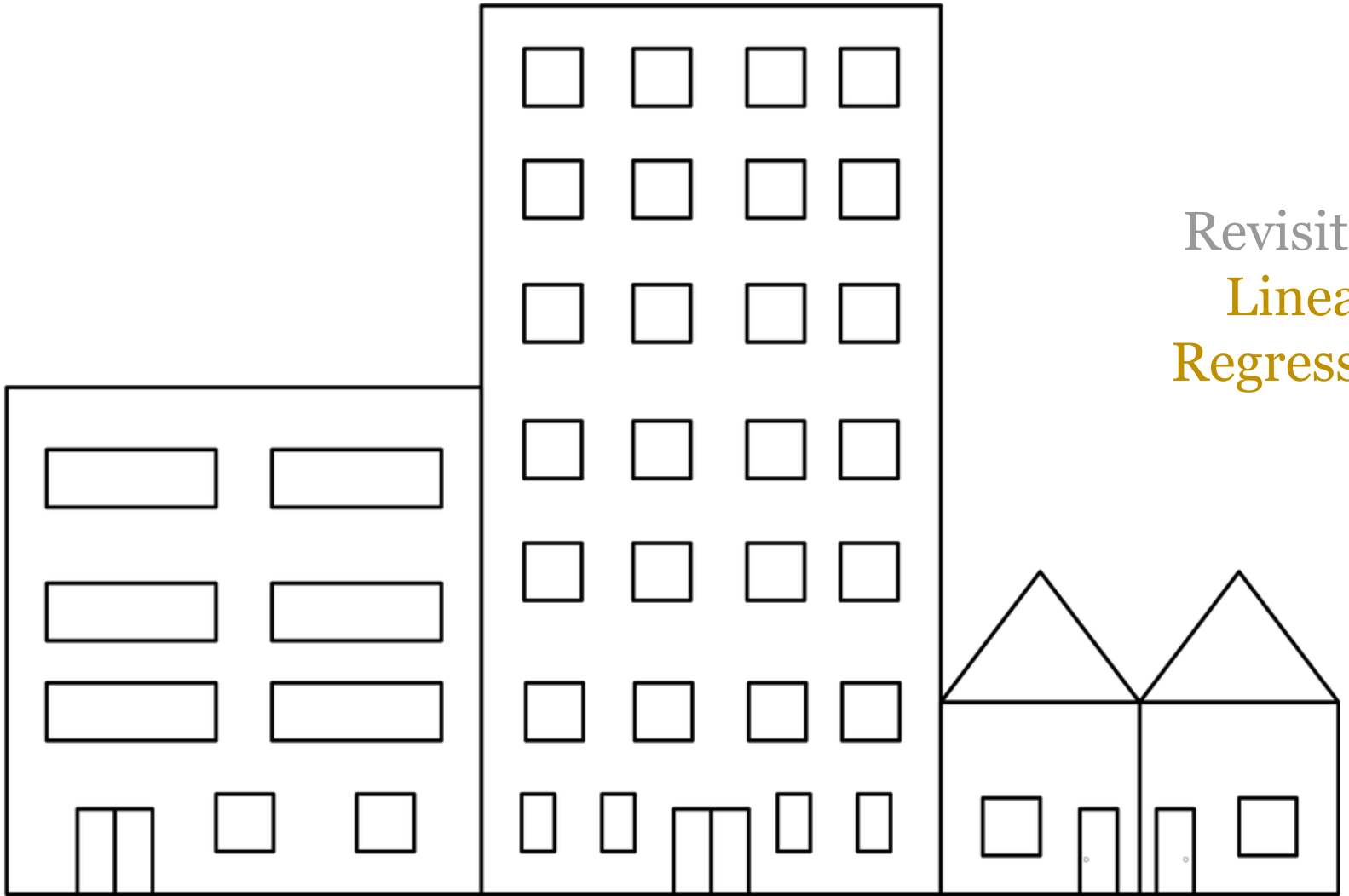
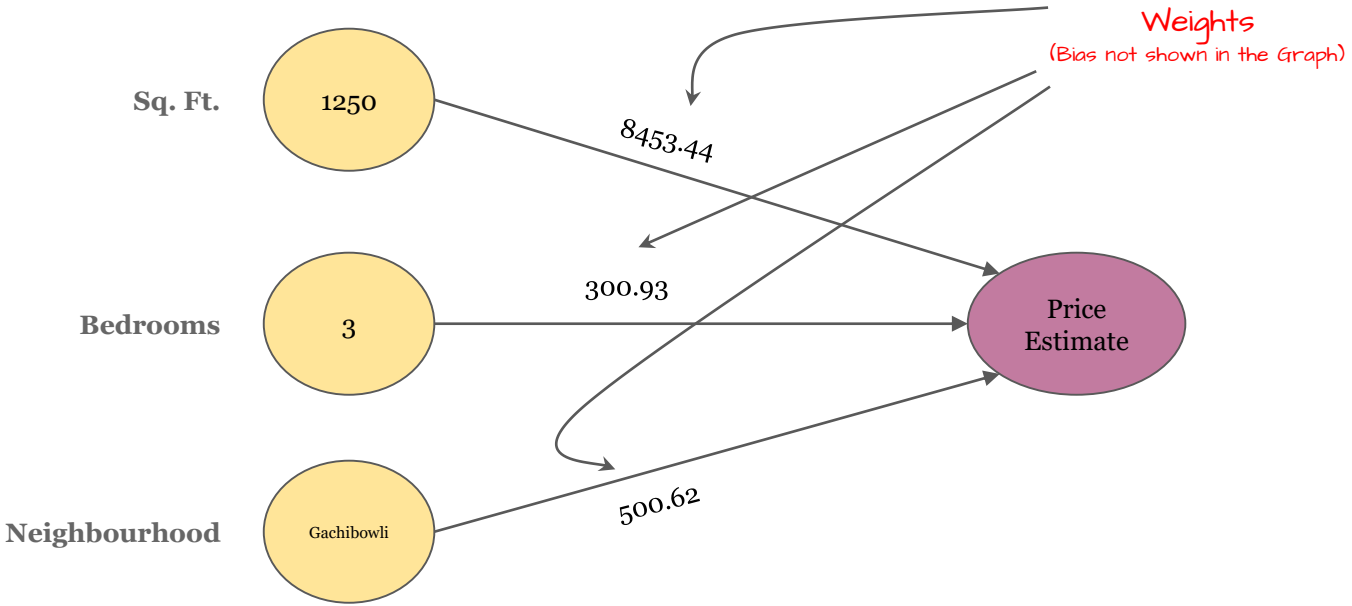


Revisiting Linear Regression

Sq. Ft	Neighbourhood	Bedrooms	Price (‘000)
2000	Gachibowli	3	180
1750	Jubilee Hills	3	210
1100	Kukatpally	2	55
900	Gachibowli	2	72
1245	KPHB	3	60
…	…	…	…
…	…	…	…

Model’s Goal

Sq. Ft	Neighbourhood	Bedrooms	Price (‘000)
1250	Gachibowli	3	???

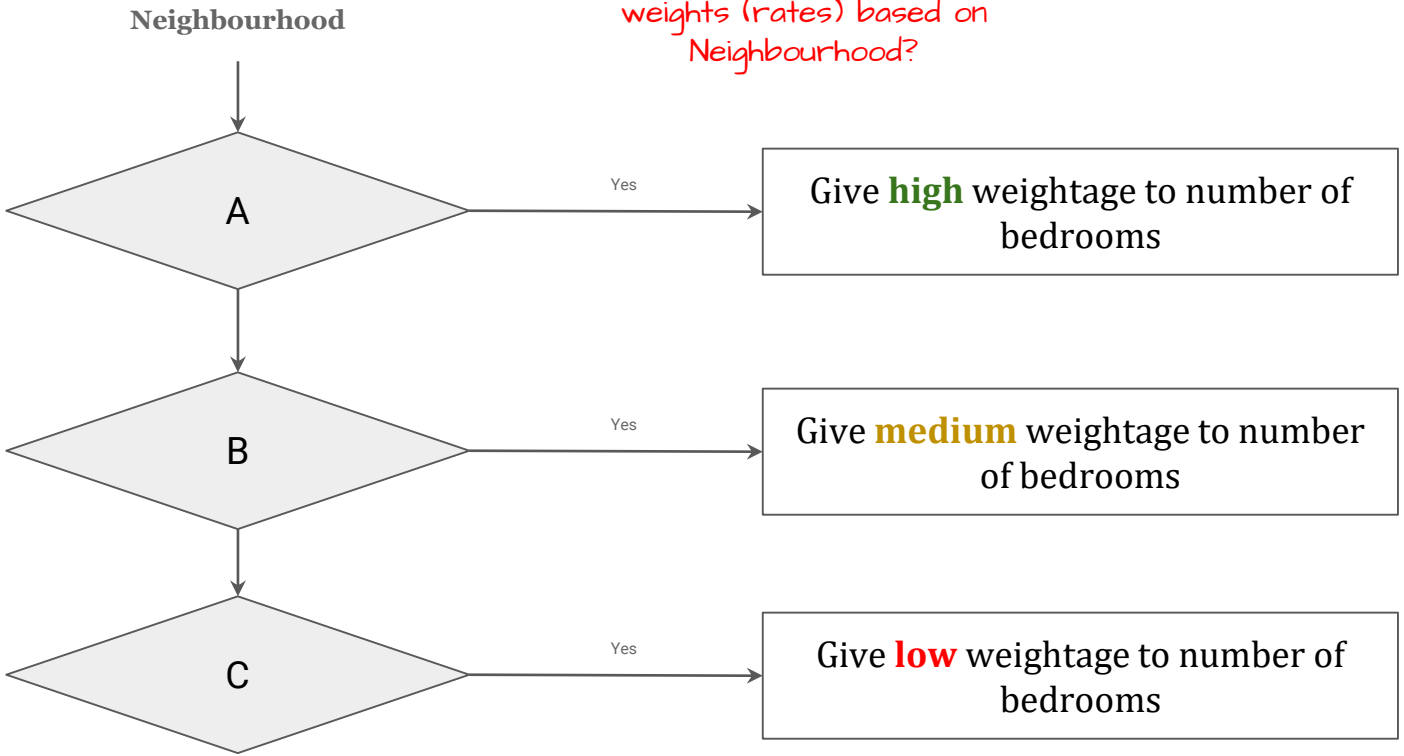


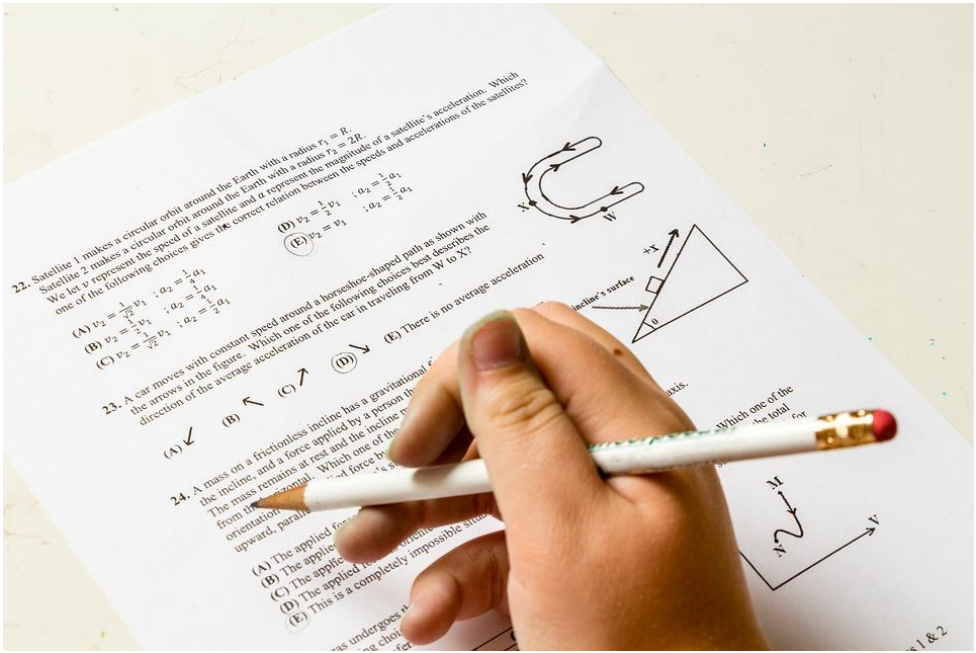
$$y = w_1 x_1 + w_2 x_2 + w_3 x_3 + b$$

Not this simple!!!

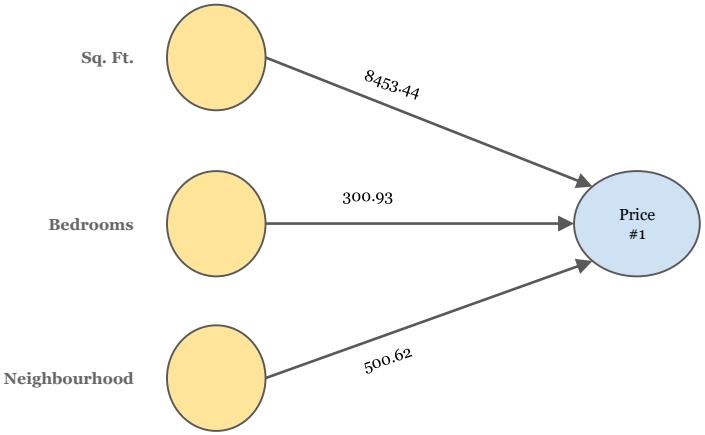
There are usually lots of ifs and buts...

How do we apply different weights (rates) based on Neighbourhood?



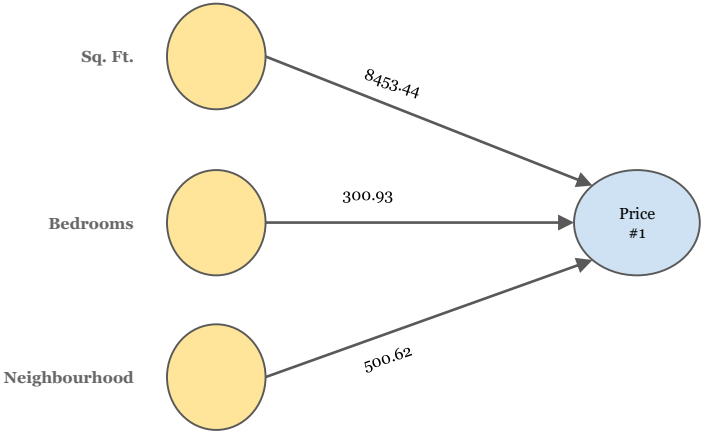


How do we capture complex logic?

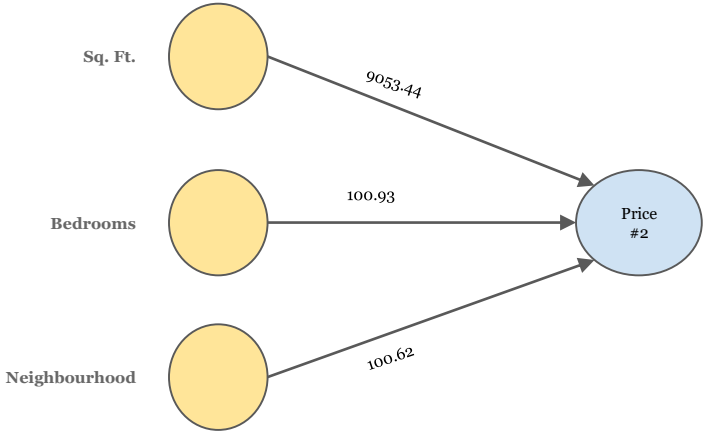


First Set of Weights

Learn some logic in data

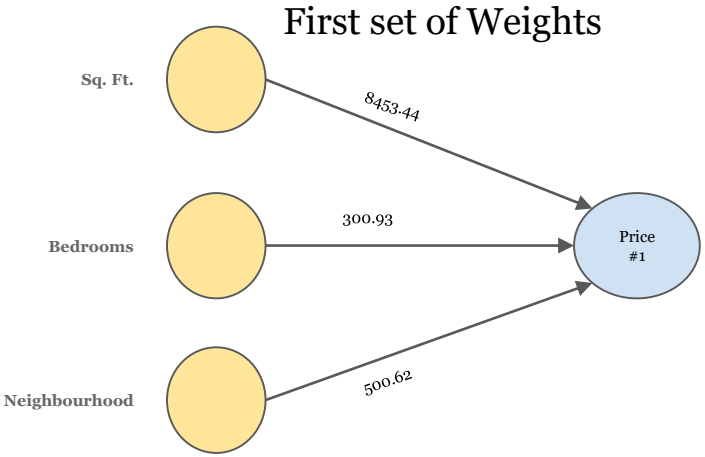


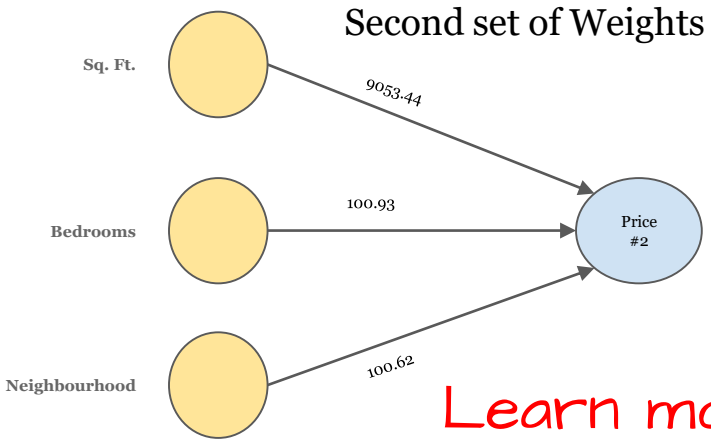
First Set of Weights



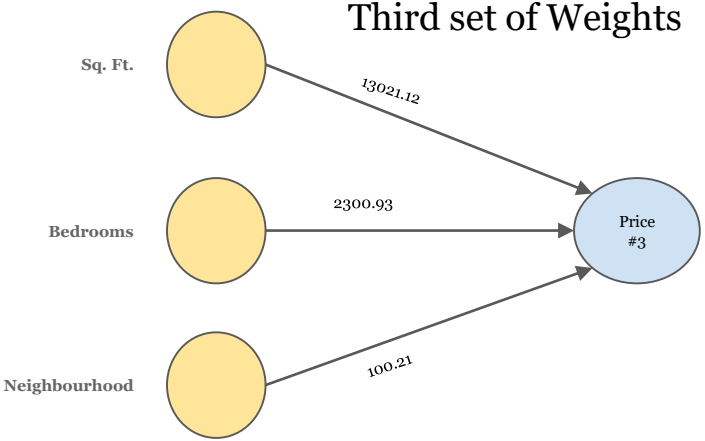
Second Set of Weights

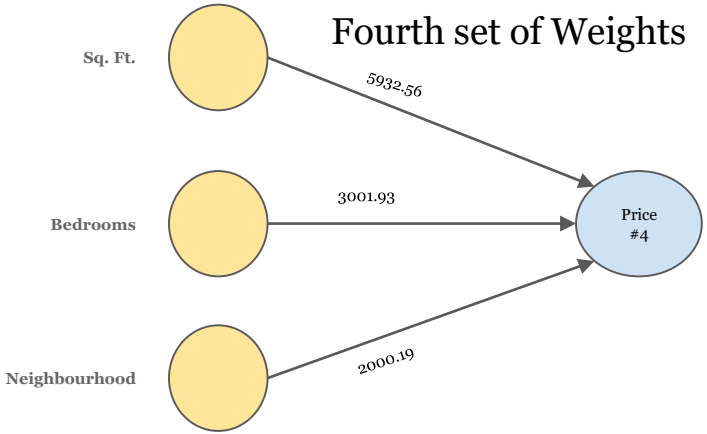
Learn ANOTHER logic in data





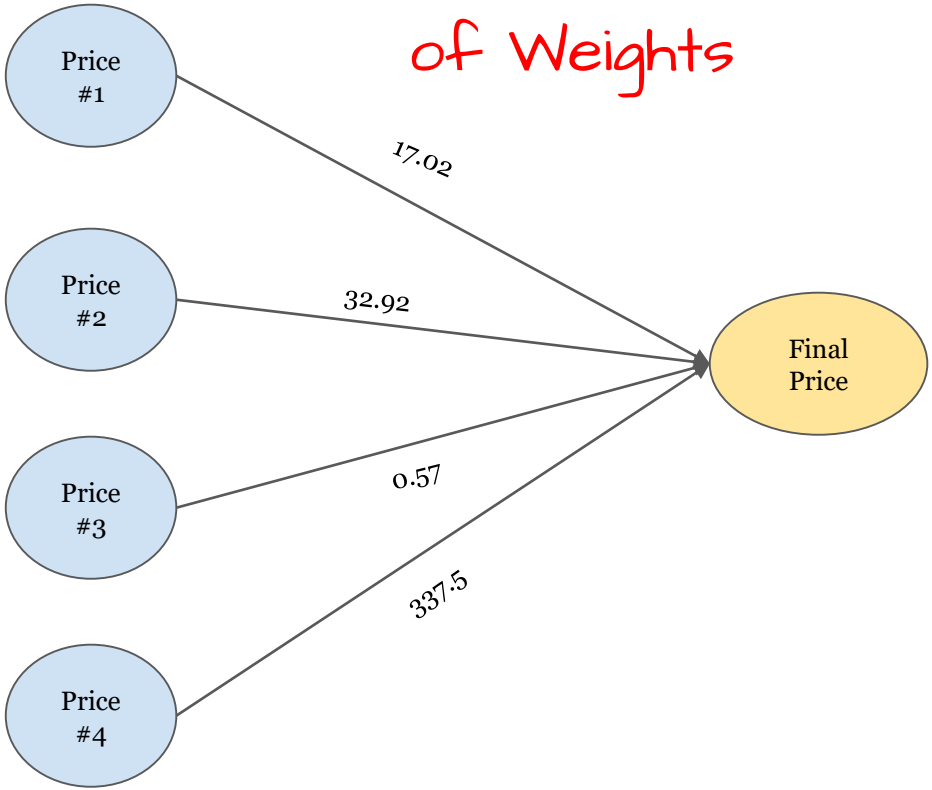
Learn more and more

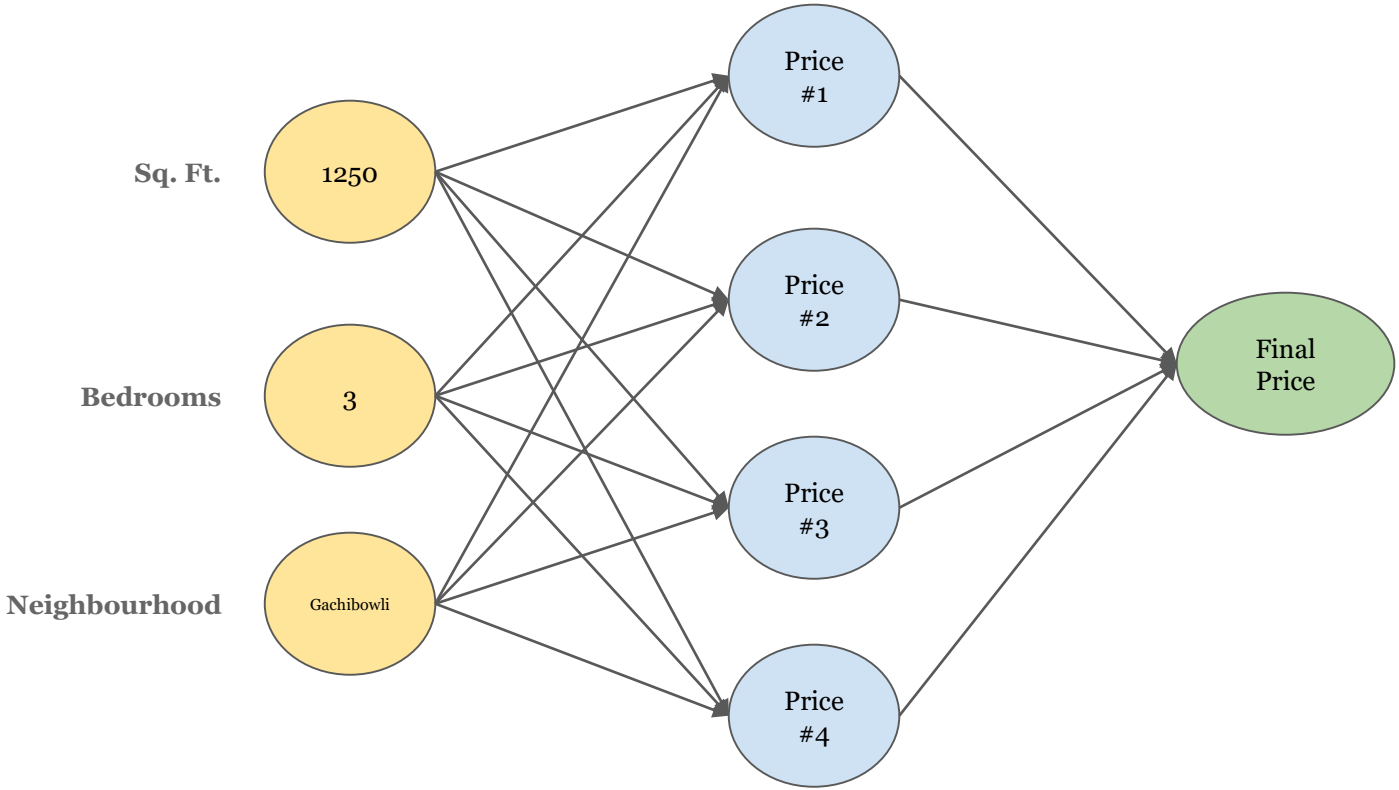




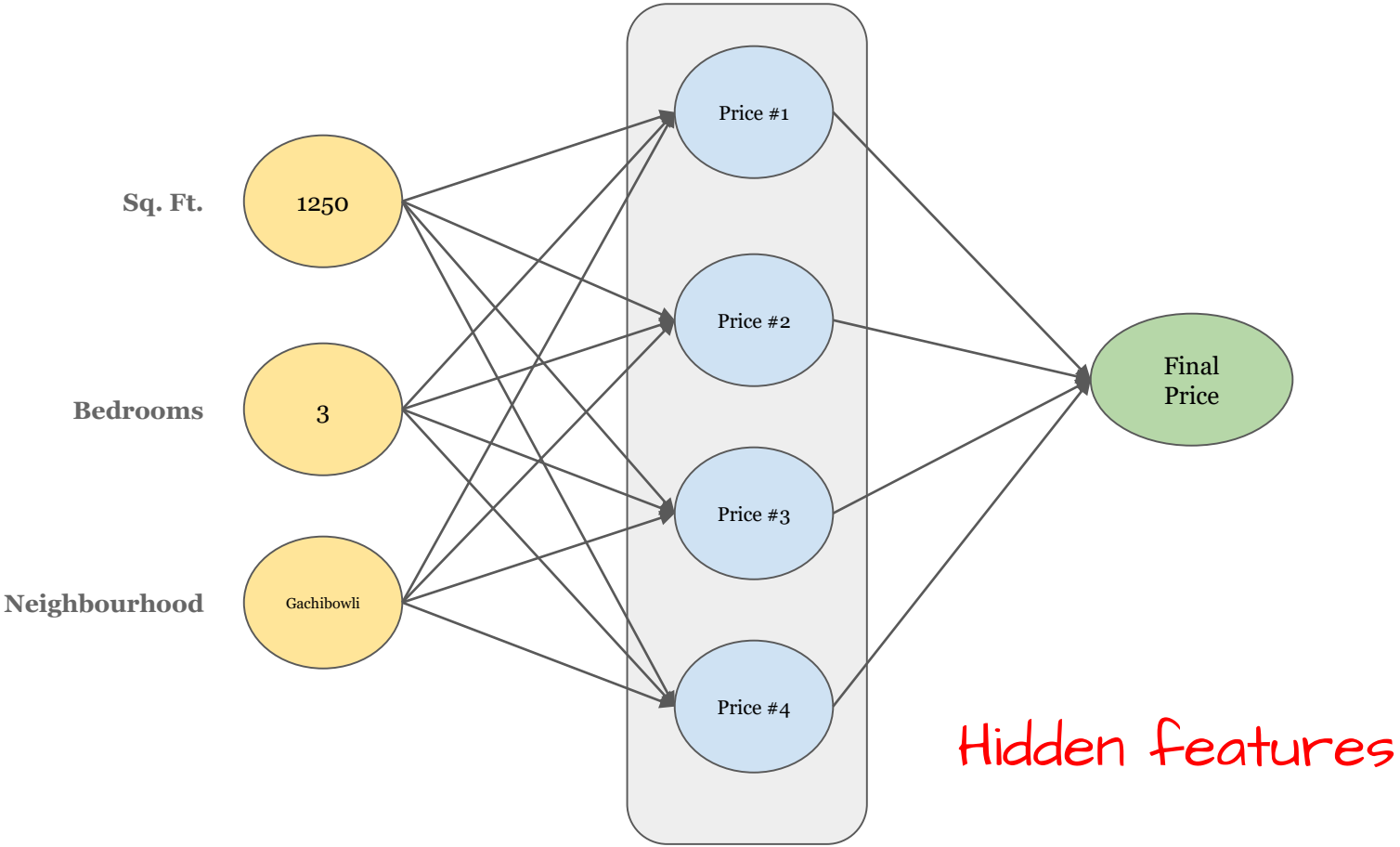
What to do with all the Prices?

User another set of Weights




Sq. Ft.
1250
Bedrooms
3
Neighbourhood
Gachibowli
Price #1
Price #2
Price #3
Price #4
Final Price

What do Price# 1, 2, 3 and 4 represent?


Sq. Ft.
1250
Bedrooms
3
Neighbourhood
Gachibowli
Price #1
Price #2
Price #3
Price #4
Final Price
Hidden features

What are these hidden features?

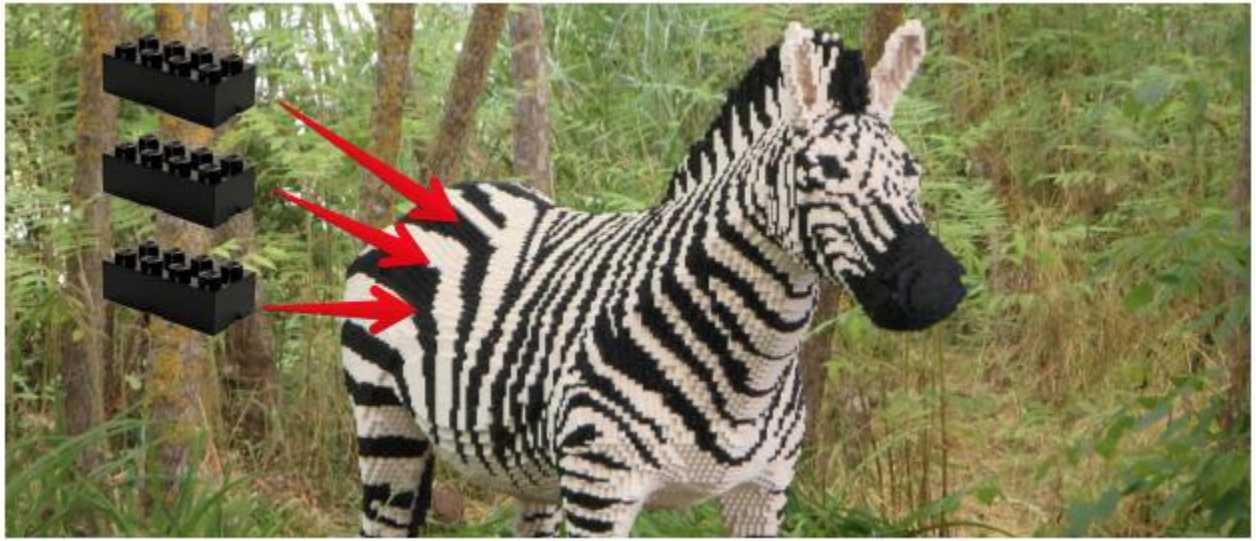
What are these hidden features?

We, humans, do not really understand them

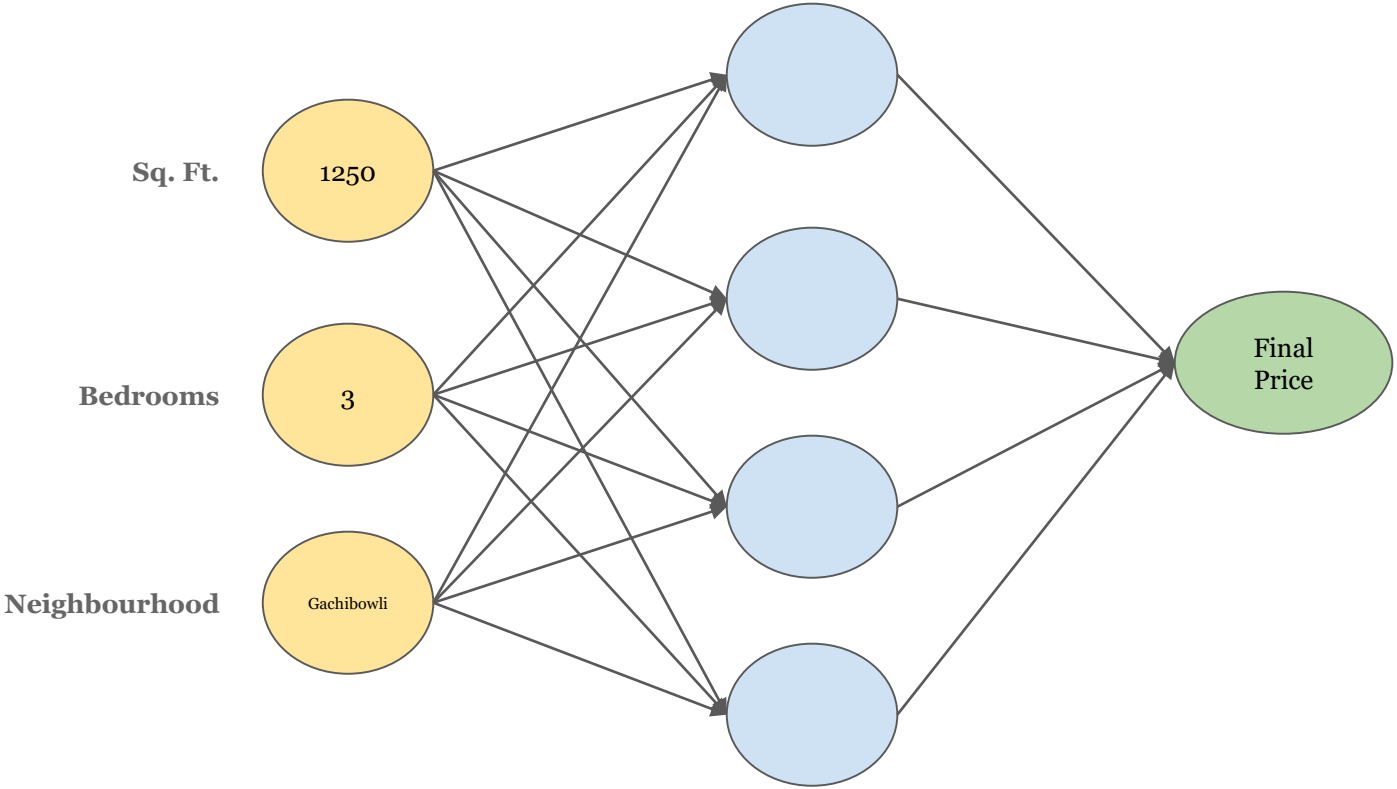
It's like 'Lego' Block

Individual Lego block (hidden feature) can not tell the final outcome

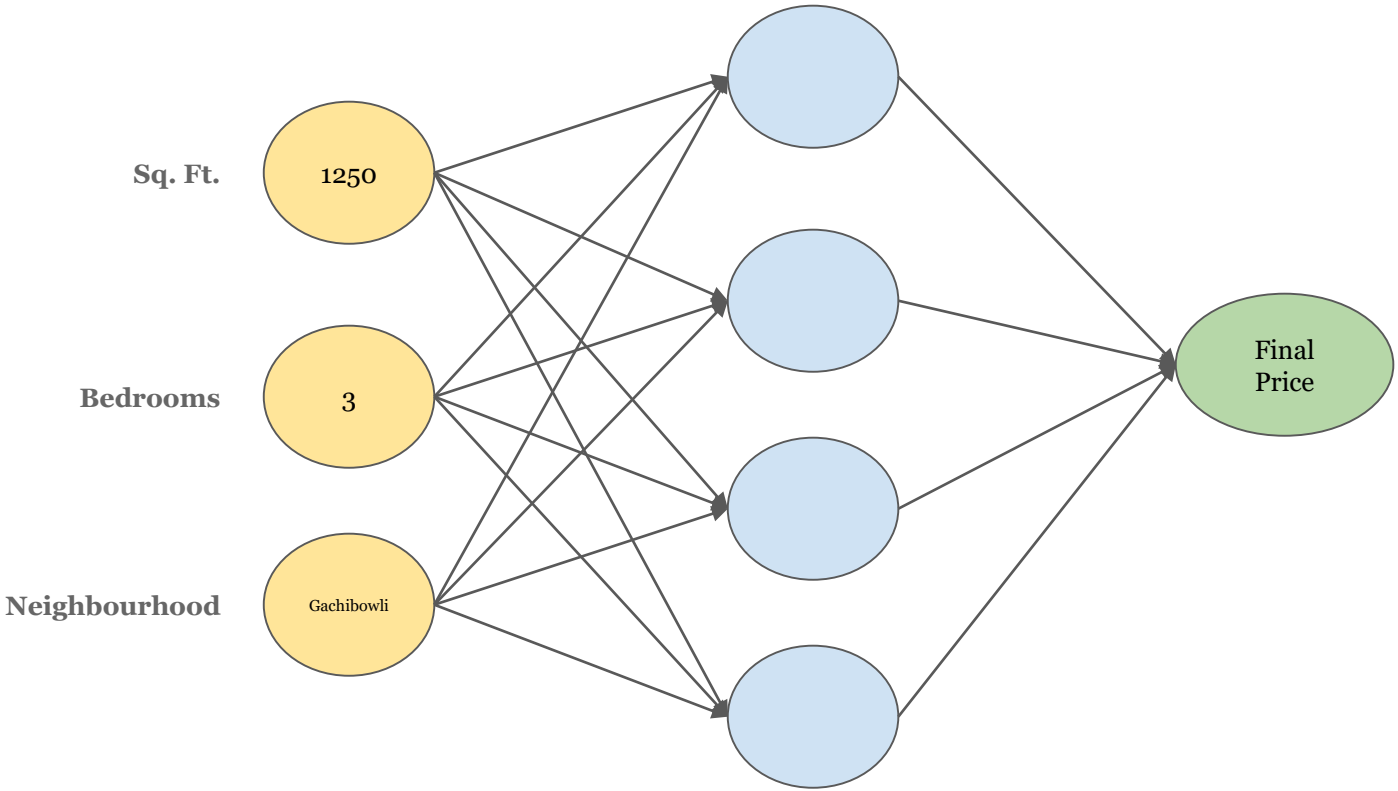
It's like 'Lego'



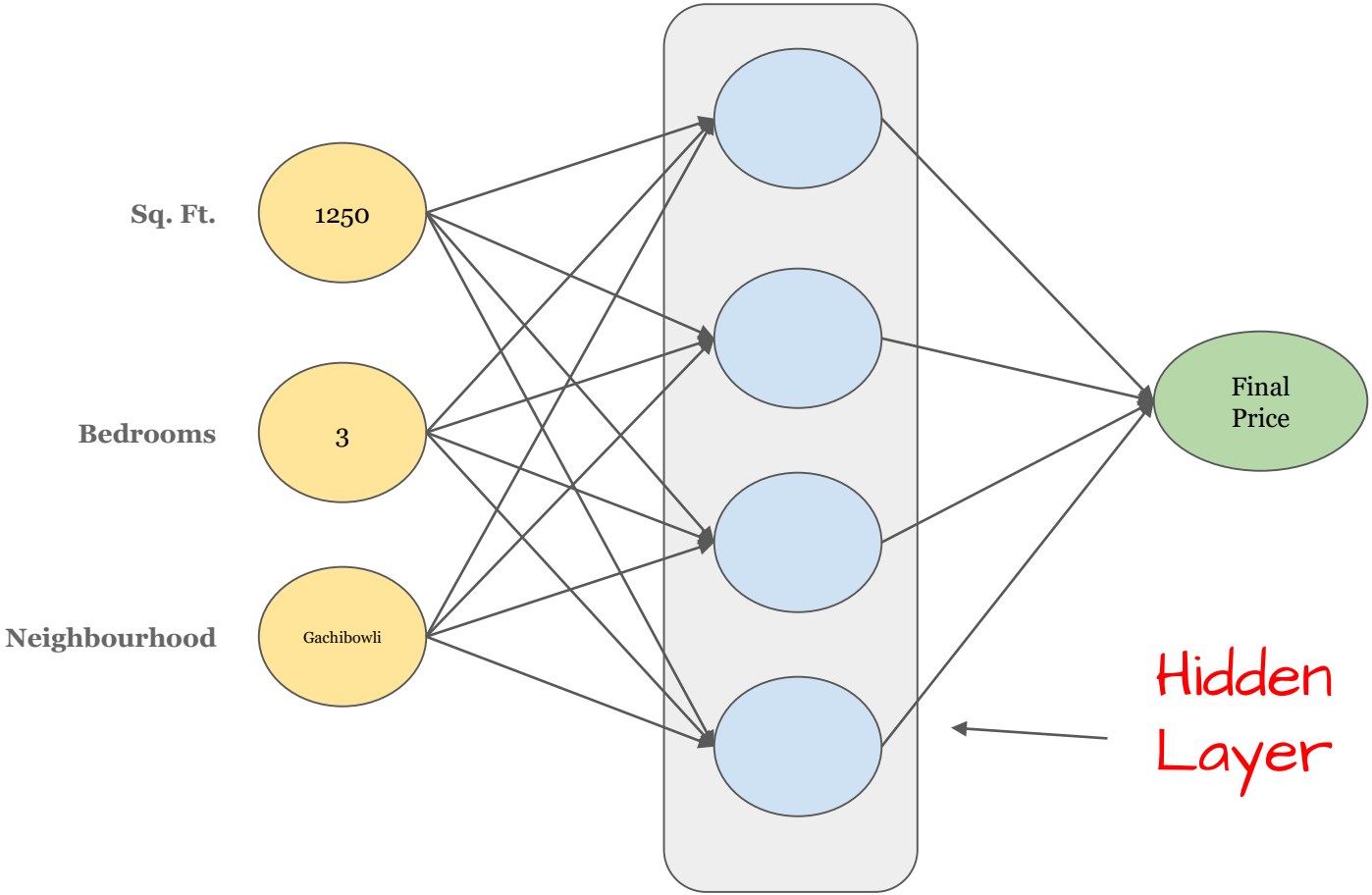
But model understands how to combine these hidden features to give a better outcome

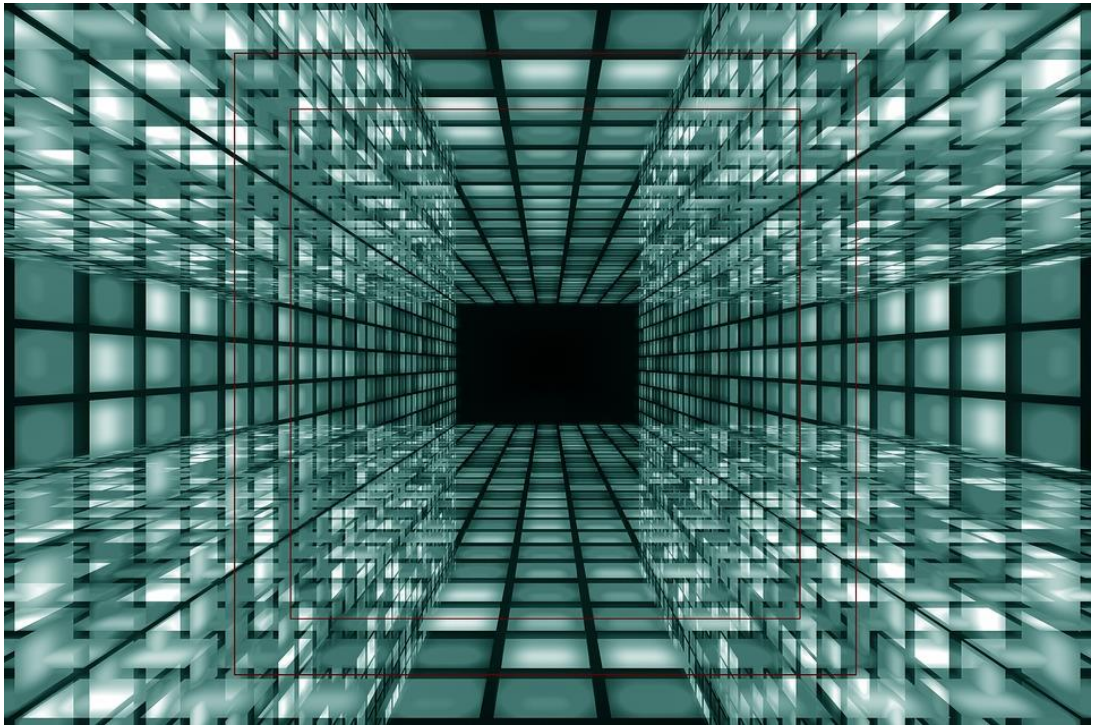


What is this structure?



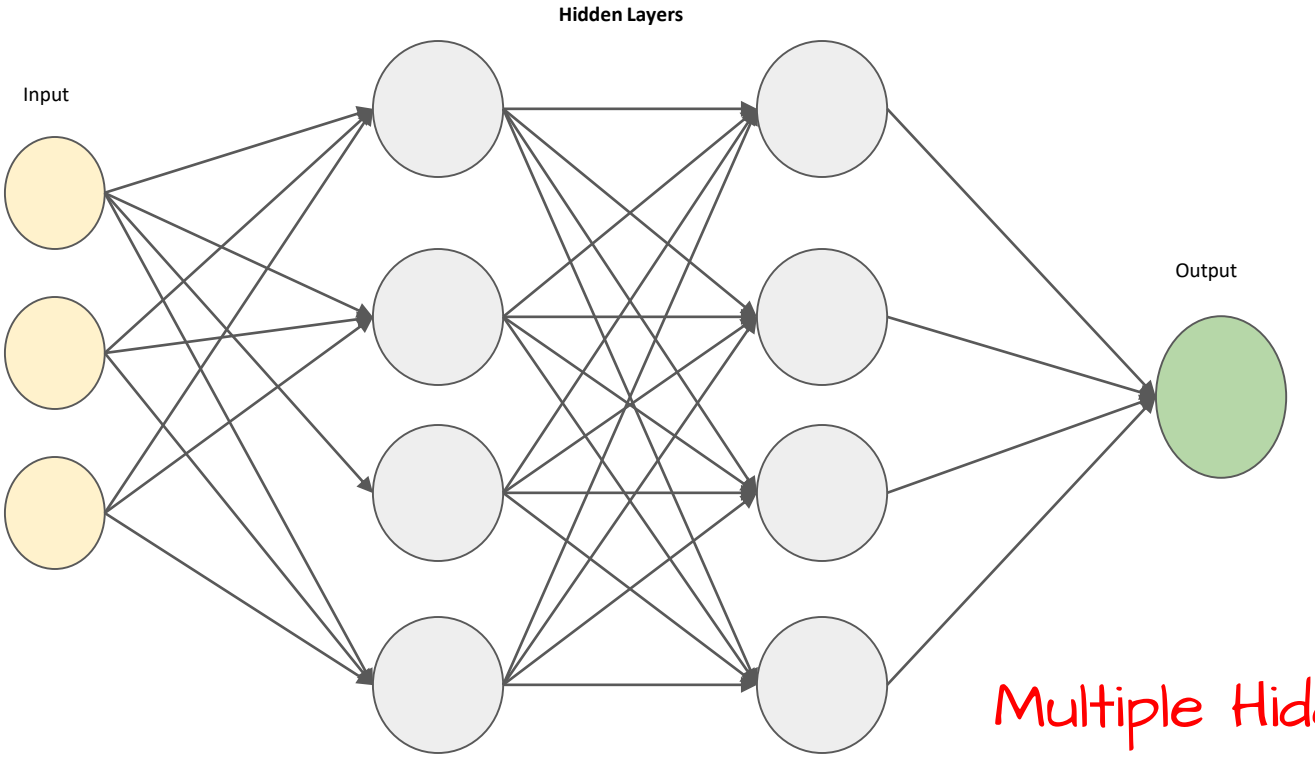
Neural Network


Sq. Ft.
1250
Bedrooms
3
Neighbourhood
Gachibowli
Final Price
Hidden Layer



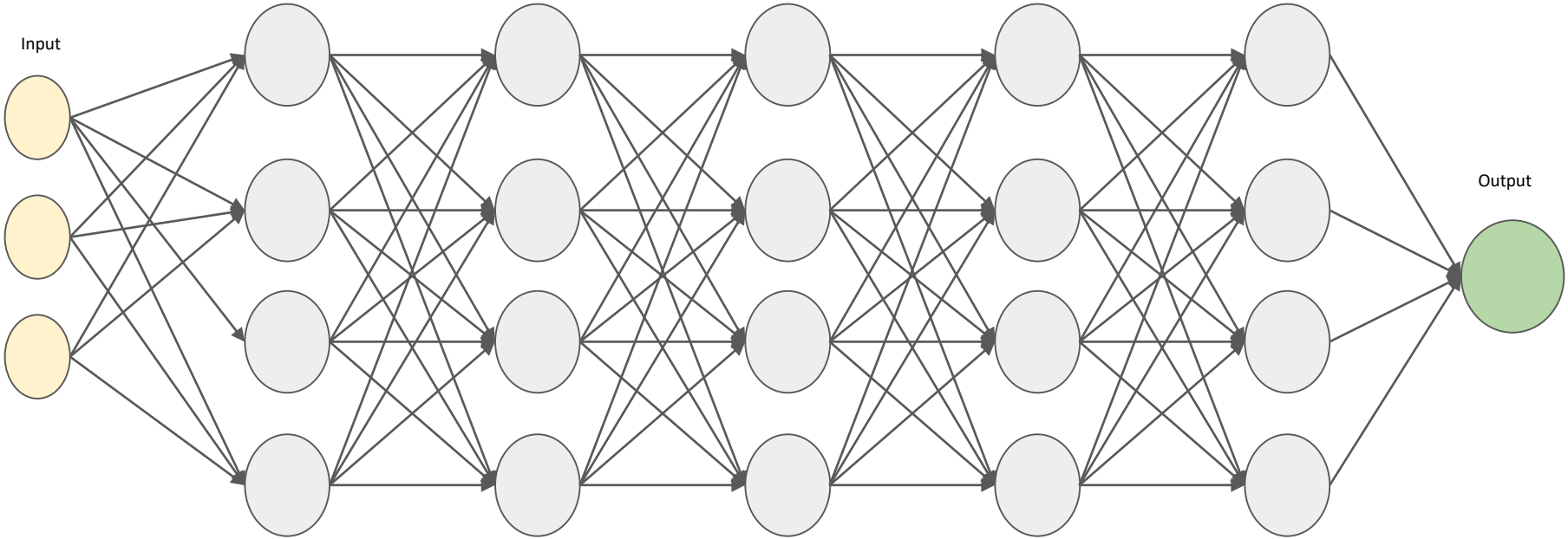
What is Deep Learning

Deep Neural Network



Multiple Hidden Layers

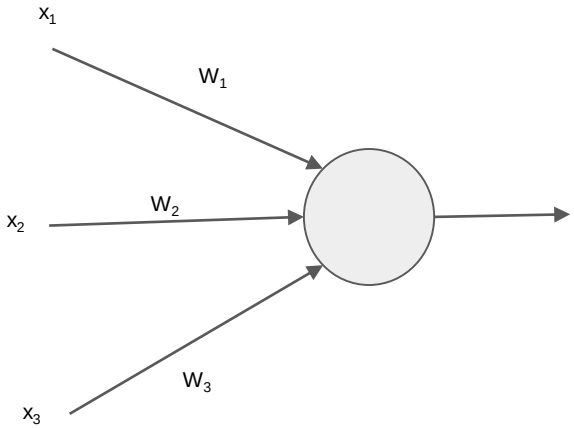
Deep Neural Network



Adding non-linearity to Decision making

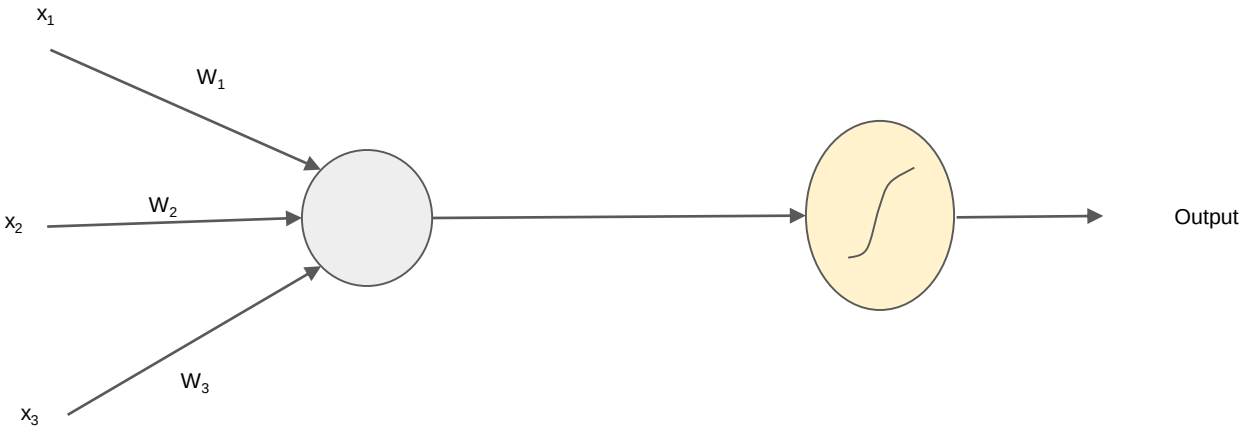
Activation function

Neuron output

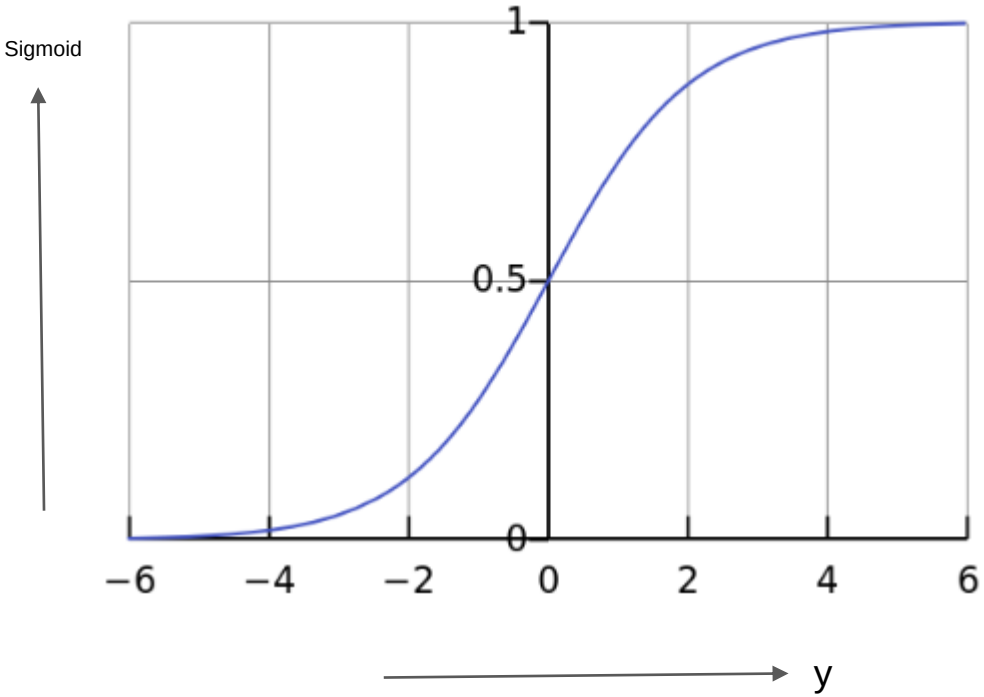


$$y = w_1 x_1 + w_2 x_2 + w_3 x_3 + b$$

Controlling Neuron firing



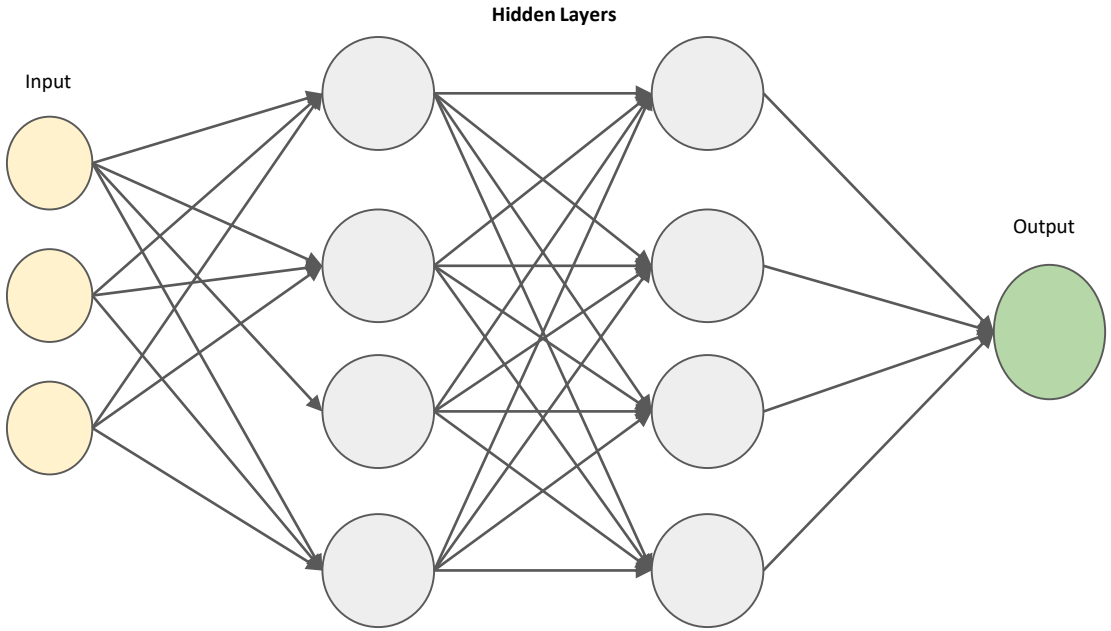
Sigmoid Function



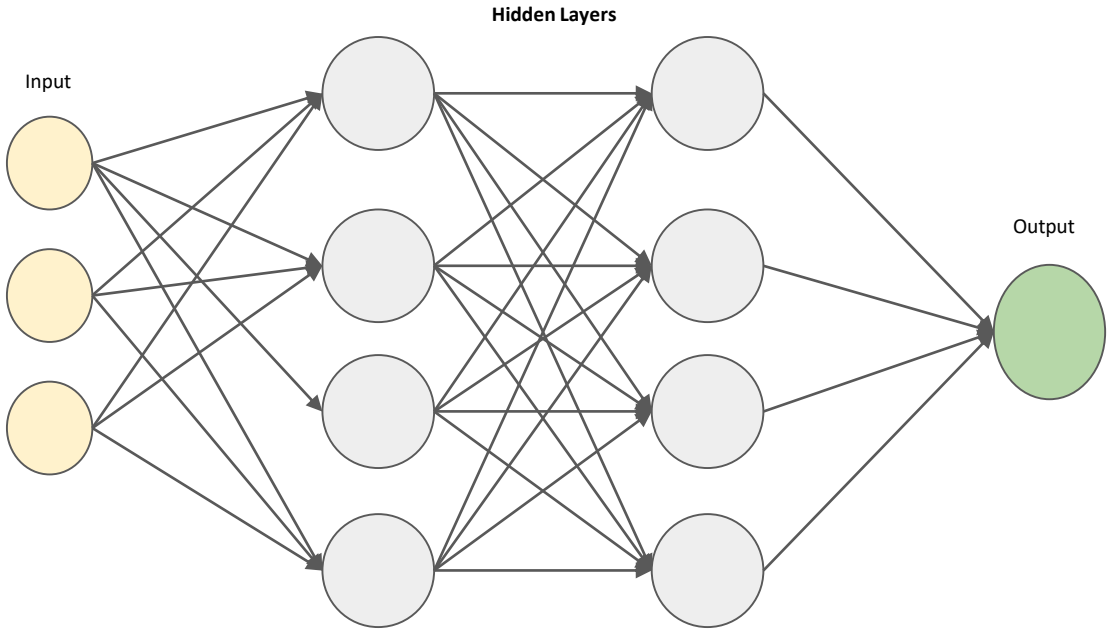
$$sigmoid(y) = \frac{1}{1 + e^{-y}}$$

$$y = \sum wx + b$$

Number of weights



Number of weights



3 * 4

Number of weights