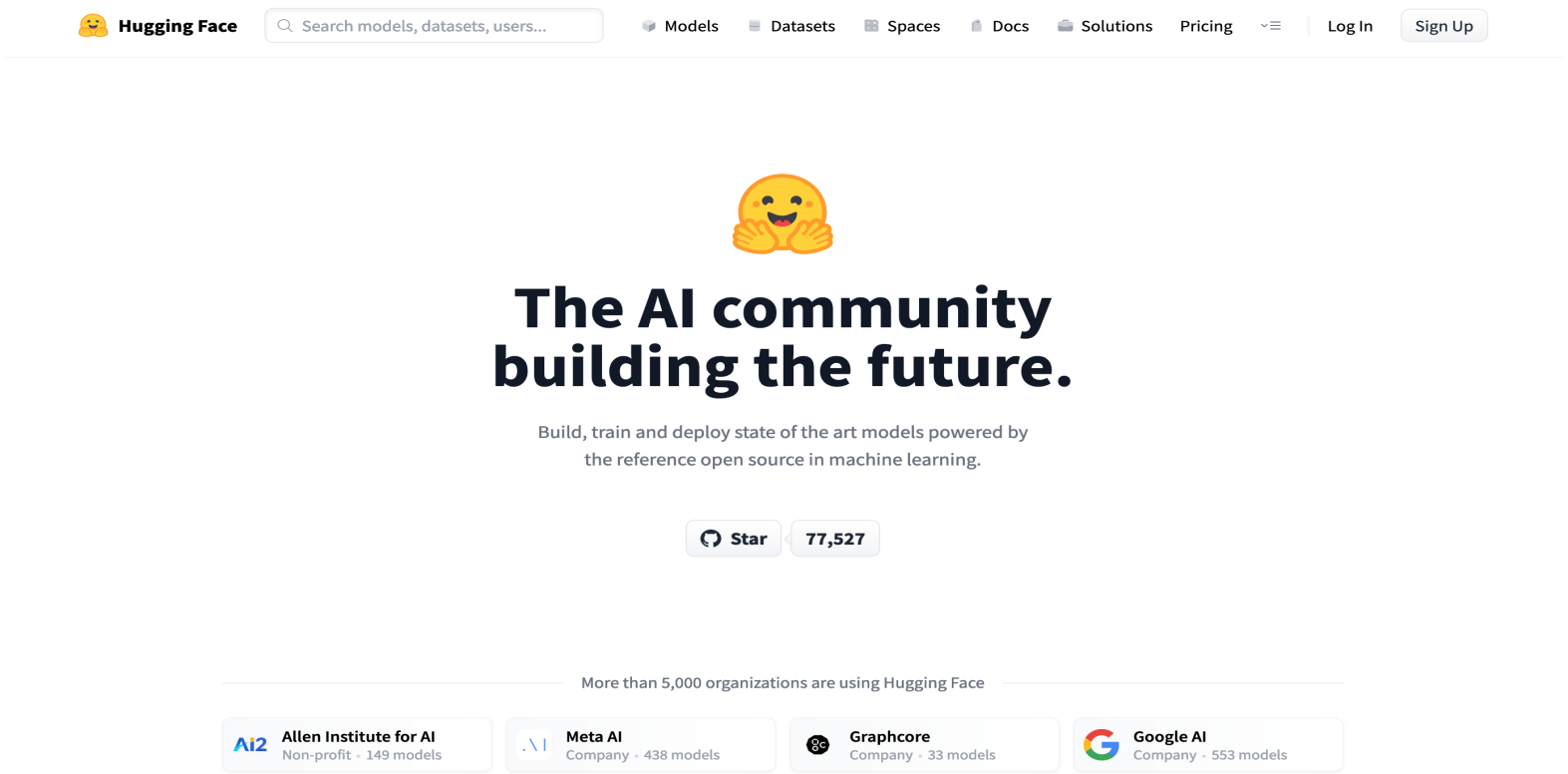
NLP


Hugging Face
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Models
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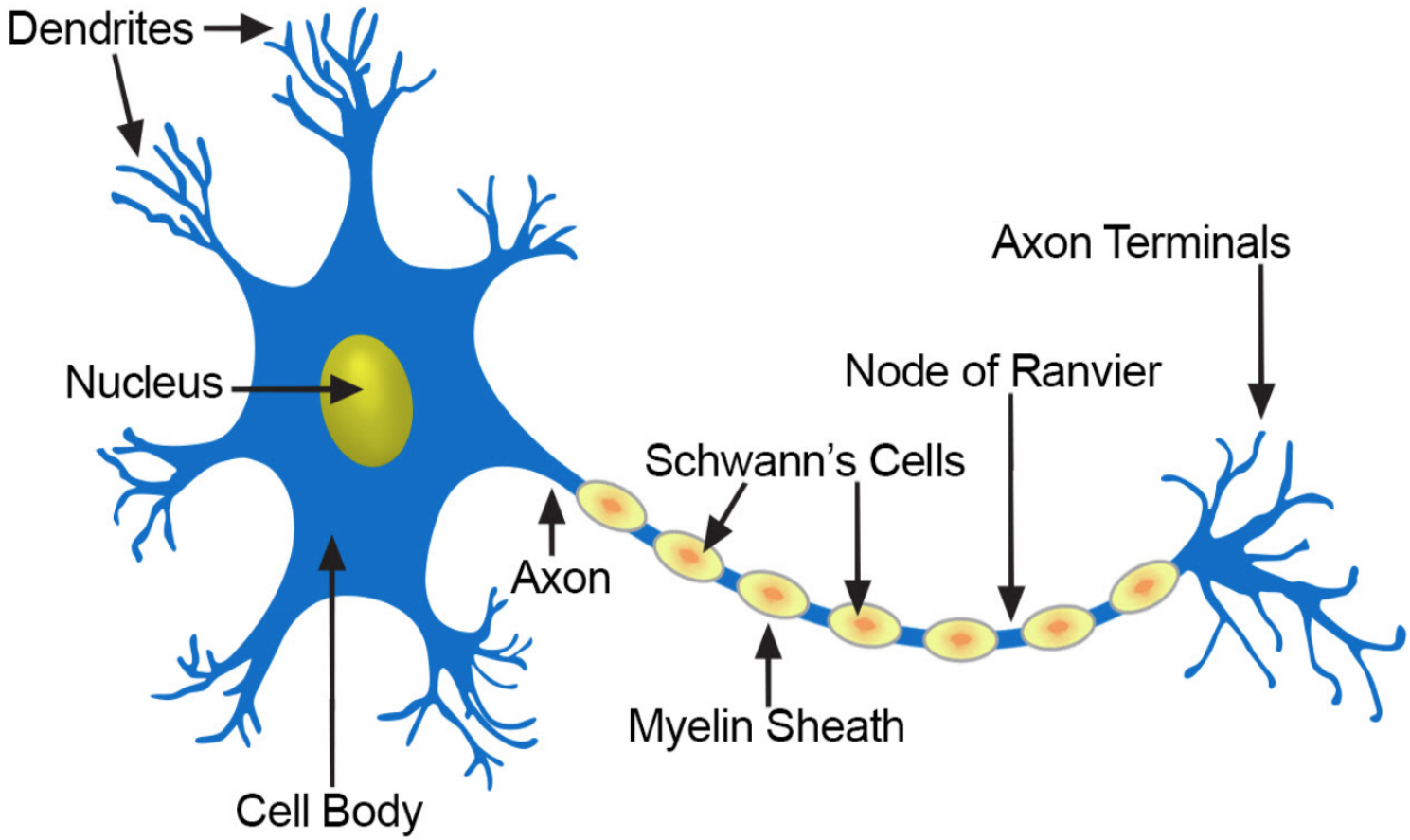
The AI community building the future.
Build, train and deploy state of the art models powered by the reference open source in machine learning.
Star
77,527
More than 5,000 organizations are using Hugging Face
Allen Institute for AI
Non-profit • 149 models
Meta AI
Company • 438 models
Graphcore
Company • 33 models
Google AI
Company • 553 models

Syllabus

Syllabus

Programming assignments

Neurons in the human brain



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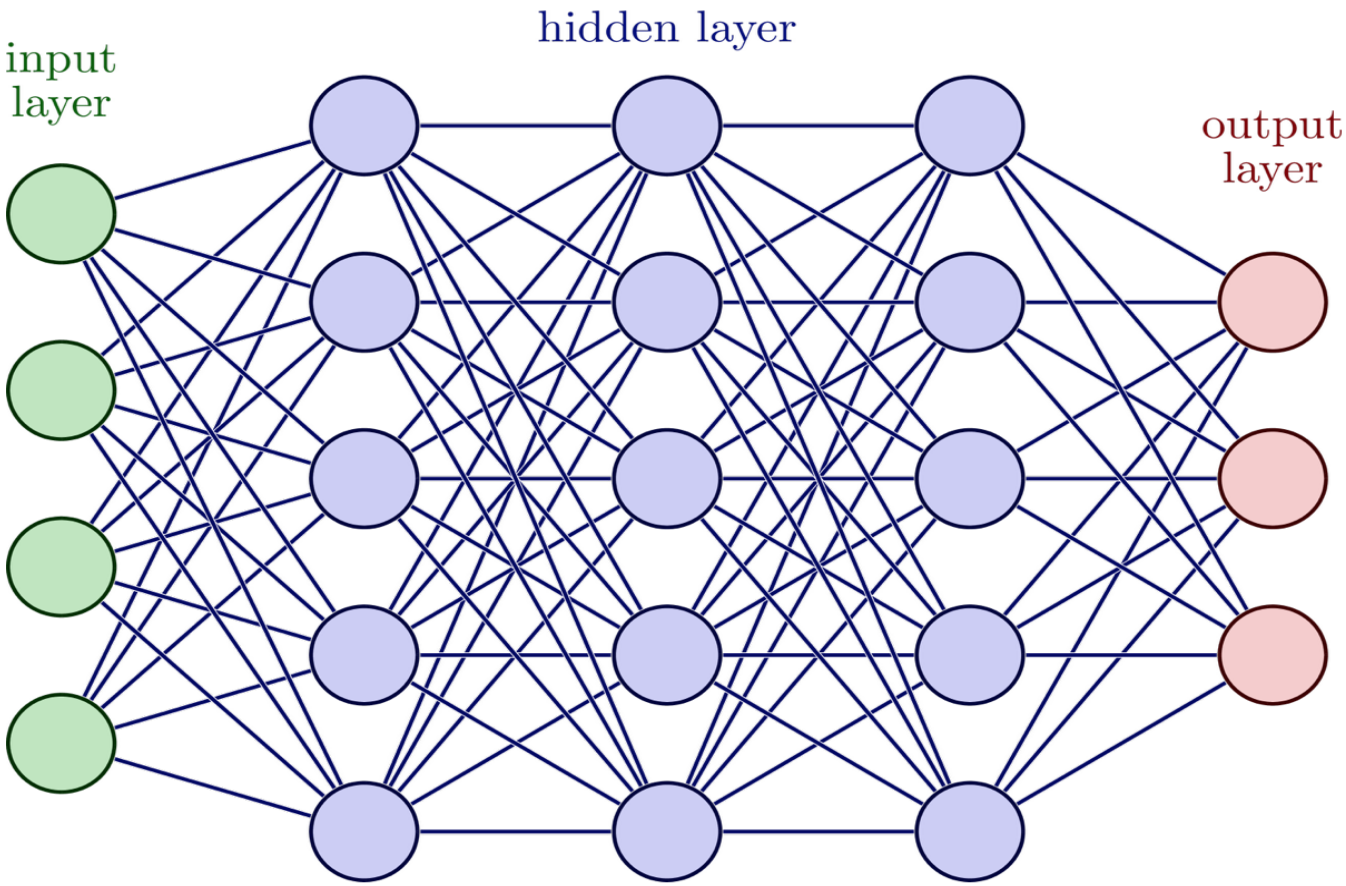
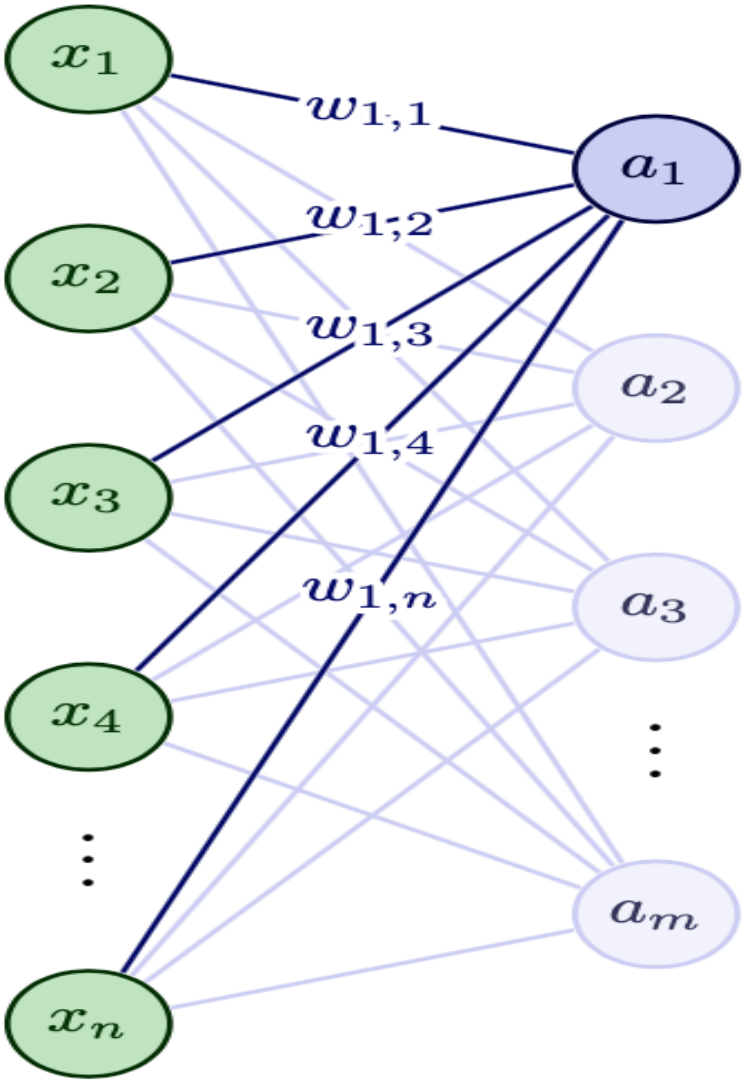
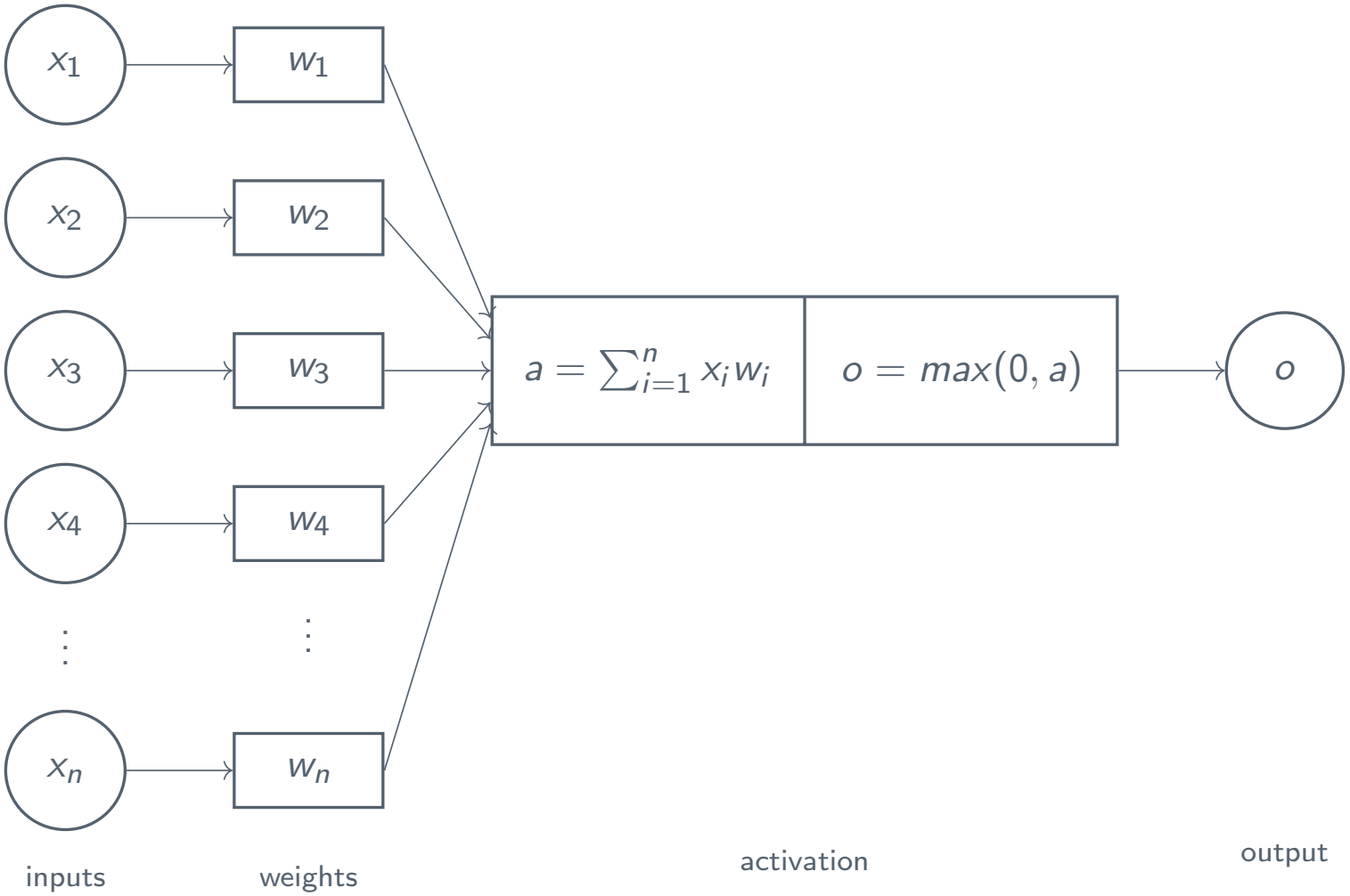
Neurons in neural networks



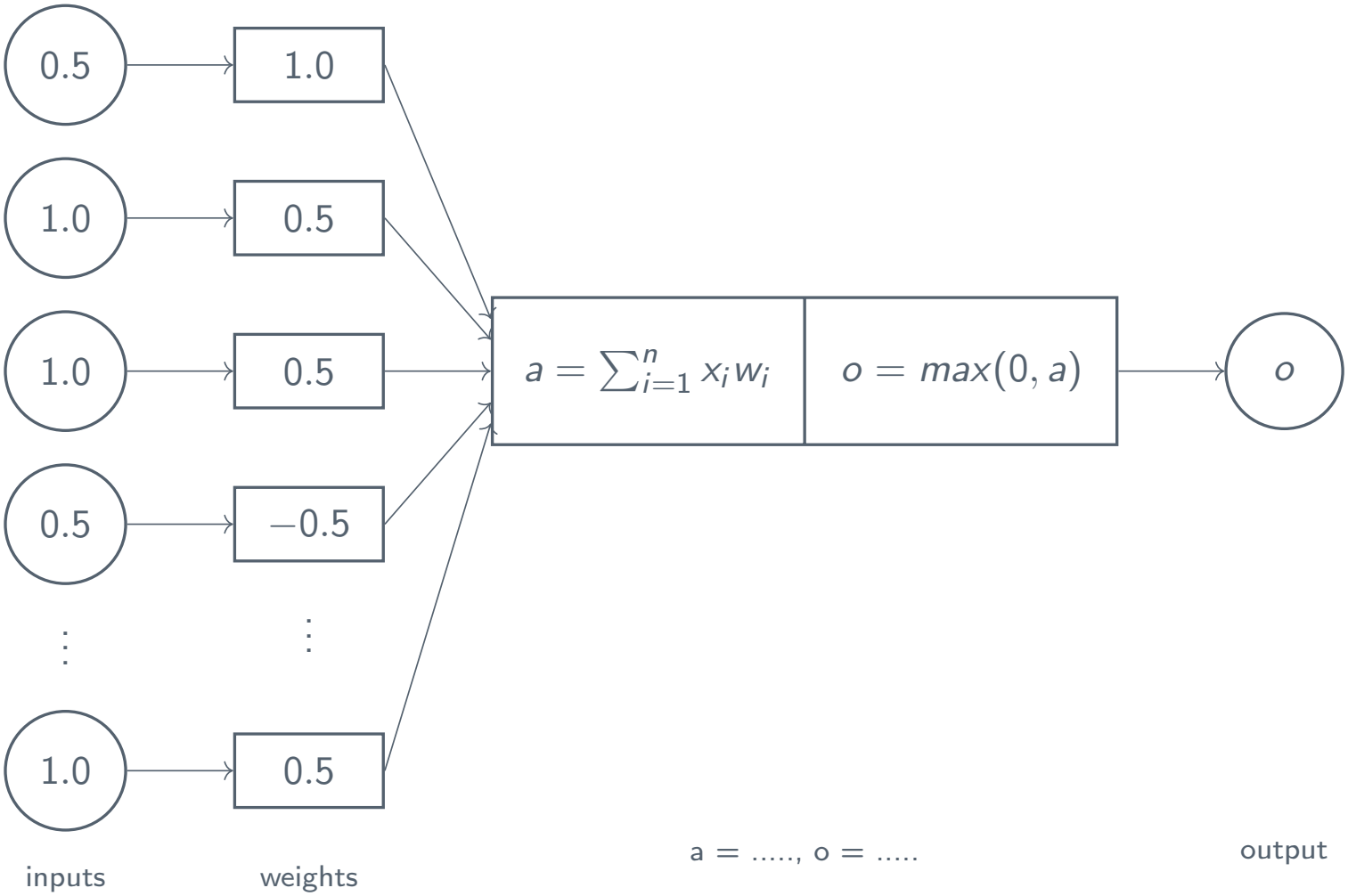
Neurons in neural networks



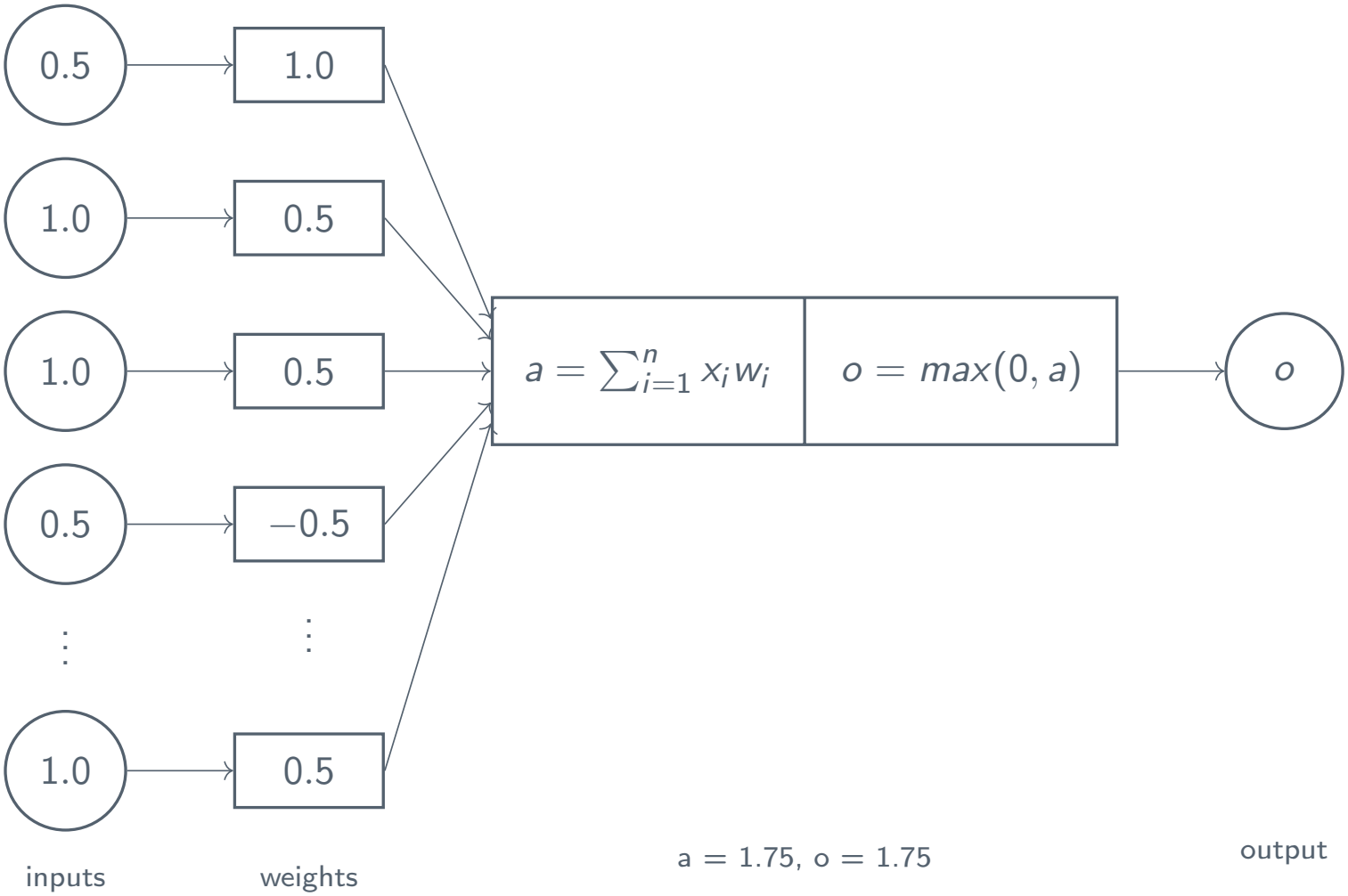
Neurons in neural networks



Neurons in neural networks



Neurons in neural networks: Answer



Neurons in neural networks: python


```python
import numpy as np

x = np.array([0.5, 1.0, 1.0, 0.5, 1.0])
w = np.array([1.0, 0.5, 0.5, -0.5, 0.5])

a = sum(x*w)

print(a)
# >> 1.75

def relu(i):
    return max(0,i)

o = relu(a)

print(o)
# >> 1.75
```

Tensors

Both x inputs and w weights are treated as tensors (vectors):

$$o(x) = f(\sum_{i=1}^{n} w_i x_i)$$

Vectors of x and w:

$$o = f\left(\begin{bmatrix} x_{11} & \dots & x_{N1} \end{bmatrix} \begin{bmatrix} w_0 \\ w_1 \end{bmatrix}\right)$$

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Vectors of x and w:

$$o = f\left(\begin{bmatrix}1.0 & 0.5 & 1.0\end{bmatrix}\begin{bmatrix}w_0 \\ w_1\end{bmatrix}\right)$$

Perceptrons

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Next time ...

Read chapter 1.