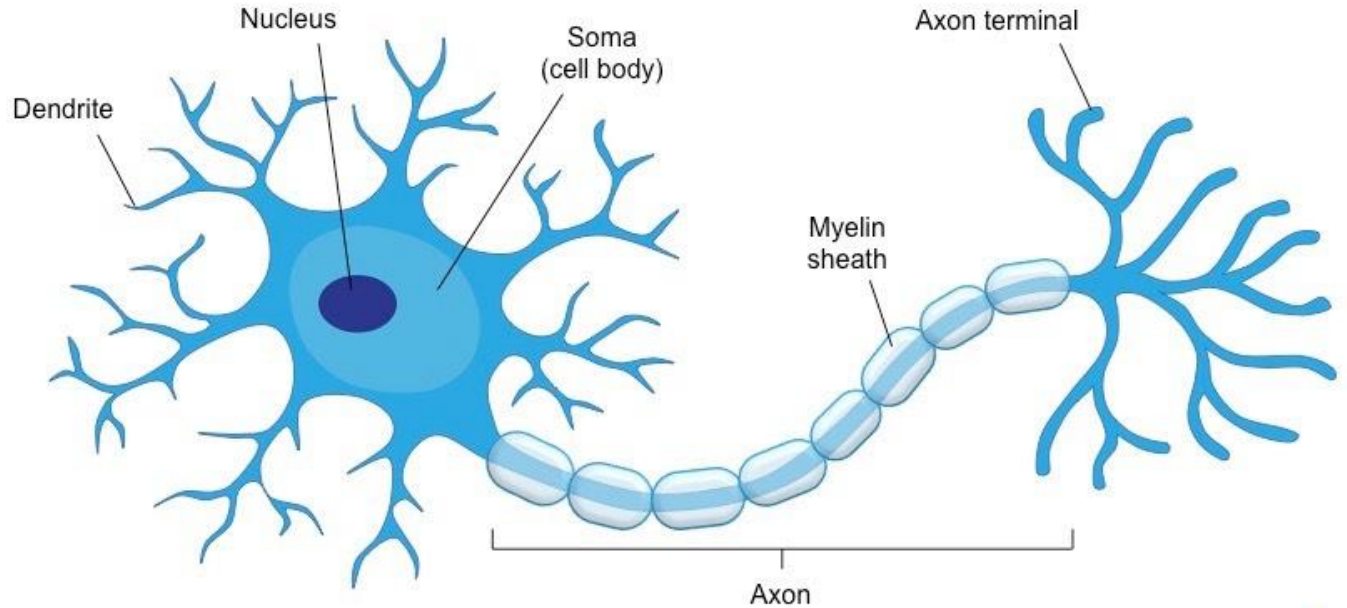# Neural Networks

1. Development of NNs
2. Biological Neurons
3. Perceptrons

Biological Neurons

Biological Neurons

Development of NNs

Dark Ages of Neural Networks

- NNs were invented in 1943 by McCulloch and Pitts, who presented a simplified computational model of how biological neurons worked together
- Until the late 2000s, other ML techniques offered better results and had stronger theoretical foundations

Why Deep Learning Works Now

- Huge quantities of data
  - NN outperforms all other methods when the size of the data is large and the problem is complex
- Increase in computing power
  - Moore's law, GPU advancements
- Improved training algorithms
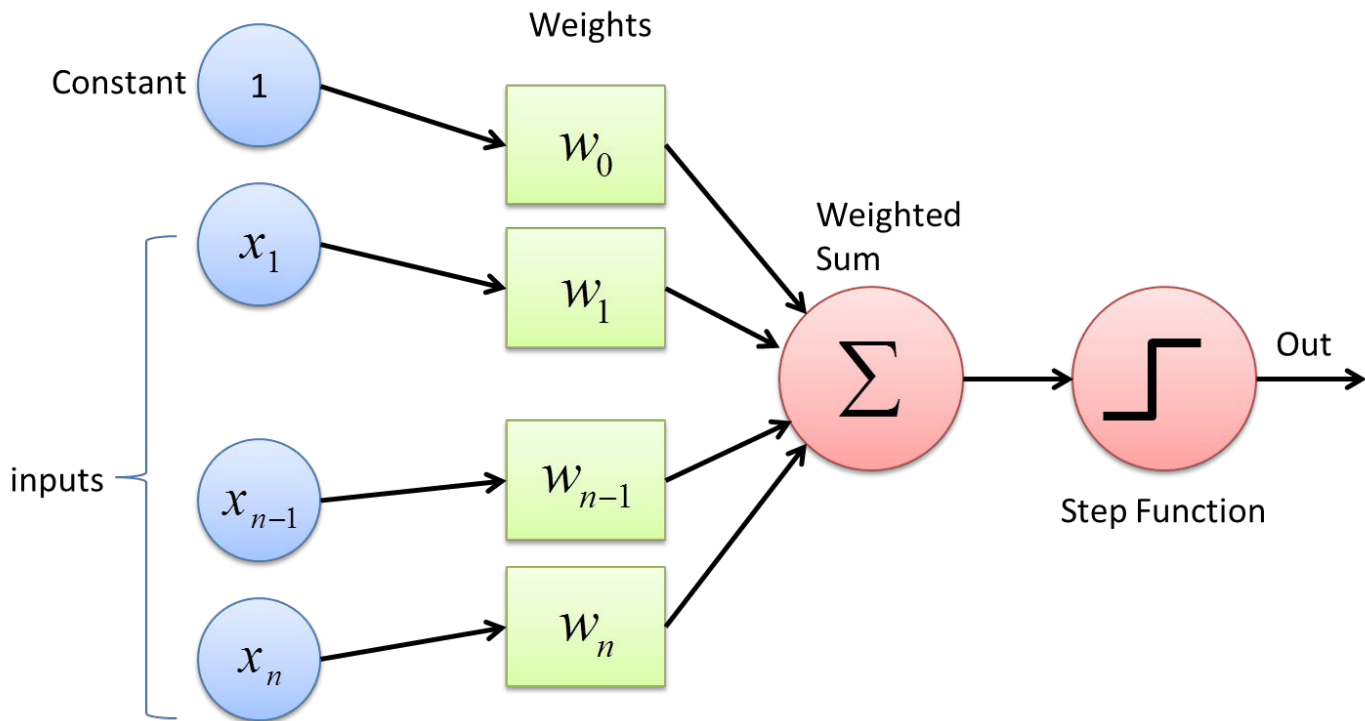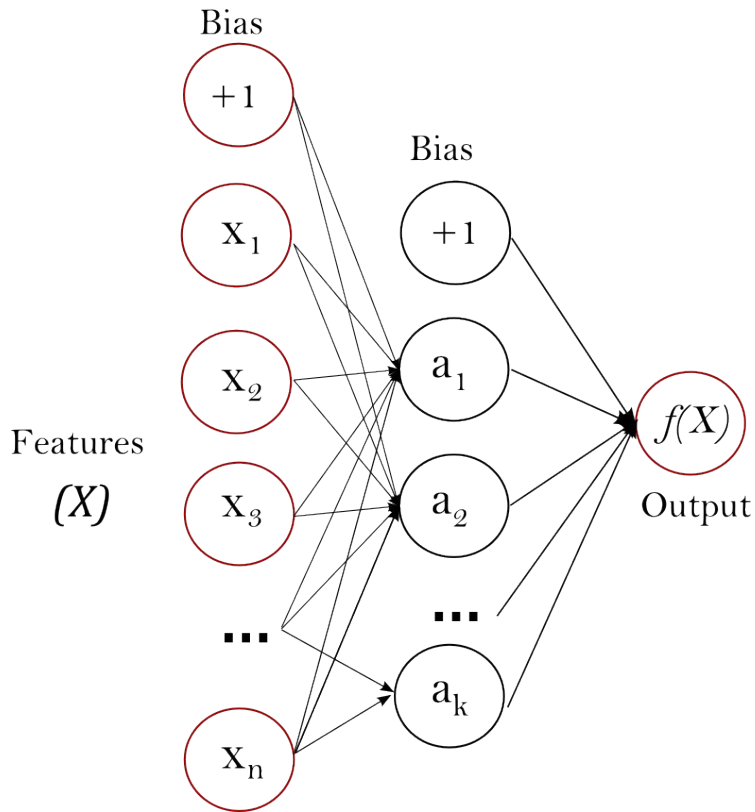- Huge amounts of success with a lot of funding
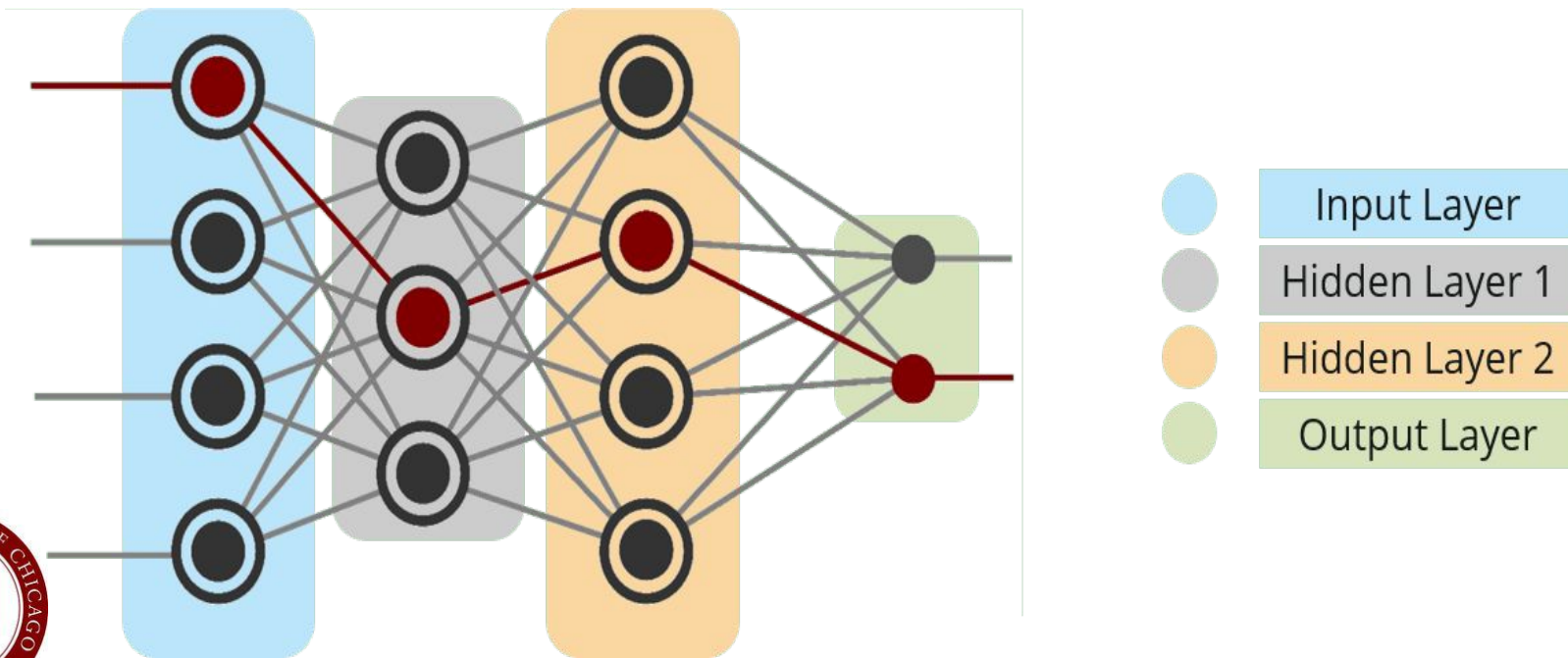
Perceptron

The Perceptron (A Single Neuron)

The Perceptron (Multiple Neurons)

The Perceptron (Multiple Layers)

Questions to Answer

1. In what ways is the perceptron like the biological neuron and in what ways is it different?
2. How many neurons do you need in the last layer of a multi-layer perceptron if you need to classify whether an image is a cat or a dog? What activation should you use in the last layer?