Input at time step t

1. $x(t) = R^{v \times 1}$

Hidden state at time t

$$h^{(t)} = \tanh(W_{hx} x^{(t)} + W_{hh} h^{(t-1)} + b_h)$$

Output

$$y(t) = \text{Softmax}(W_{yh} h^{(t)} + b_y)$$

For this model

$x(t) = R^{10 \times 1}$

$W_{hx} = R^{4 \times 10}$

$W_{hh} = R^{4 \times 4}$

$b_t = R^{4 \times 1}$

$b_y = R^{10 \times 1}$