Getting Started with Neural Networks

Model Summary of Pre-trained model

```
In [5]: model.summary()
```

Layer (type)	Output Shape	Param #
input_2 (InputLayer)	(None, 224, 224, 3)	0
block1_conv1 (Conv2D)	(None, 224, 224, 64)	1792
block1_conv2 (Conv2D)	(None, 224, 224, 64)	36928
block1_pool (MaxPooling2D)	(None, 112, 112, 64)	0
block2_conv1 (Conv2D)	(None, 112, 112, 128)	73856
block2_conv2 (Conv2D)	(None, 112, 112, 128)	147584
block2_pool (MaxPooling2D)	(None, 56, 56, 128)	0
block3_conv1 (Conv2D)	(None, 56, 56, 256)	295168
block3_conv2 (Conv2D)	(None, 56, 56, 256)	590080
block3_conv3 (Conv2D)	(None, 56, 56, 256)	590080
block3_pool (MaxPooling2D)	(None, 28, 28, 256)	0
block4_conv1 (Conv2D)	(None, 28, 28, 512)	1180160
block4_conv2 (Conv2D)	(None, 28, 28, 512)	2359808
block4_conv3 (Conv2D)	(None, 28, 28, 512)	2359808
block4_pool (MaxPooling2D)	(None, 14, 14, 512)	0
block5_conv1 (Conv2D)	(None, 14, 14, 512)	2359808
block5_conv2 (Conv2D)	(None, 14, 14, 512)	2359808
block5_conv3 (Conv2D)	(None, 14, 14, 512)	2359808
block5_pool (MaxPooling2D)	(None, 7, 7, 512)	0

```
Total params: 14,714,688
Trainable params: 14,714,688
Non-trainable params: 0
```

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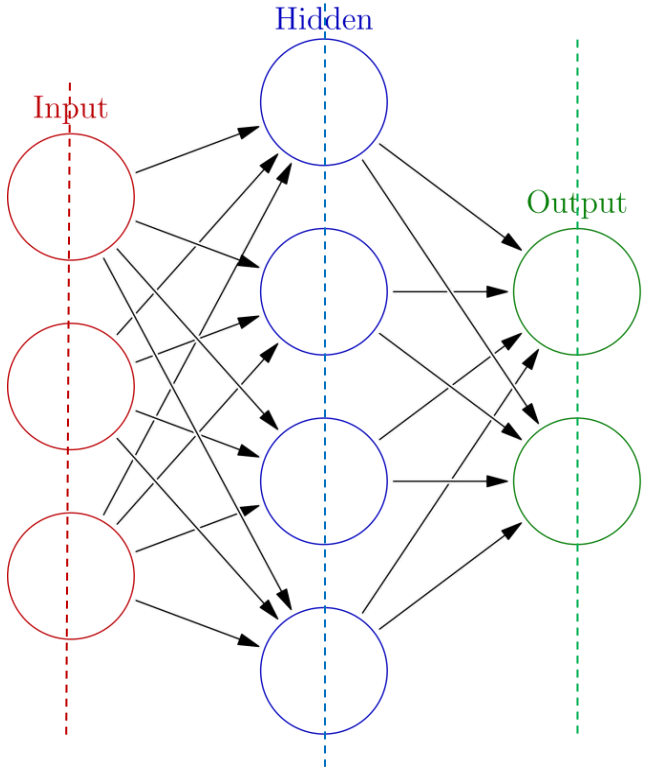
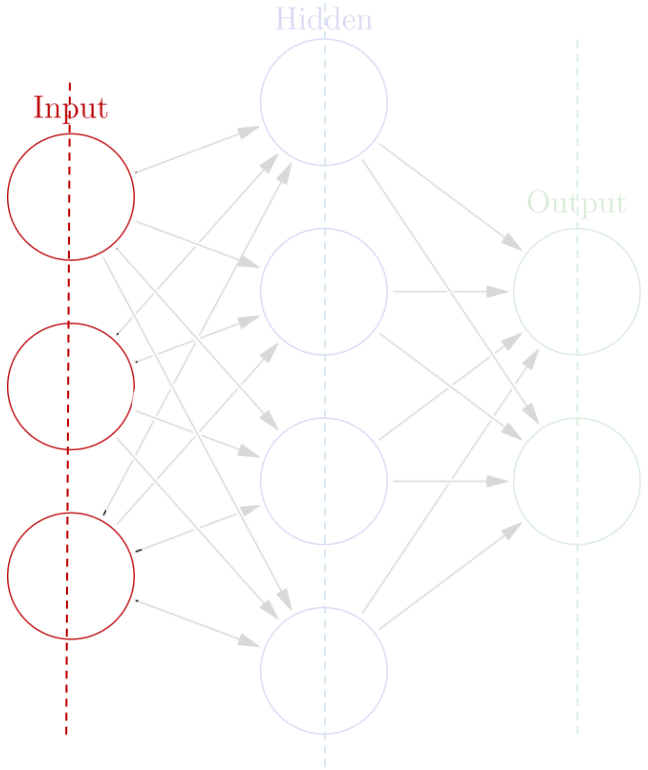
Building blocks of NN

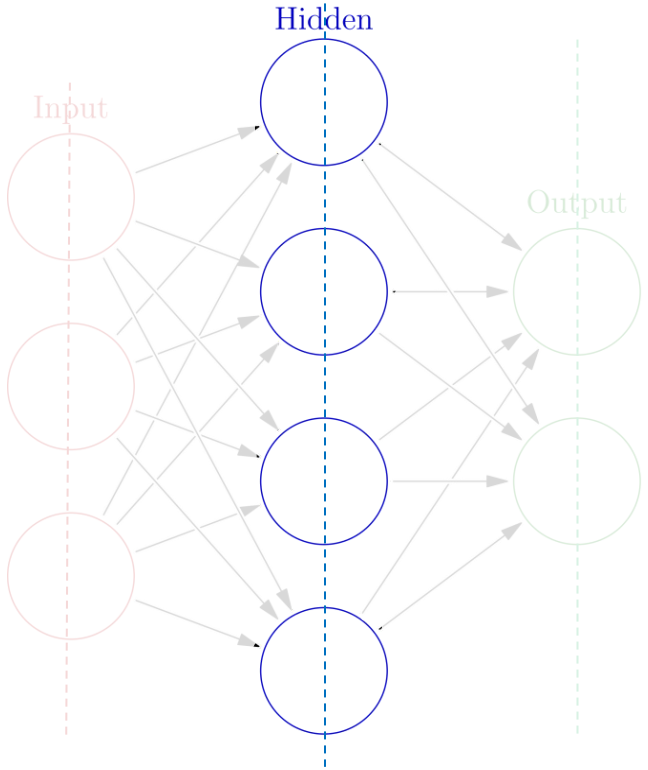


Building blocks of NN

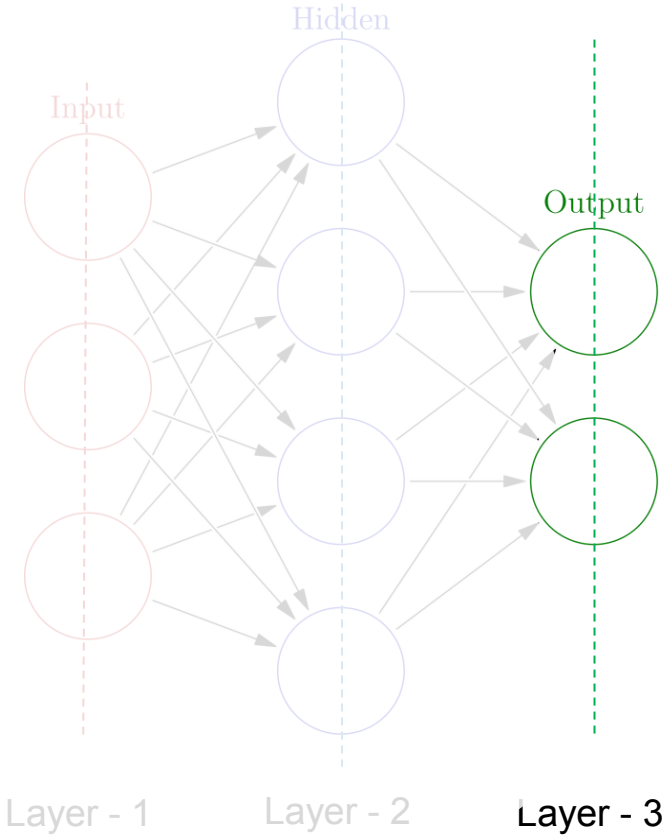


Layer - 1 Layer - 2 Layer - 3

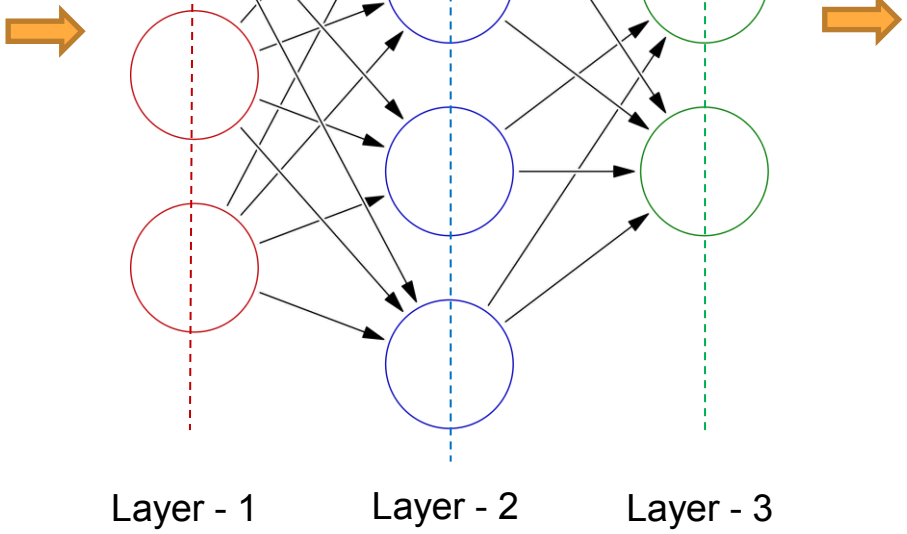
Building blocks of NN



Building blocks of NN

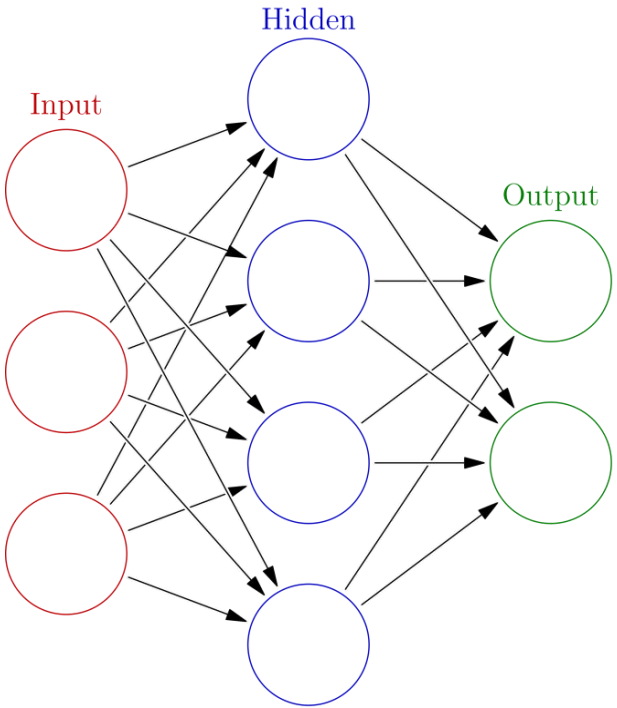


Building blocks of NN

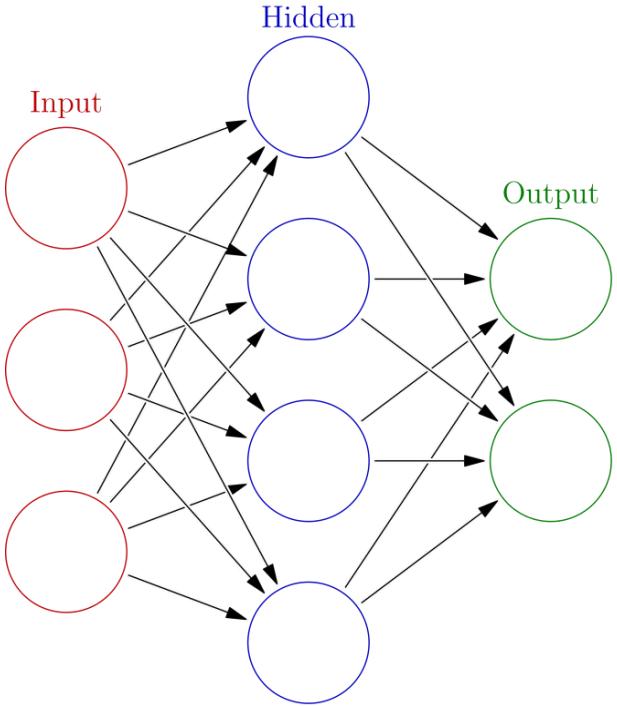


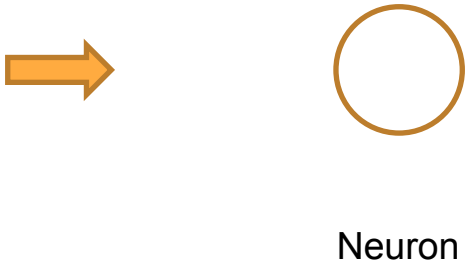
Emergency Vehicle

Elementary Unit of a layer



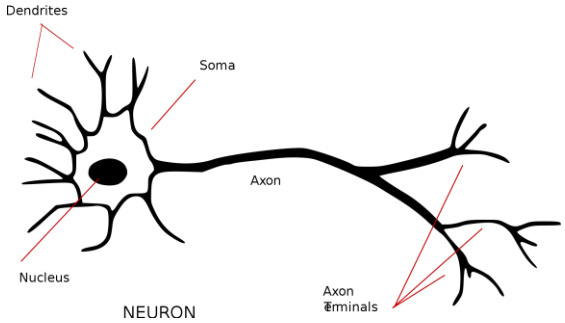
Elementary Unit of a layer



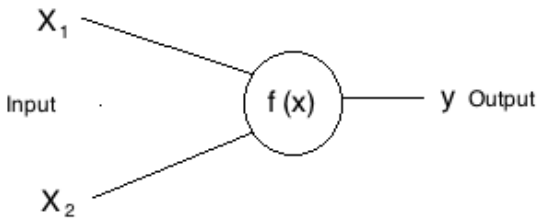


Neuron

Biologically inspired Neuron

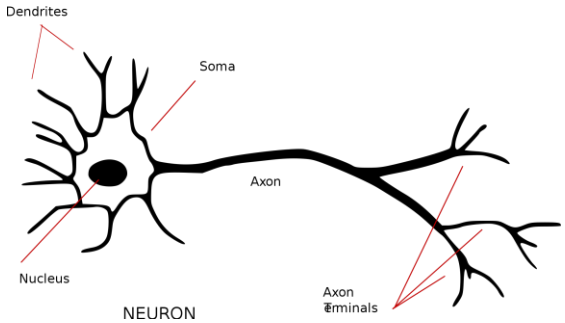


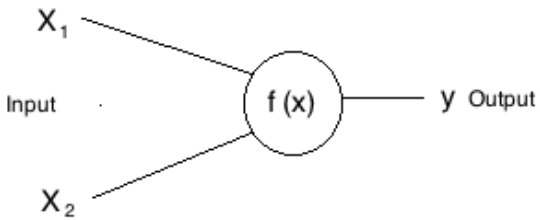
Biological Neuron



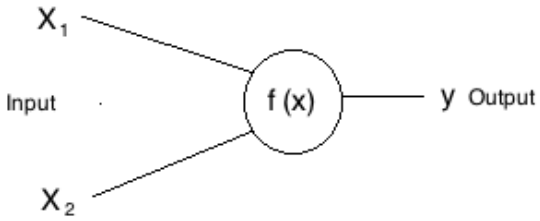
Artificial Neuron

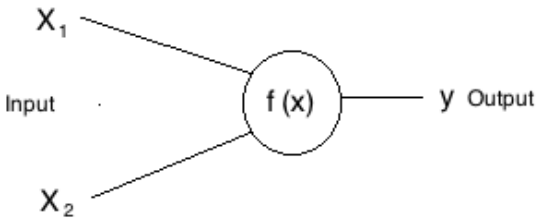
Biologically inspired Neuron

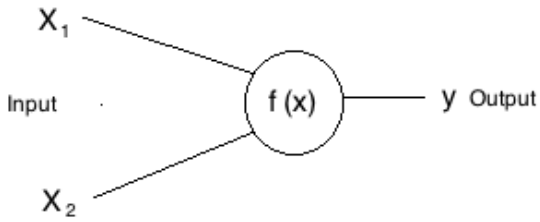




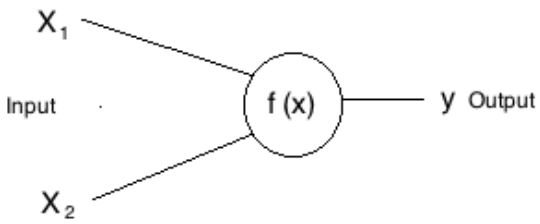
Firing of a Neuron







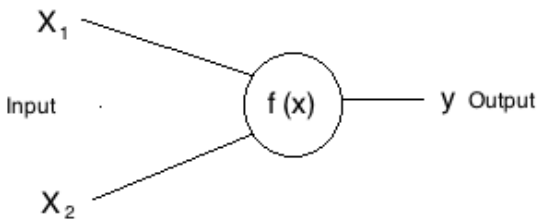
Bias of a Neuron.



$$x_1 + x_2 > threshold$$ *Fire*

$$x_1 + x_2 < threshold$$ *No Fire*

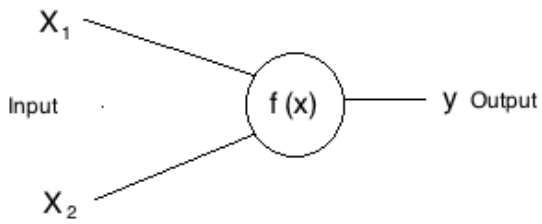
Bias of a Neuron.



$$x_1 + x_2 - threshold > 0 \qquad \textit{Fire} \qquad x_1 + x_2 + bias > 0$$

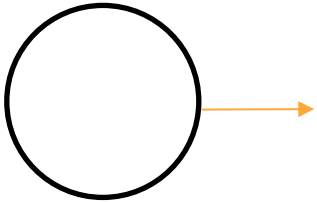
$$x_1 + x_2 - threshold < 0 \qquad \textit{No Fire} \qquad x_1 + x_2 + bias < 0$$

Weights of a Neuron.



$$x_1 + x_2 + bias > 0$$

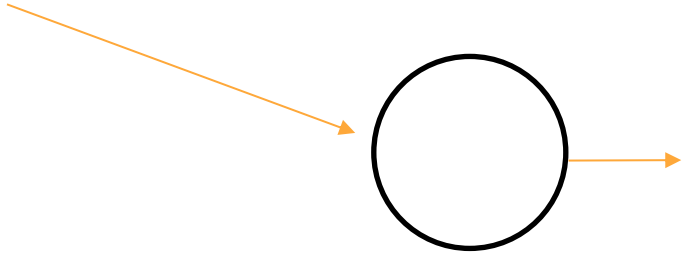
Weights of a Neuron.



Should go to the party?

Weights of a Neuron.

x1 = Is the weather good?

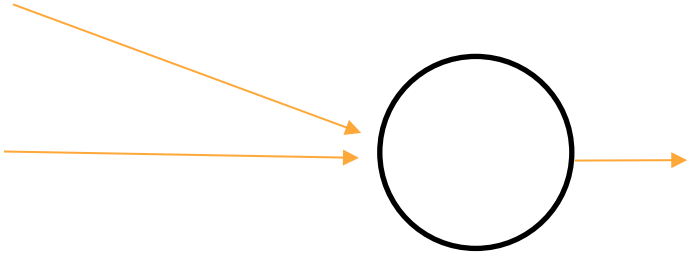


Should go to the party?

Weights of a Neuron.

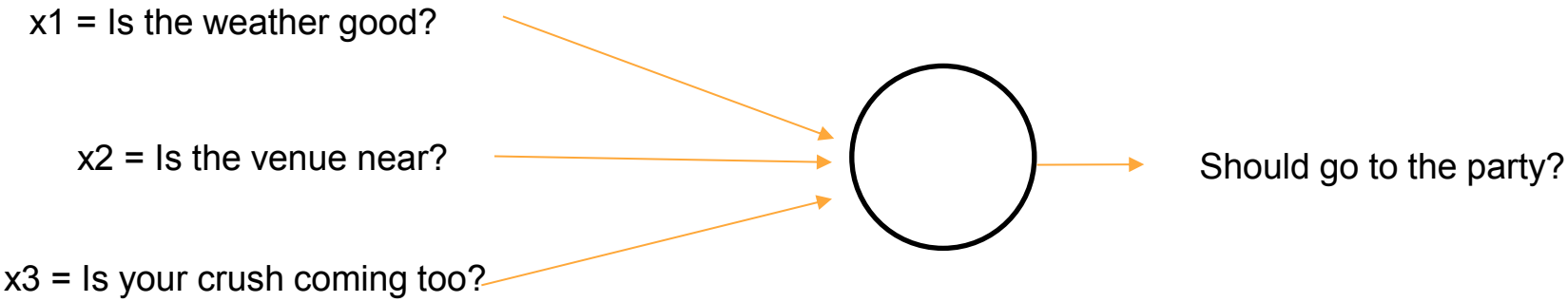
x1 = Is the weather good?

x2 = Is the venue near?

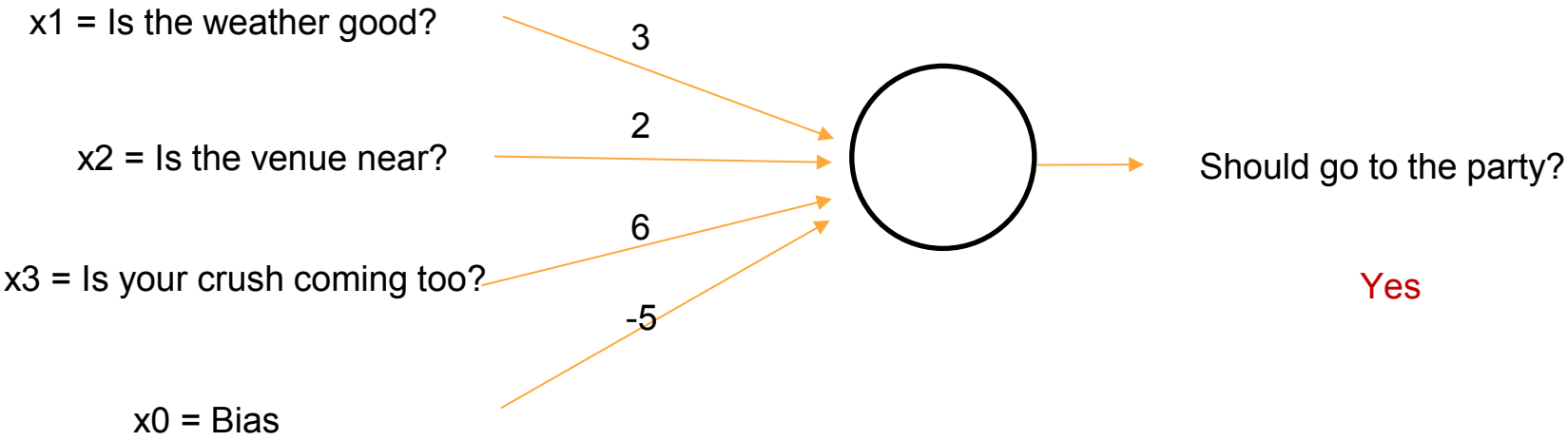


Should go to the party?

Weights of a Neuron.

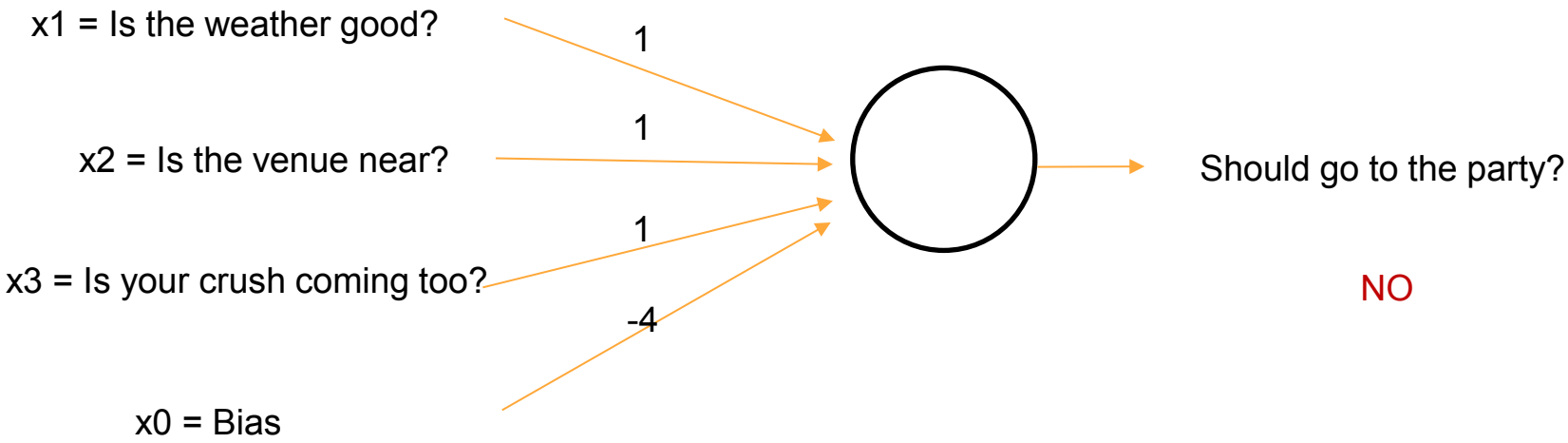


Weights of a Neuron



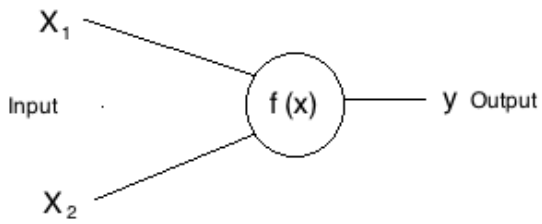
X0(w0)	X1(w1)	X2(w2)	X3(w3)	y
1(-5)	0(3)	0(2)	1(6)	1

Weights of a Neuron



X0(w0)	X1(w1)	X2(w2)	X3(w3)	y
1(-5)	0(3)	0(2)	1(6)	1
1(-4)	1(1)	1(1)	1(1)	-1

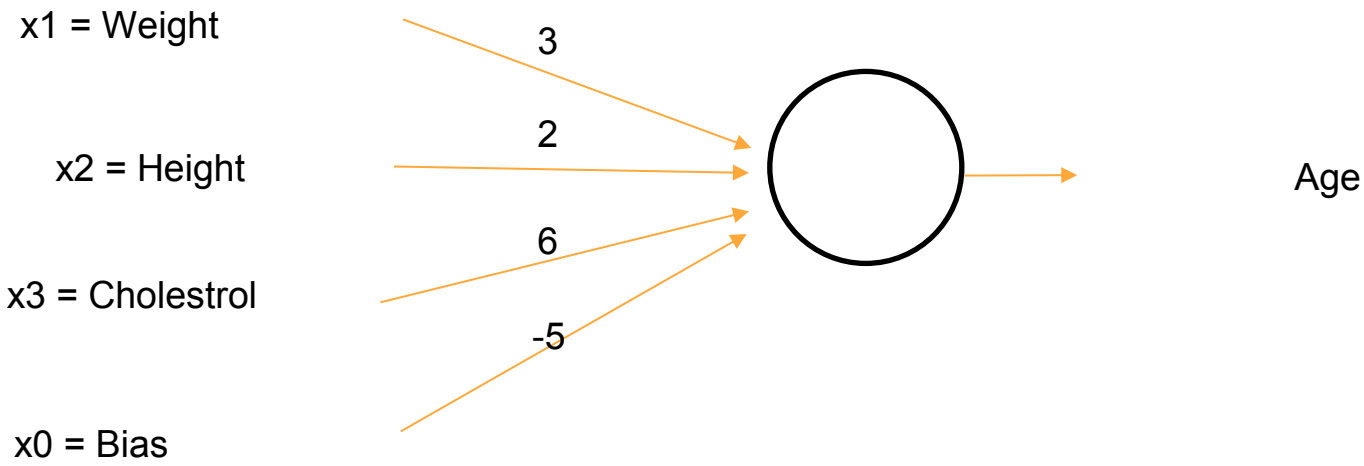
Activation Function



$$y = w_0.x_0 + w_1.x_1 + w_2.x_2$$

$$y \epsilon (-\infty, \infty)$$

Weights of a Neuron



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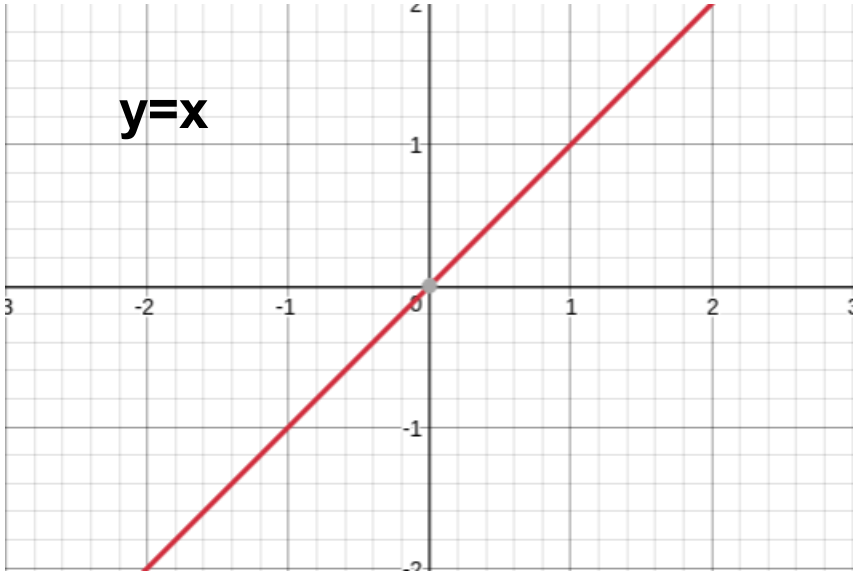
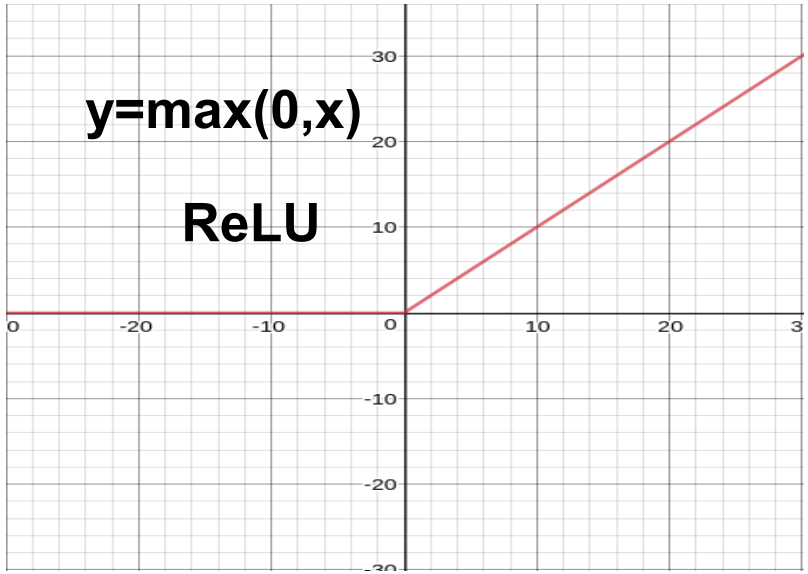
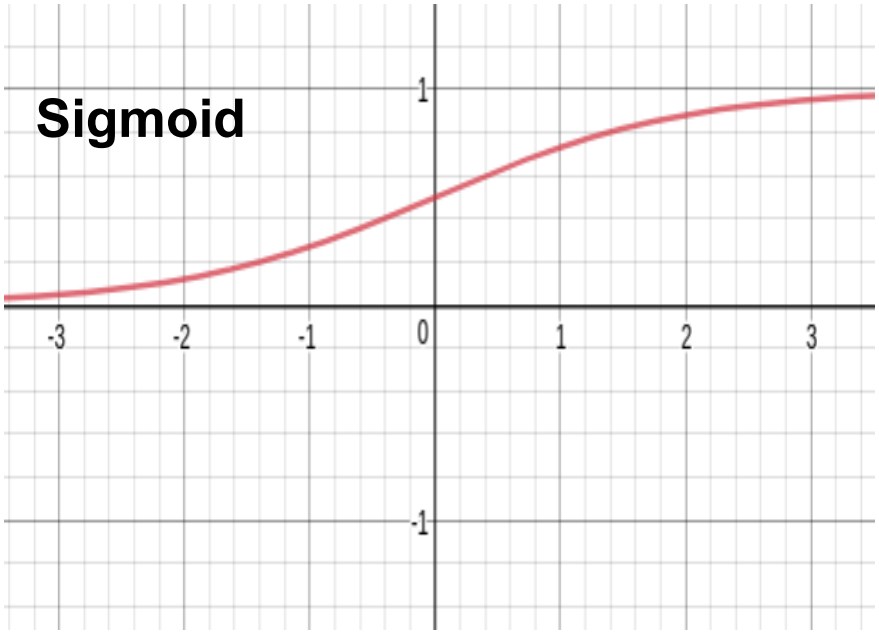
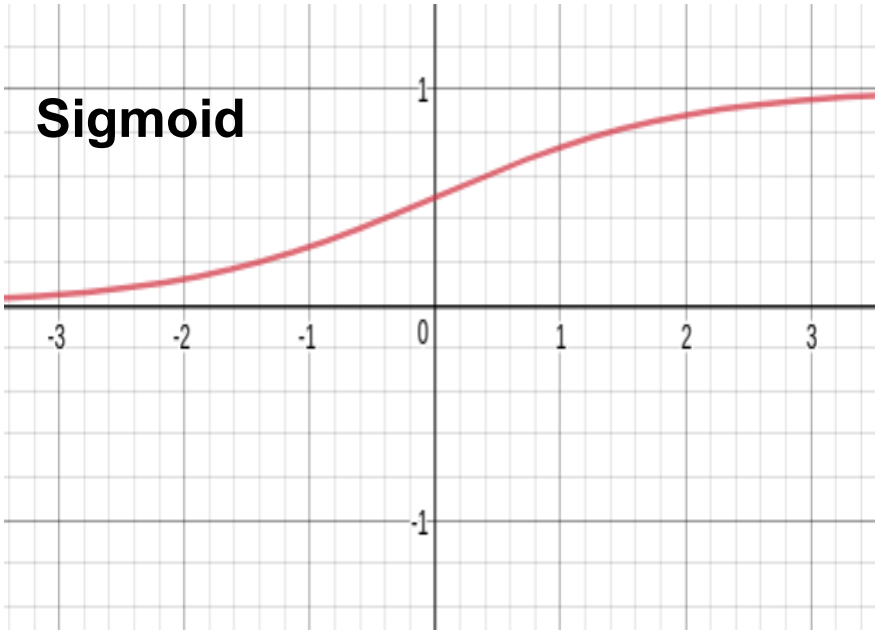


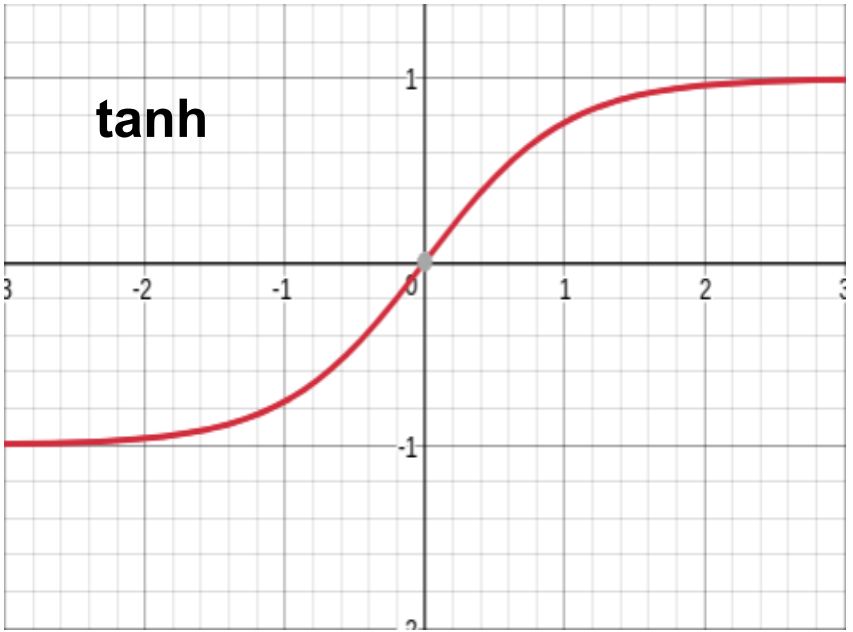


Activation Function

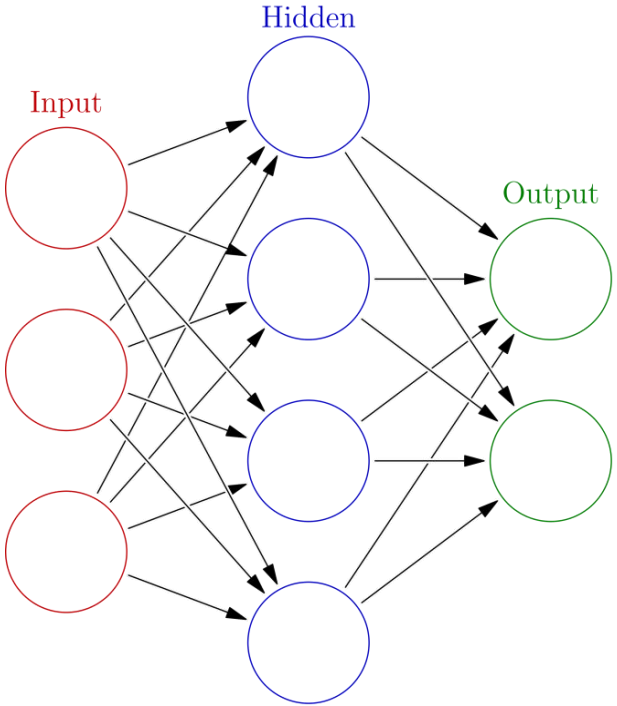


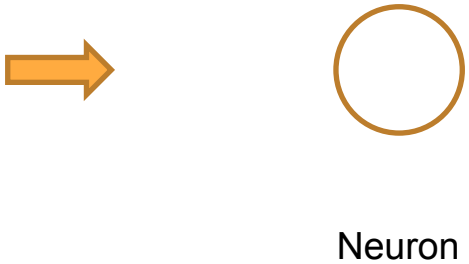
Activation Function





Recap of Neural Networks





Neuron

Thank you