Deep Learning is a subset of Machine learning that deals with learning complex patterns, in a way that is inspired by the working of the human brain. The reason why deep learning has surged in recent times is the ability to scale to large datasets. The performance of machine learning models is known to saturate after a certain amount of data and additional data makes no difference. With the advent of BigData resulting in huge datasets available nowadays, we want our algorithms to keep giving better performance with more and more data. And that is where deep learning comes into the picture.

What is a Neural Network ?
There is a collection of layers of neurons (each neuron holds a value known as activation of that neuron). There are a total of 3 layers, since the input layer is not counted.

There is an input layer of 3 neurons each holding the input variables, and an output layer holding the predicted housing price.

There are 2 layers of 2 neurons each in between. These are called hidden layers since they are used for computation purposes only and we aren't concerned with their values during runtime.

The activation of the first neuron in the first hidden layer is A1, the second neuron being A2, the first neuron of the second hidden layer is B1, and the second neuron of second hidden layer B2.

Each neuron is connected to all the neurons of the previous layer through numbers called weights(W) and a bias(b). The weights are organized in the form of a matrix of shape . This basically means that Wij refers to the weight of the connection from ith neuron in current layer to jth neuron in previous layer. The biases are organized in the shape of so Bi corresponds to the bias of the ith neuron in current layer. Therefore, W1 is of shape (2,3), b1 of shape(2,1), W2 of shape (2,2) and so on.

$$f(x_1, x_2, x_3) = w_{11}{}^*x_1 + w_{12}{}^*x_2 + w_{13}{}^*x_3 + b_{11}$$

$$A_1 = g(f(x_1, x_2, x_3)) = g(w_{11}{}^*x_1 + w_{12}{}^*x_2 + w_{13}{}^*x_3 + b_{11})$$