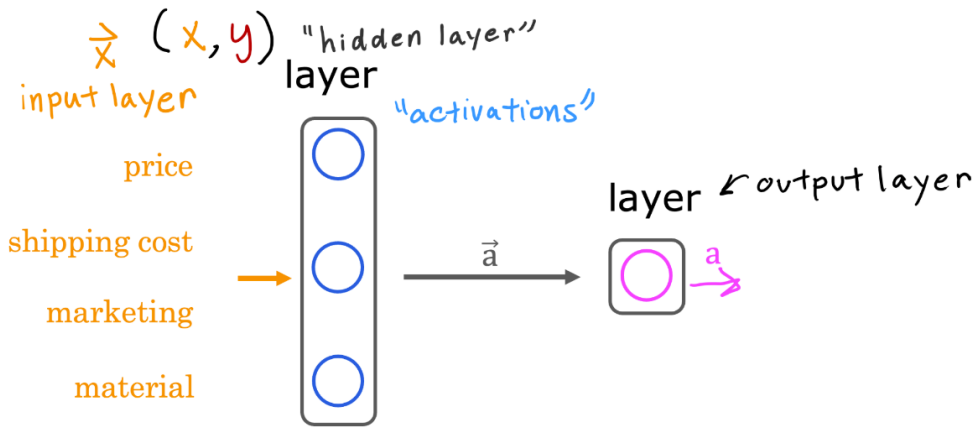
1. 1 point



Which of these are terms used to refer to components of an artificial neural network? (hint: three of these are correct)

- [x] neurons
- [x] layers
- [ ] axon
- [x] activation function

2. True/False? Neural networks take inspiration from, but do not very accurately mimic, how neurons in a biological brain learn. 1 point

- (•) True
- ( ) False

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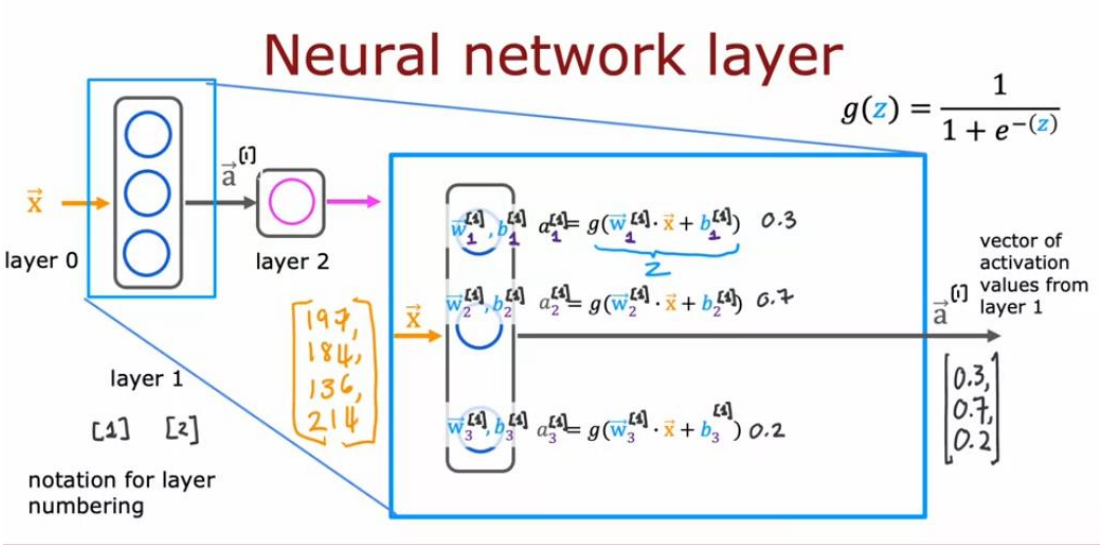
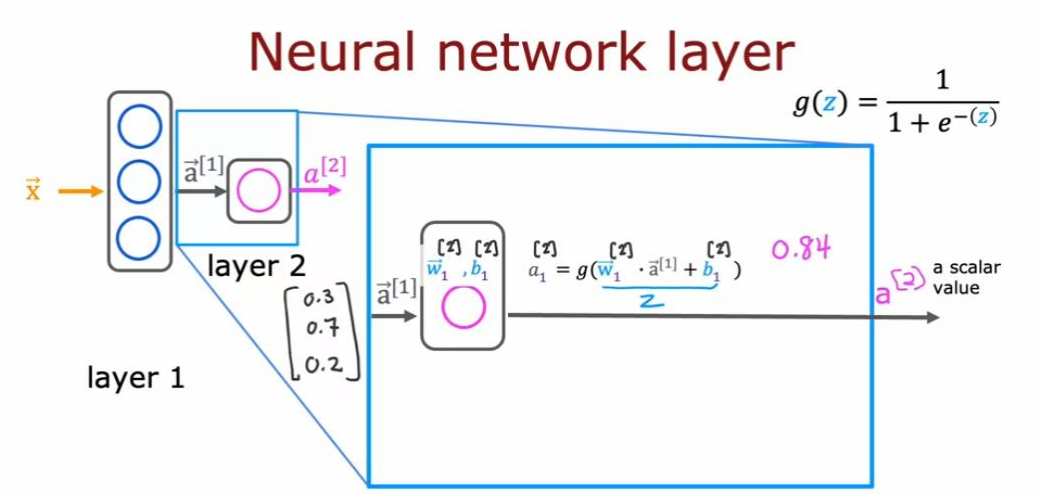
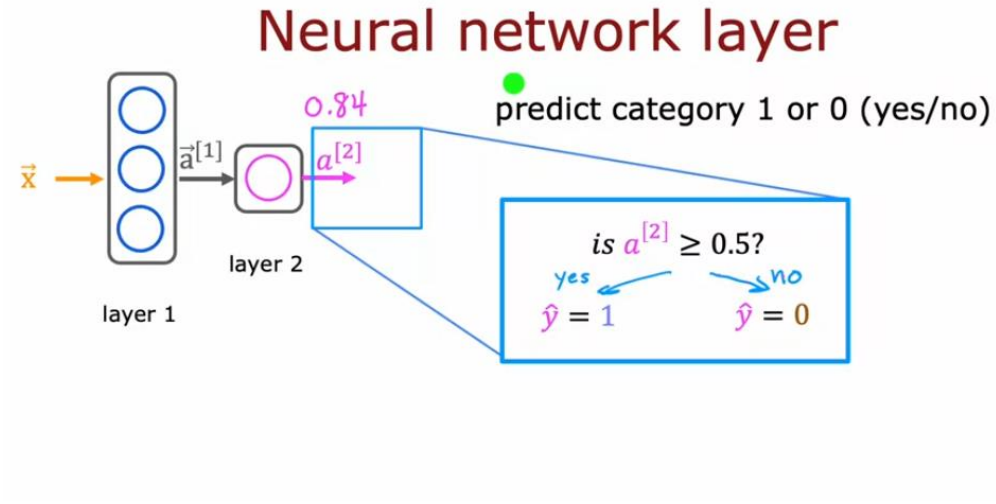
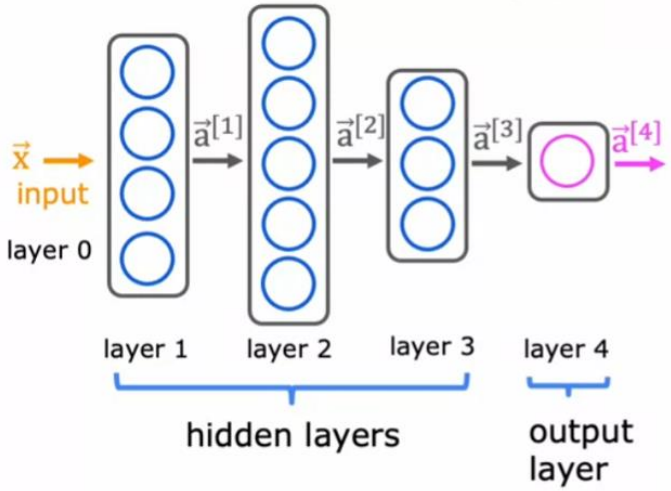


A üstü parantez sayı hangi katmana ait olduğunu gösterir.

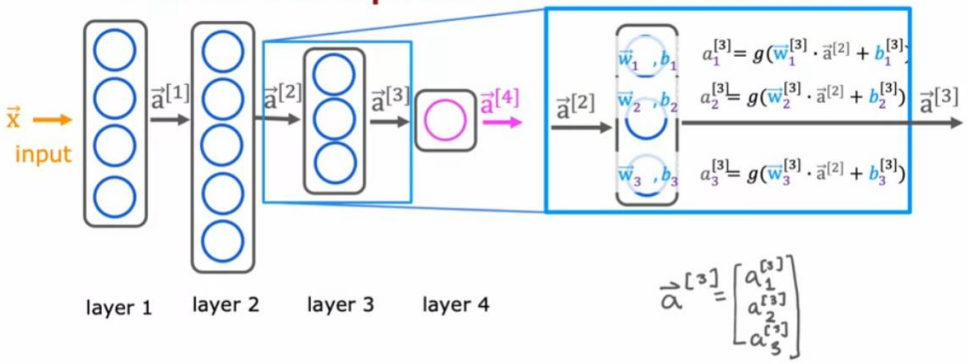




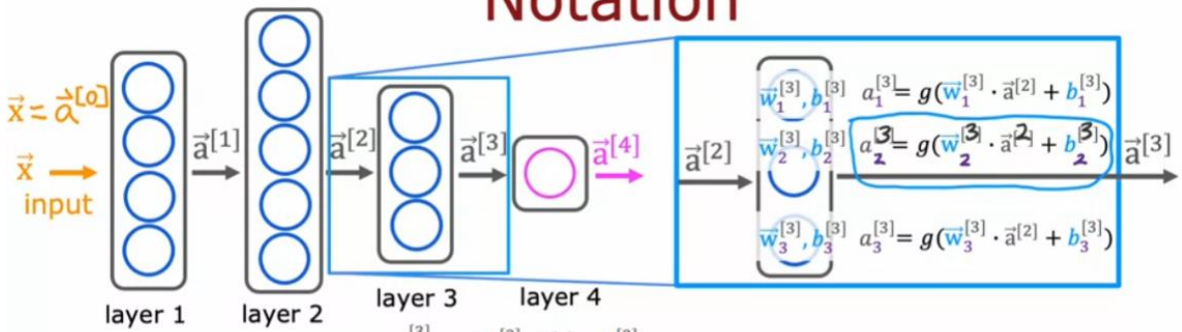
More complex neural network



More complex neural network



Notation



$a_2^{[3]} = g(\vec{w}_2^{[3]} \cdot \vec{a}^{[2]} + b_2^{[3]})$

Activation value of layer l, unit(neuron) j

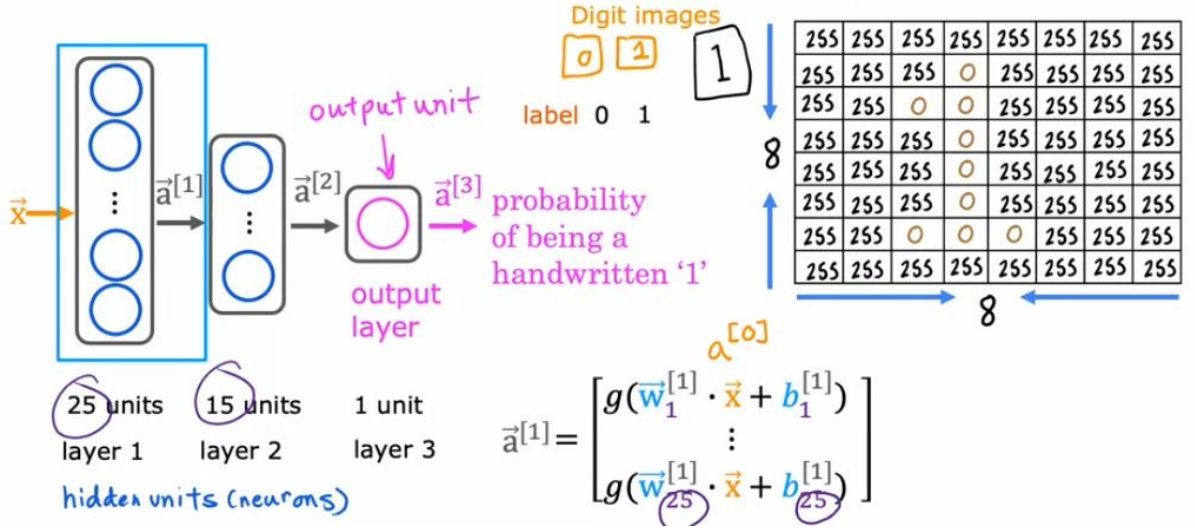
output of layer $l-1$ (previous layer)

$$a_j^{[l]} = g(\vec{w}_j^{[l]} \cdot \vec{a}^{[l-1]} + b_j^{[l]})$$

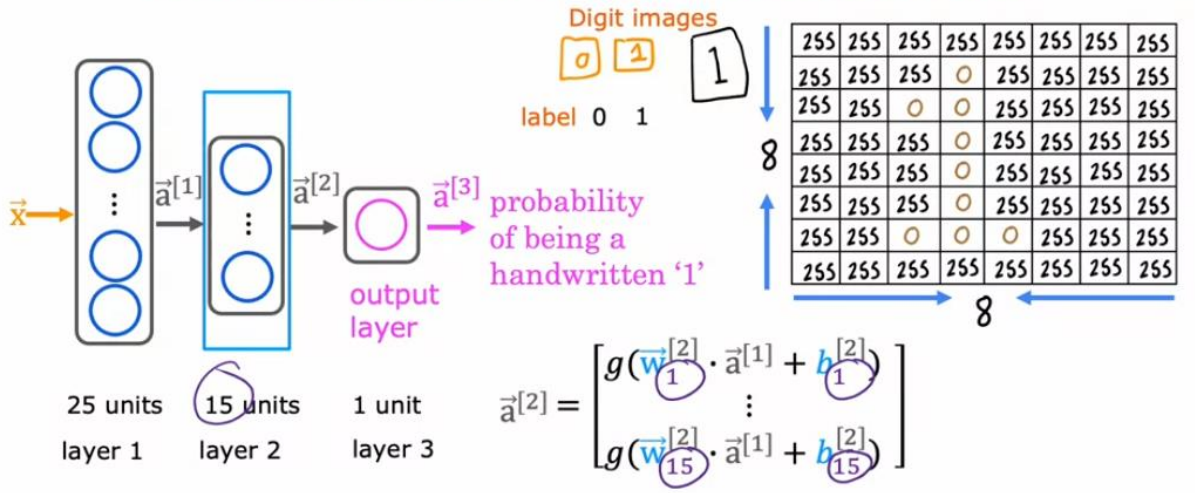
sigmoid "activation function"

Parameters w & b of layer l, unit j

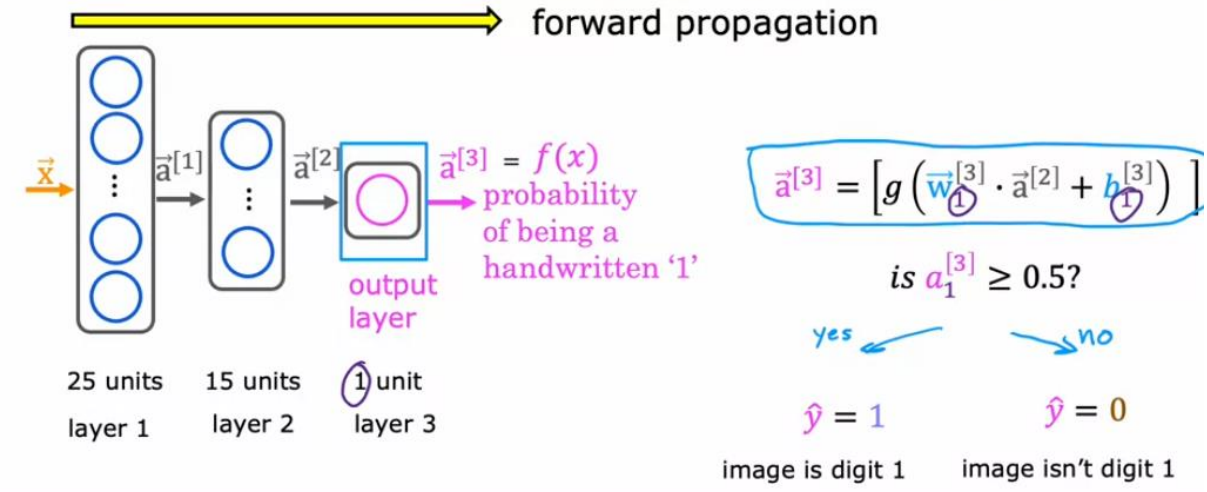
Handwritten digit recognition



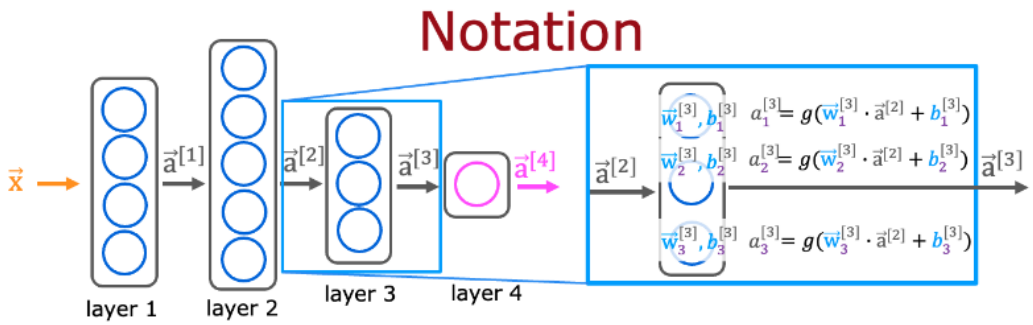
Handwritten digit recognition



Handwritten digit recognition



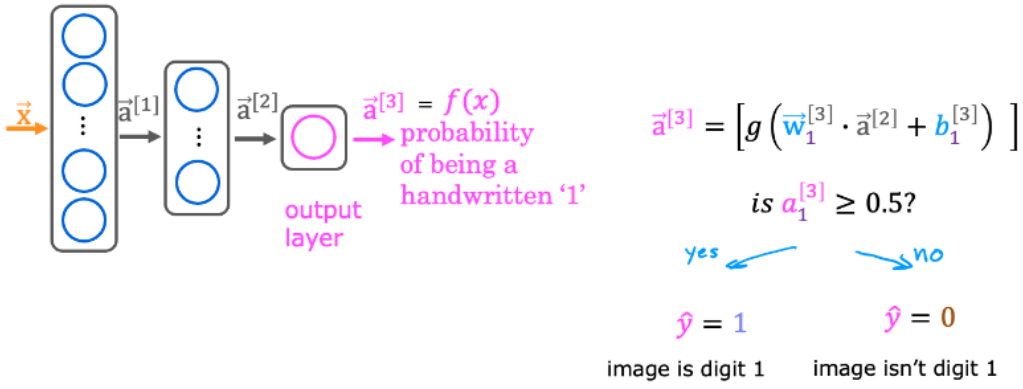
1. 1 point



For a neural network, what is the expression for calculating the activation of the third neuron in layer 2? Note, this is different from the question that you saw in the lecture video.

- $a_3^{[2]} = g(\vec{w}_3^{[2]} \cdot \vec{a}^{[2]} + b_3^{[2]})$
- (selected) $a_3^{[2]} = g(\vec{w}_3^{[2]} \cdot \vec{a}^{[1]} + b_3^{[2]})$
- $a_3^{[2]} = g(\vec{w}_2^{[3]} \cdot \vec{a}^{[2]} + b_2^{[3]})$
- $a_3^{[2]} = g(\vec{w}_2^{[3]} \cdot \vec{a}^{[1]} + b_2^{[3]})$

2. 1 point



For the handwriting recognition task discussed in lecture, what is the output $a_1^{[3]}$?

- A vector of several numbers, each of which is either exactly 0 or 1
- A vector of several numbers that take values between 0 and 1
- A number that is either exactly 0 or 1, comprising the network's prediction
- (selected) The estimated probability that the input image is of a number 1, a number that ranges from 0 to 1.

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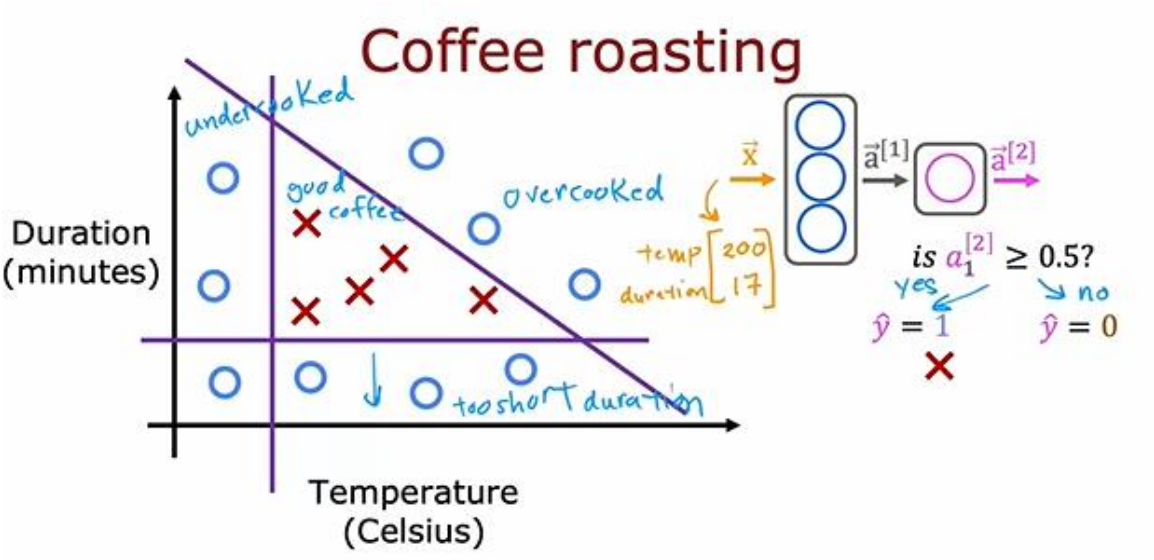
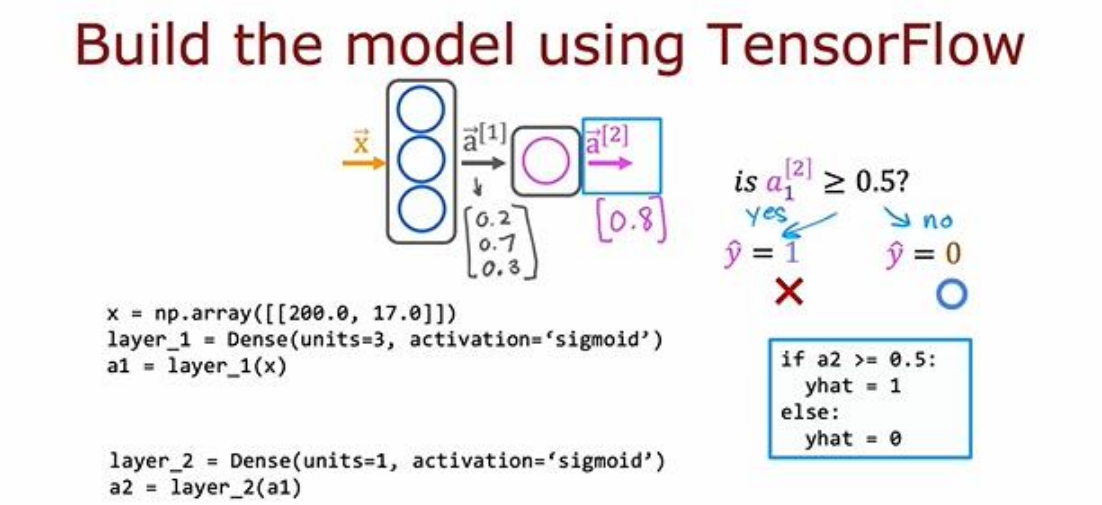
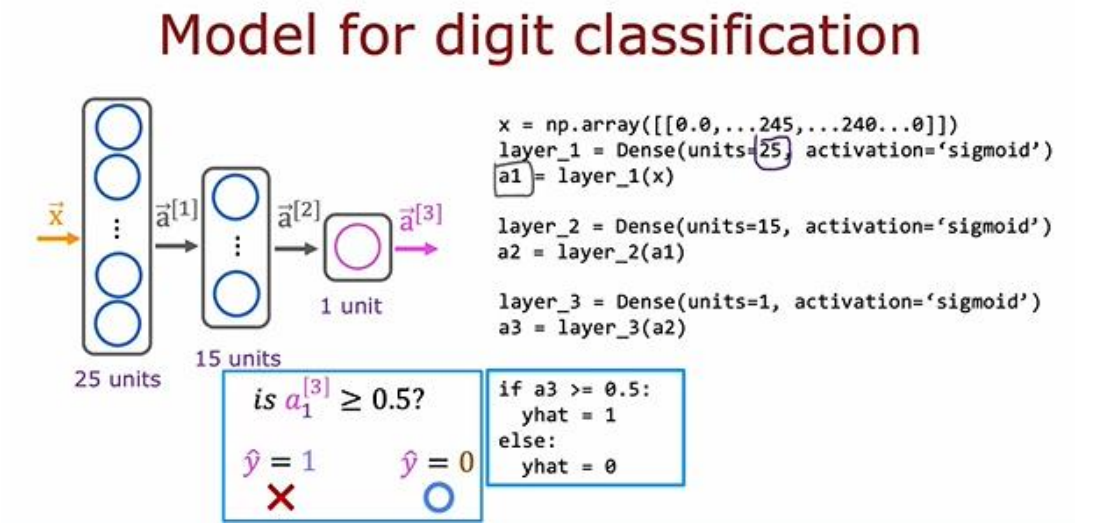
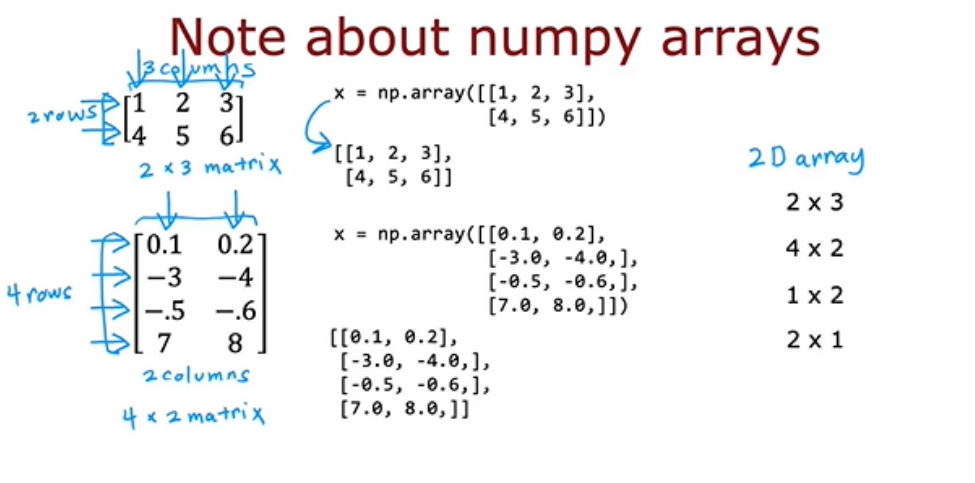
Inference in Code

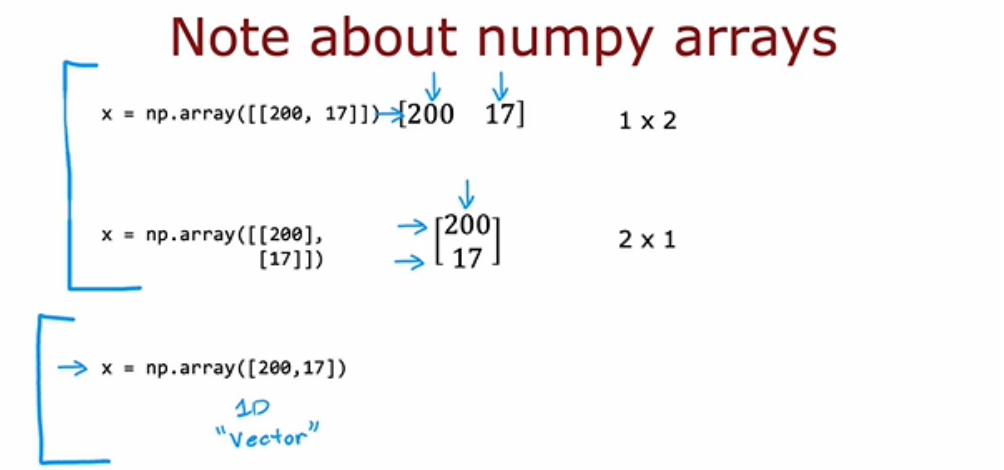


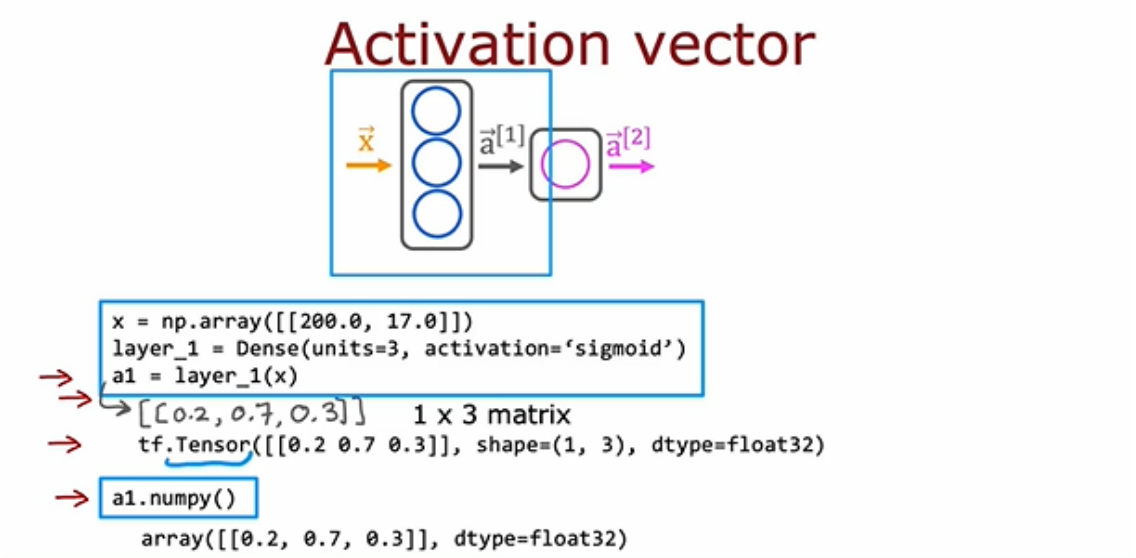




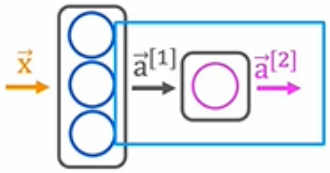
Data in Tensorflow







Activation vector




```
layer_2 = Dense(units=1, activation='sigmoid')
a2 = layer_2(a1)
```

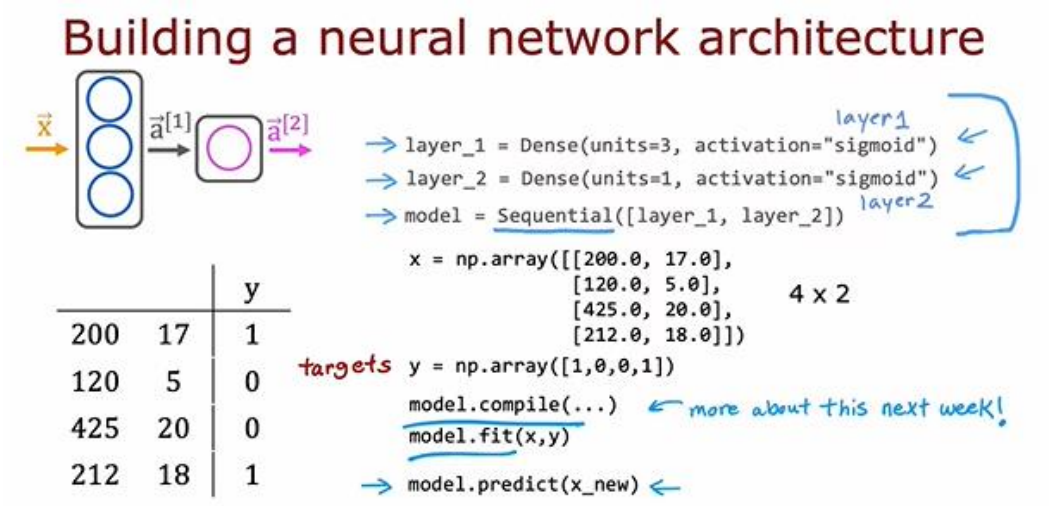
[[0.8]] ← 1 x 1

```
tf.Tensor([[0.8]], shape=(1, 1), dtype=float32)
```

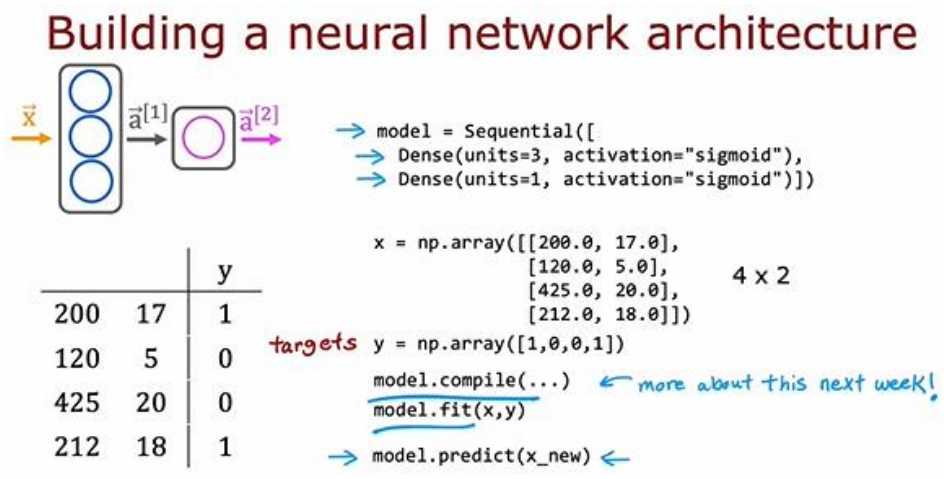
```
a2.numpy()
```

```
array([[0.8]], dtype=float32)
```

Building a neural network



		y
200	17	1
120	5	0
425	20	0
212	18	1



		y
200	17	1
120	5	0
425	20	0
212	18	1