3 Blue 1 Brown Video 1 NOTES - by Jovanny Aguilar:

-Cortex resolves symbols and represents such images as their own distinct ideas
-Computer machines cannot recognize such patterns unless programmed/taught
-Boom in development for neural networks; requires hundreds of components; very mathematically based.

-Neuron: Thing that holds a number between 0 and 1.

-The 784 neurons to create the grid serves as the first layer makeup of the network.
-Last layer has only 10 neurons which corresponds to the digits 0-9

-Hidden layers

-Certain patterns are considered throughout the layers until reaching the final layer, in which the "brightest" neuron serves as the "network's choice".

-Hypothesis: Divide the number symbol into tiny subparts, almost like "da" in an integral.

Question: What parameters to put in the network so that the neuron in the second layer can pick up on edges in a specific region from the first layer.

-What to do: Assign a weight attached to each of the connections between second layer neurons and first layer neurons. The weights are just numbers

-Then take all activations from first layer and find the weighted sum according to the set weights:

$a_1w_1 + a_2w_2 + \ldots + a_nw_n$

-Activations always some value between 0 & 1

-Push the weighted sum into some function that squishes the real number line into a range that is between 0 and 1.

An example of such a function would be the sigmoid function: $\sigma(x) = 1/(1+ e^{-x})$

Very negative inputs end up close to 0 while very positive inputs end up close to 1.

Process involves alottttt of linear algebra.

Hypothetical: Only activate meaningfully when weighted sum > 10
Solution: Include a bias to the function
Summarize:

Weight: Tells what pixel pattern the neurons in the second layer are picking up on from the first
Bias: Tells how high the weighted sum has gotta be before the neurons start getting meaningfully activated