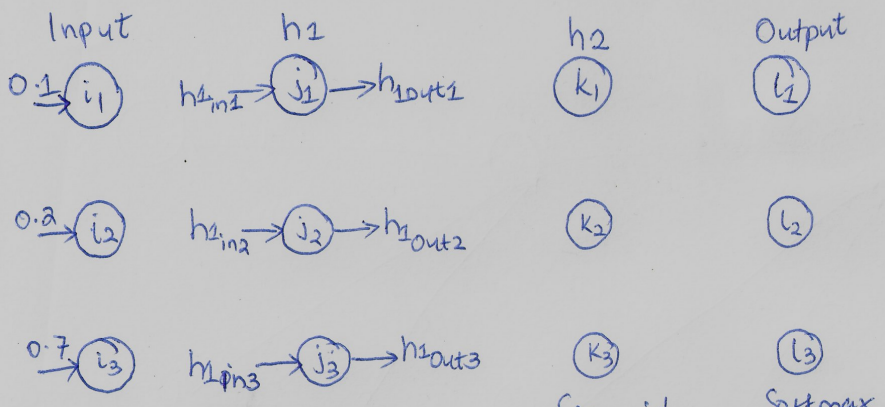
## Layer 1




$$[i_1 \; i_2 \; i_3] \times \begin{bmatrix} W_{i1j1} & W_{i1j2} & W_{i1j3} \\ W_{i2j1} & W_{i2j2} & W_{i2j3} \\ W_{i3j1} & W_{i3j2} & W_{i3j3} \end{bmatrix} + [b_{j1} \; b_{j2} \; b_{j3}] = [h_{1in_1} \; h_{1in_2} \; h_{1in_3}]$$

Relu operation:
$relu = \max(0, x)$

~~$[0.1 \quad 0.2 \quad 0.7]$~~

$$[h_{1out_1} \; h_{1out_2} \; h_{1out_3}] = [\max(0, h_{1in_1}) \; \max(0, h_{1in_2}) \; \max(0, h_{1in_3})]$$

From our one data point: $[0.1 \quad 0.2 \quad 0.7]$ we have:

$$[0.1 \quad 0.2 \quad 0.7] \times \begin{bmatrix} 0.1 & 0.2 & 0.3 \\ 0.3 & 0.2 & 0.7 \\ 0.4 & 0.3 & 0.9 \end{bmatrix} + [1.0 \quad 1.0 \quad 1.0] = [1.35 \quad 1.27 \quad 1.8]$$

$$[h_{1out_1} \; h_{1out_2} \; h_{1out_3}] = [1.35 \quad 1.27 \quad 1.8]$$

Since the Relu for the matrix $[1.35 \quad 1.27 \quad 1.8]$ gives the same result.