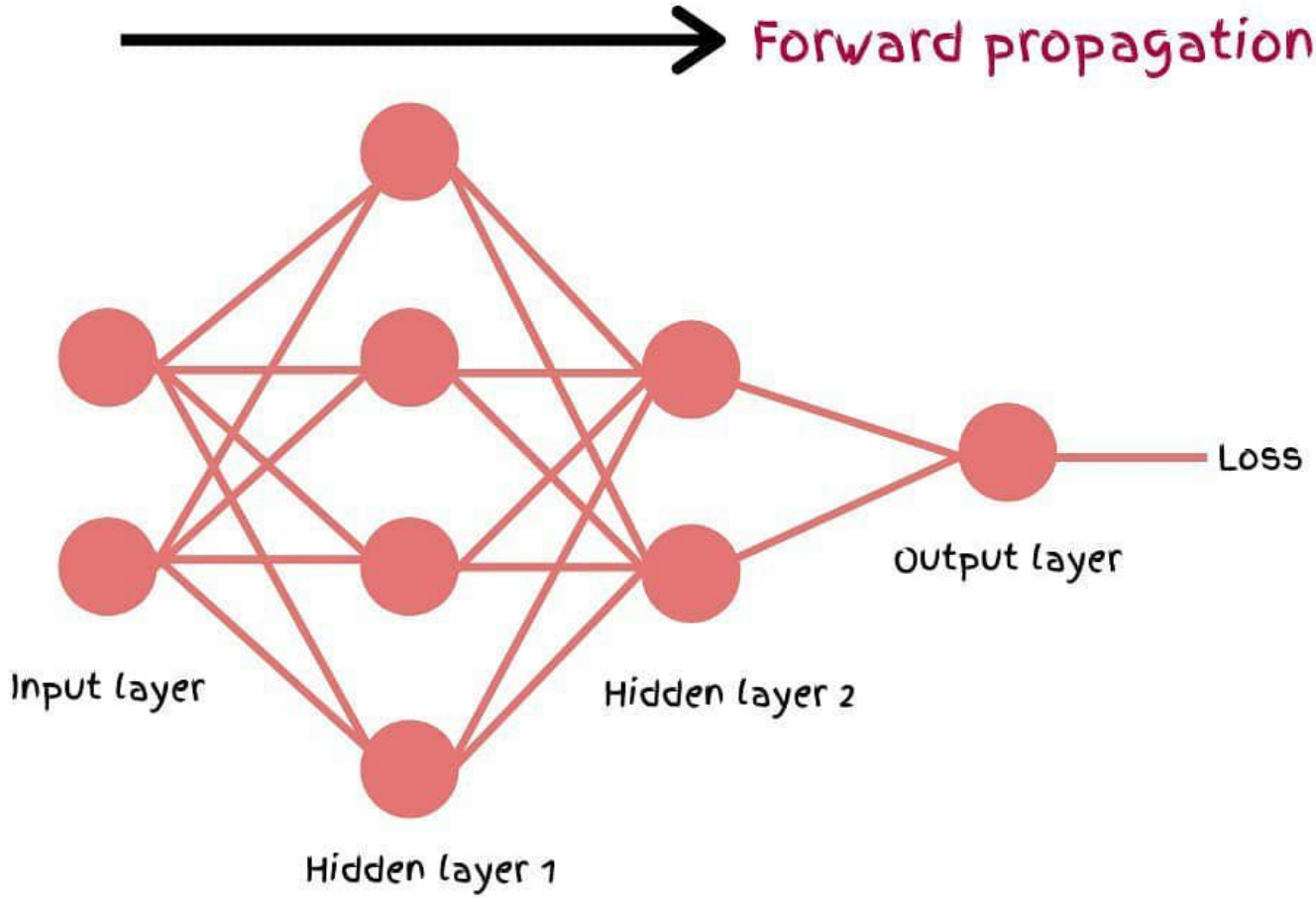
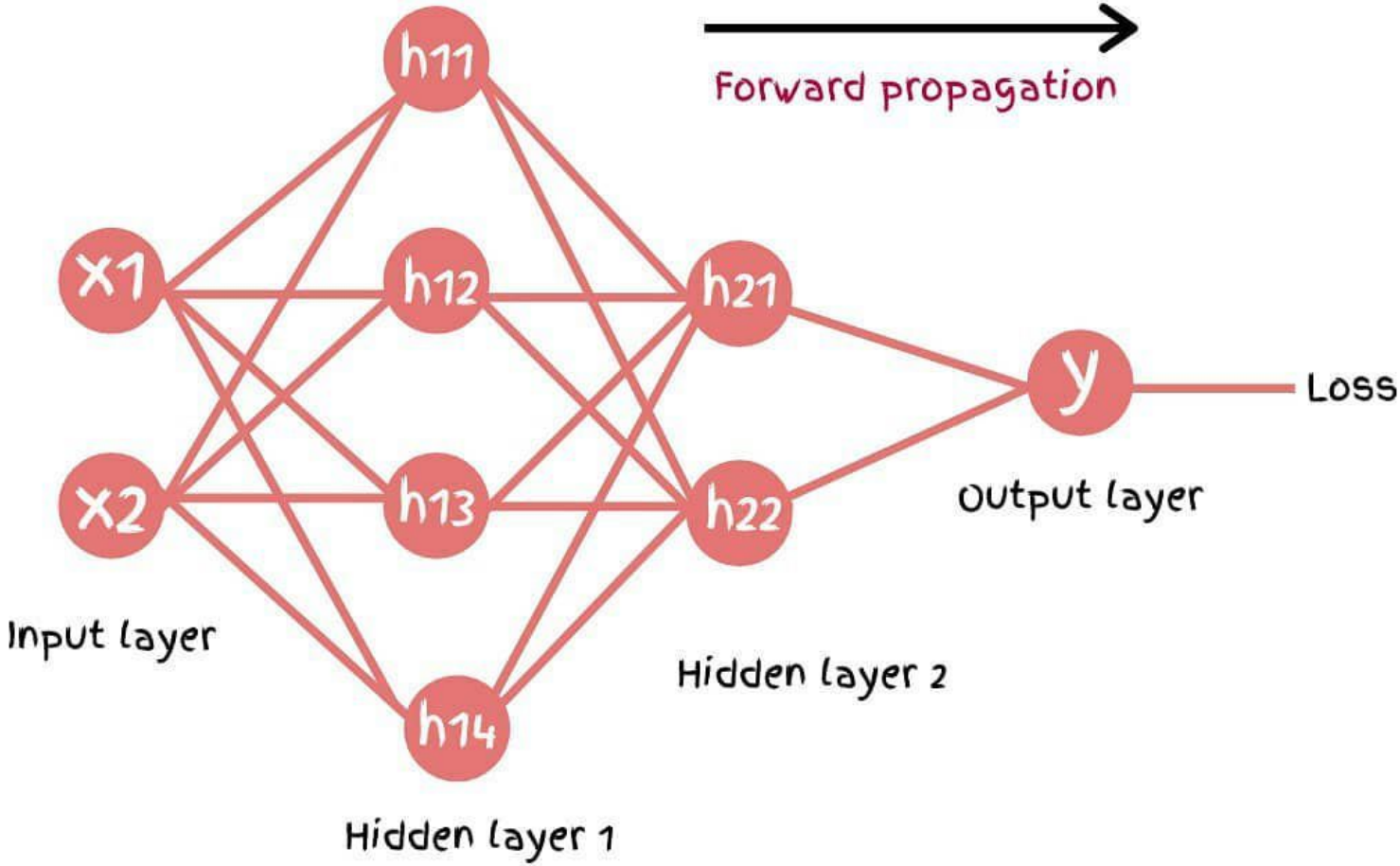
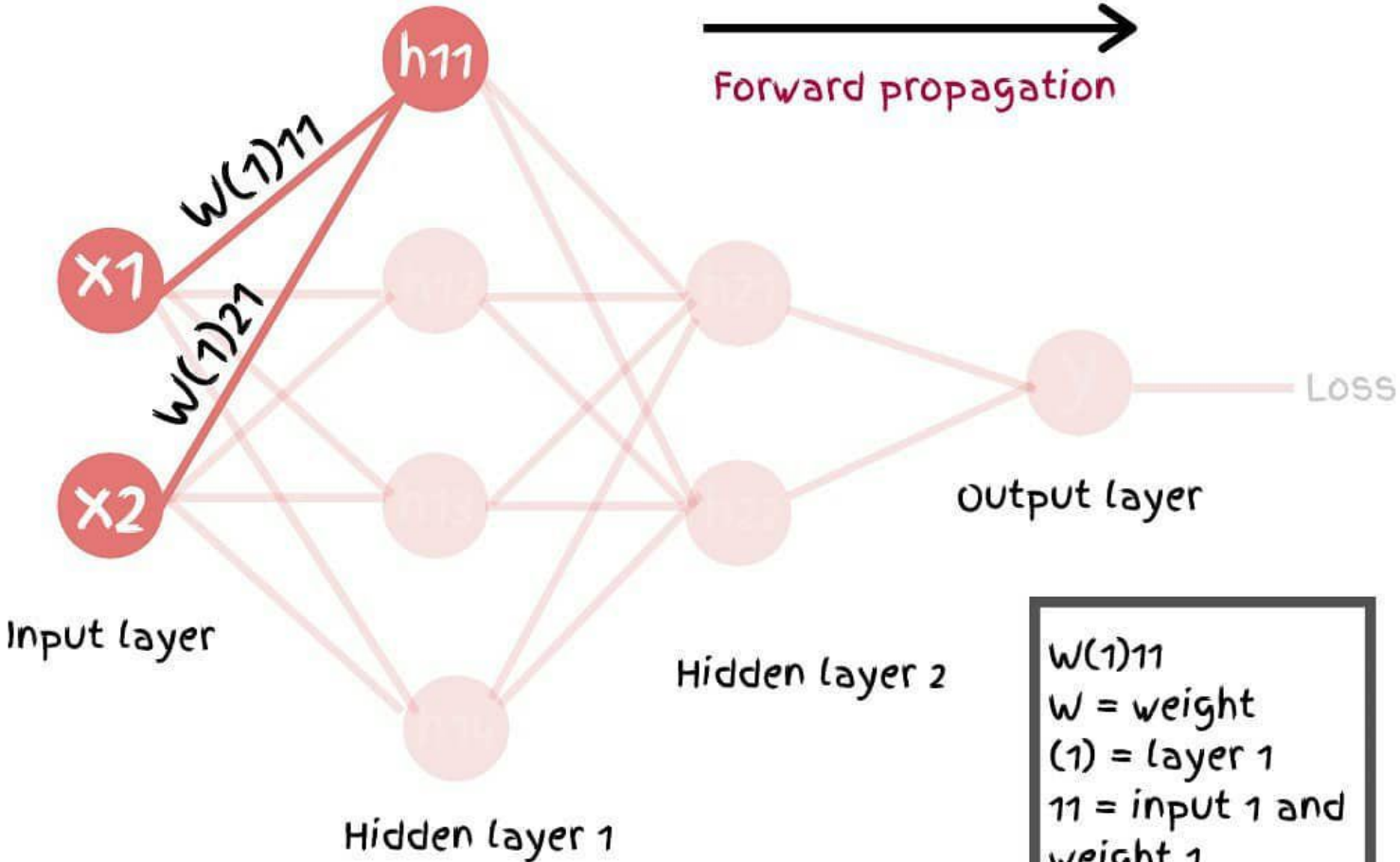


How feed-forward propagation works??

@learn.machinelearning



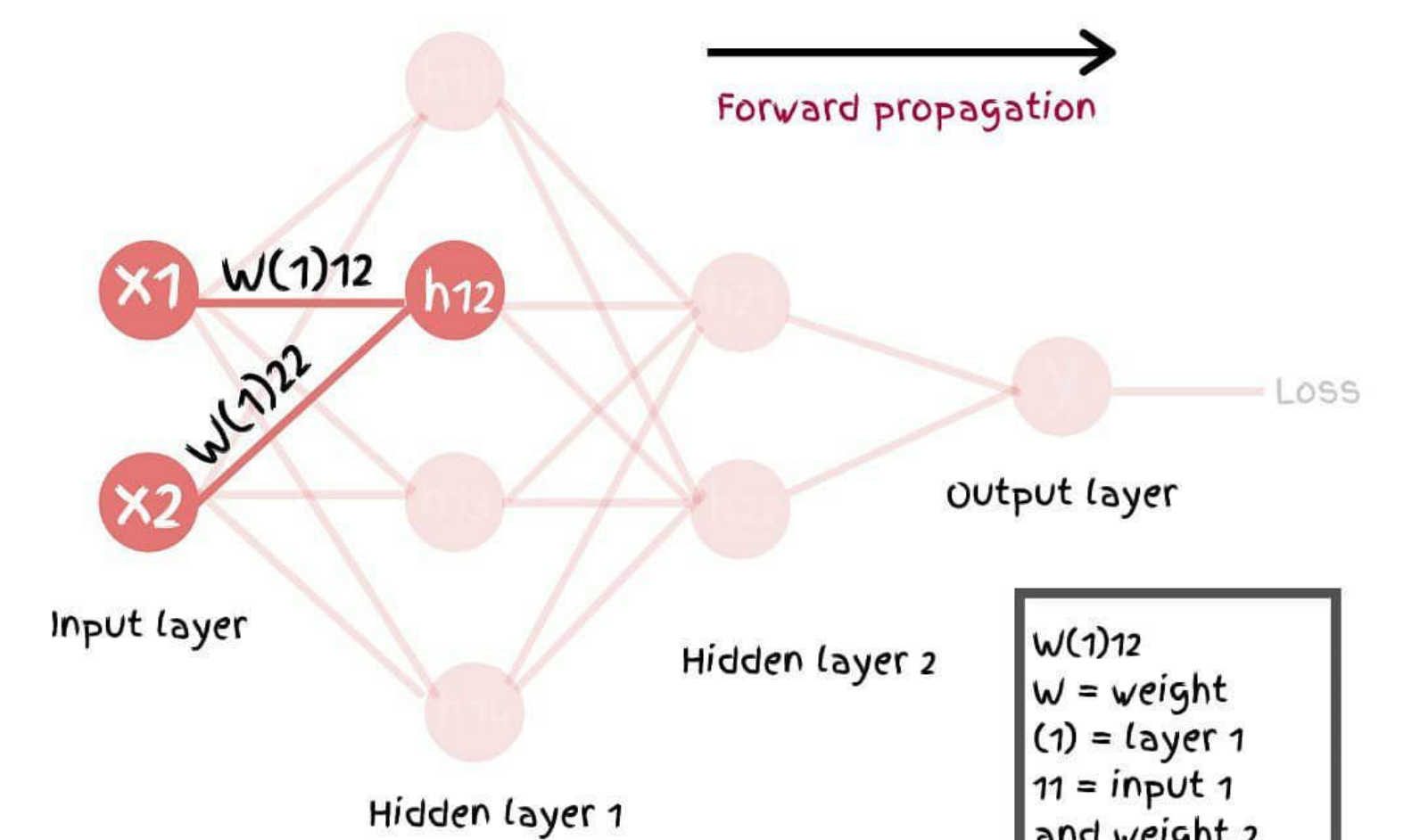
- So here we have 2 features x1 and x2.
- And we have 2 hidden layers h1 and h2.
- Each hidden layer has few neurons like we have 4 neurons in hidden layer h1 and named as {h11,h12,h13,h14} and for second hidden layer h2 {h21,h22}



W(1)11
W = weight
(1) = layer 1
11 = input 1 and weight 1

$$h11 = f(x1*W(1)11 + x2*W(1)21)$$

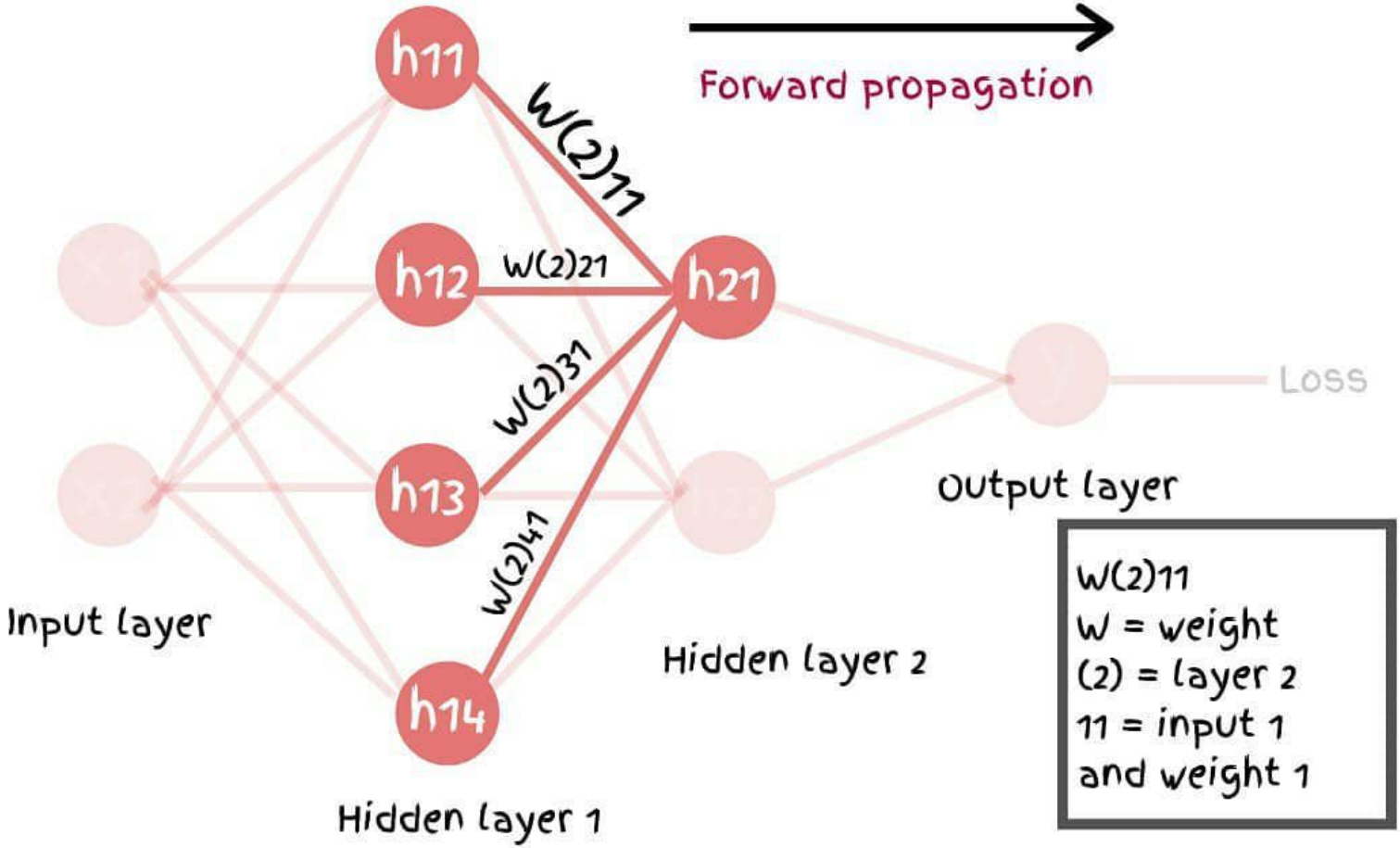
- The first operation we will be doing is to calculate h11.
- We will be doing the dot product of input with the respective weights associated with that neuron.
- Ans we will applyactivation function on the dot product.



W(1)12
W = weight
(1) = layer 1
11 = input 1
and weight 2

$$h12 = f(x1*W(1)12 + x2*W(1)22)$$

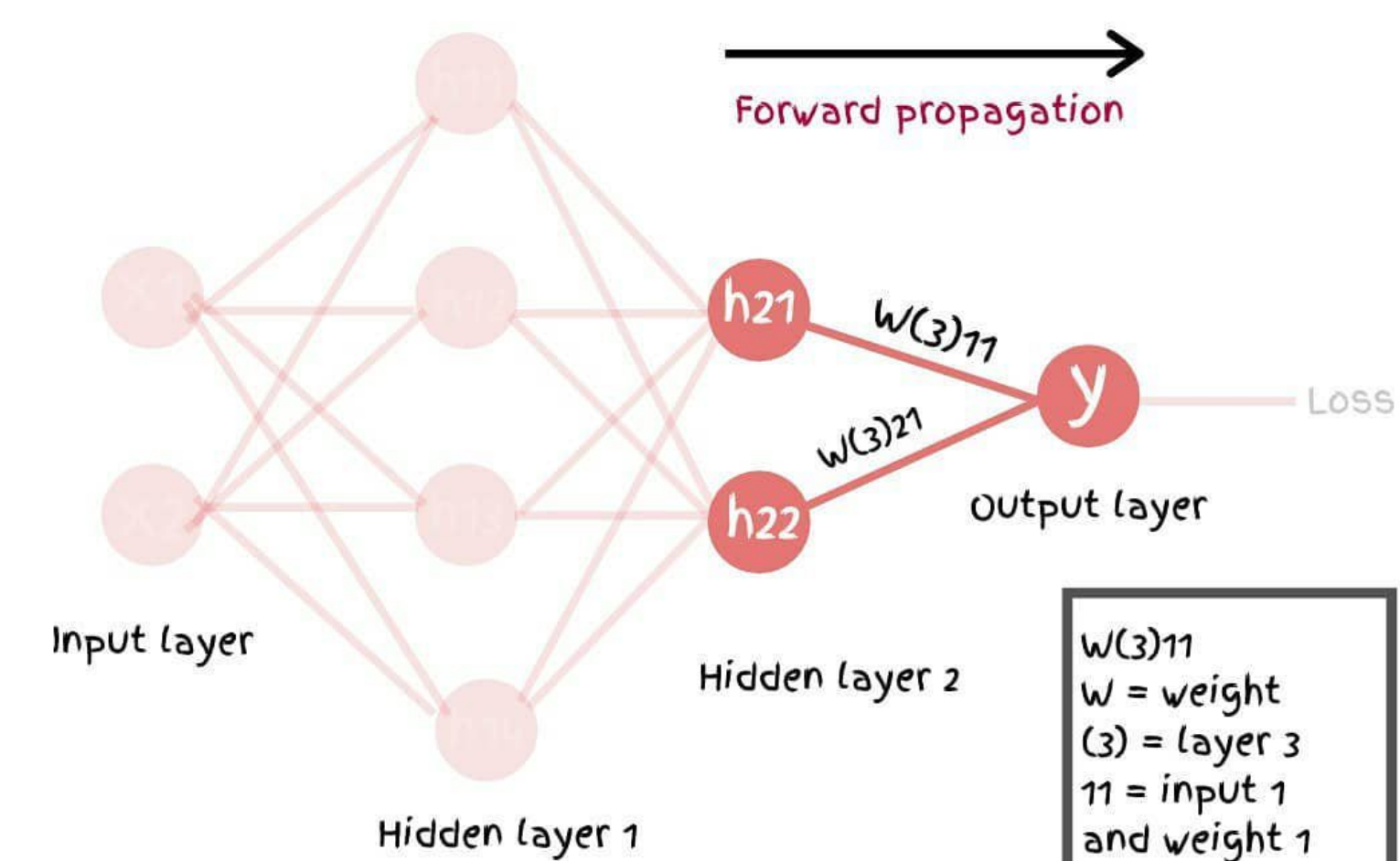
- The first operation we will be doing is to calculate h12.
- We will be doing the dot product of input with the respective weights associated with that neuron.
- Ans we will apply activation function on the dot product.



W(2)11
W = weight
(2) = layer 2
11 = input 1
and weight 1

$$h21 = f(h11*W(2)11 + h12*W(2)21 + h13*W(2)31 + h14*W(2)41)$$

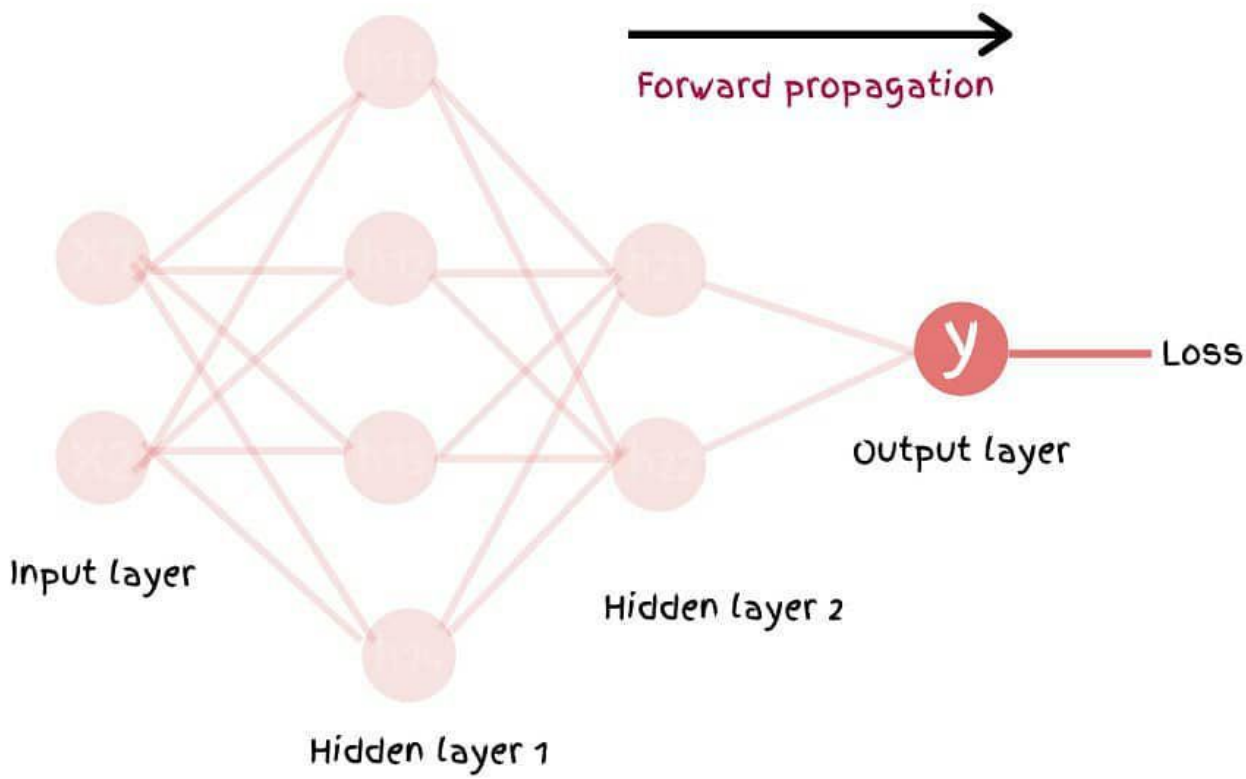
- *The first operation we will be doing is to calculate h21.*
- *We will be doing the dot product of input with the respective weights associated with that neuron.*
- *Ans we will apply activation function on the dot product.*



W(3)11
W = weight
(3) = layer 3
11 = input 1
and weight 1

$$y = f(h21*W(3)11 + h22*W(3)21$$

- The first operation we will be doing is to calculate y.
- We will be doing the dot product of input with the respective weights associated with that neuron.
- Ans we will apply activation function on the dot product.



- After Y is calculated then it is compared with ground truth label and the loss is calculated
- Let is be regression problem and loss function is MSE

```
Loss  = (1/n) sum( y - yorig )**2
```

- Let it be binary classification problem. so the output of that y will be a probability and loss dunction is log loss

```
Loss  = - (1/n) sum( yorig * log(y) + (1 - yorig * log(1 - y)
```