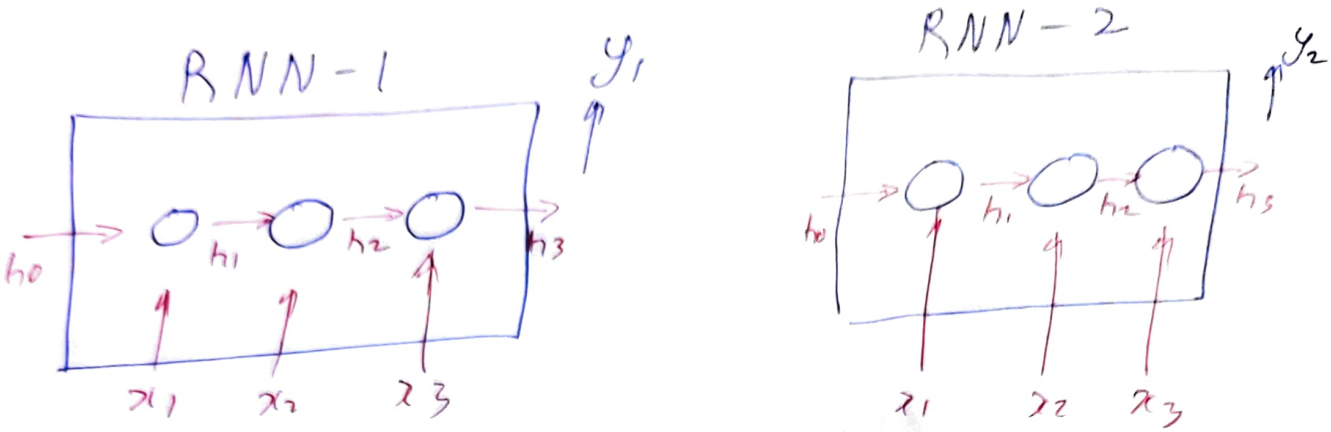
# Assignment 5.1

Q Estimate the value of the network below:

⇒




weighted $x \Rightarrow w_x = [3, -4]$

$b_h = 0 \quad b_y = 10$

weighted $h \Rightarrow w_h = \begin{bmatrix} 4 & 5 \\ -3 & 2 \end{bmatrix}$

$h_0 = [0, 0]$

$x = [1, 2, 3]$

$w_y = \begin{bmatrix} -4 \\ 2 \end{bmatrix}$

$x_1 = 1, \; x_2 = 2, \; x_3 = 3$

⇒ ∴ This are total 2 RNN units.

$$h_t = \tanh(w_x x_t + w_h \cdot h_{t-1} + b_h)$$

$$h_1 = \tanh(1 \times [3 \; -4] + 0 + 0)$$

$$= [0.99505 \quad -0.99932]$$

$$h_2 = \tanh(2 \times [3 \; -4] + [0.99505 \quad -0.99932] \begin{bmatrix} 4 & -5 \\ -3 & 2 \end{bmatrix} + 0$$

$$[0.9999 \quad -1]$$

~~$h_3 = \tanh(3 *$~~

$$h_3 = \tanh\left(3 \times [3\ -4] + [0.9999\ -1] \begin{bmatrix} 4 & -5 \\ -3 & 2 \end{bmatrix} + 0\right)$$

$$= [1\ -1]$$

$h_t = h_3$

$$\hat{y}_t = w_y \cdot h_t + b_y$$

$$\hat{y}_t = w_y \cdot h_3 + b_y$$

~~$= [1 \quad -1] \quad = [1$~~

$$= [1 \quad -1] \begin{bmatrix} -4 \\ 2 \end{bmatrix} + 10$$

$$= -6 + 10$$

$$= \hat{y}_t = 4$$

$$\boxed{\hat{y}_t = 4}$$