Recurrent Neural Nets
Forward Pass

Thang Vu

RNN
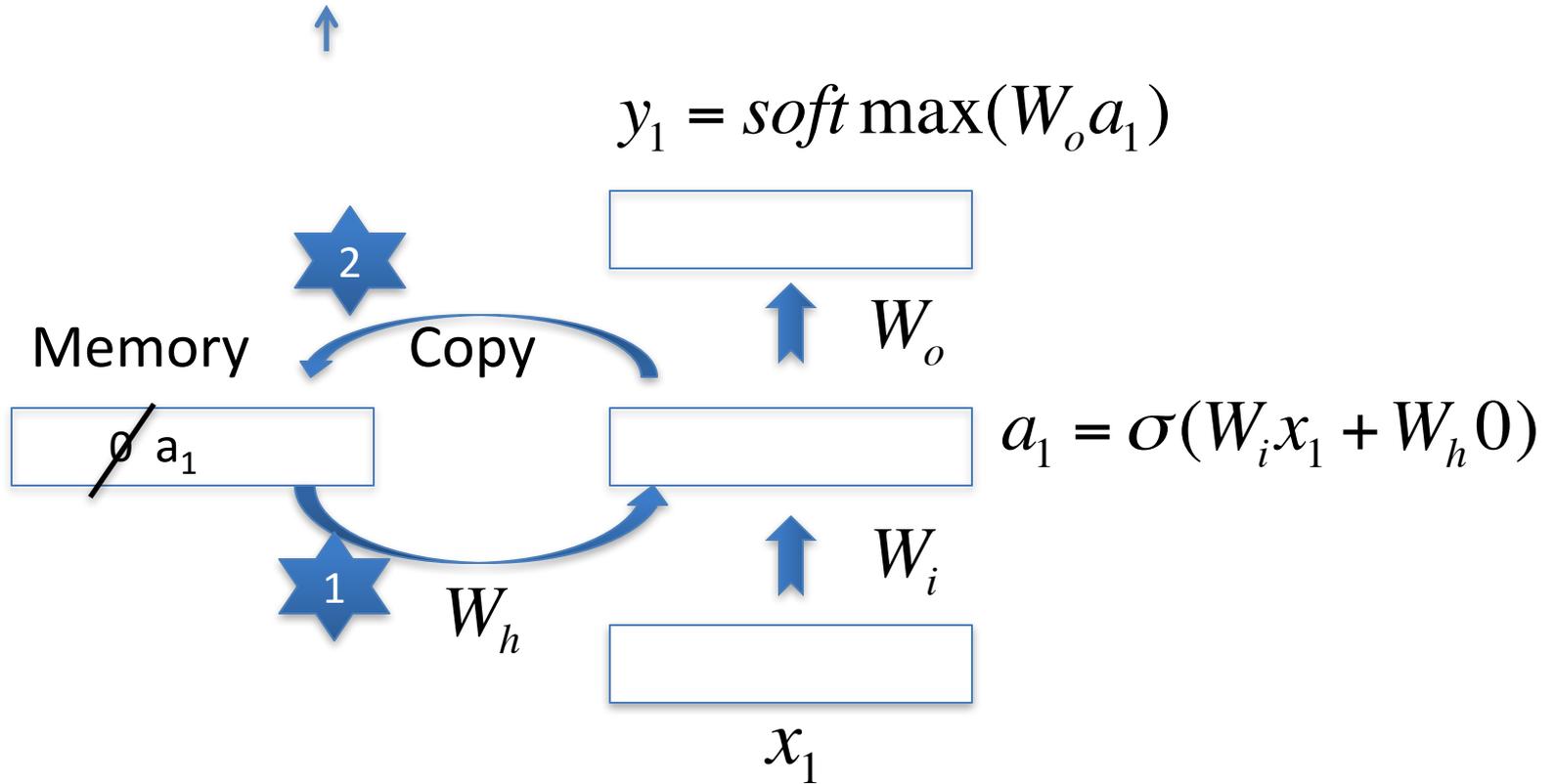
- Input data: $[x_1, x_2, x_3, ..., x_n]$

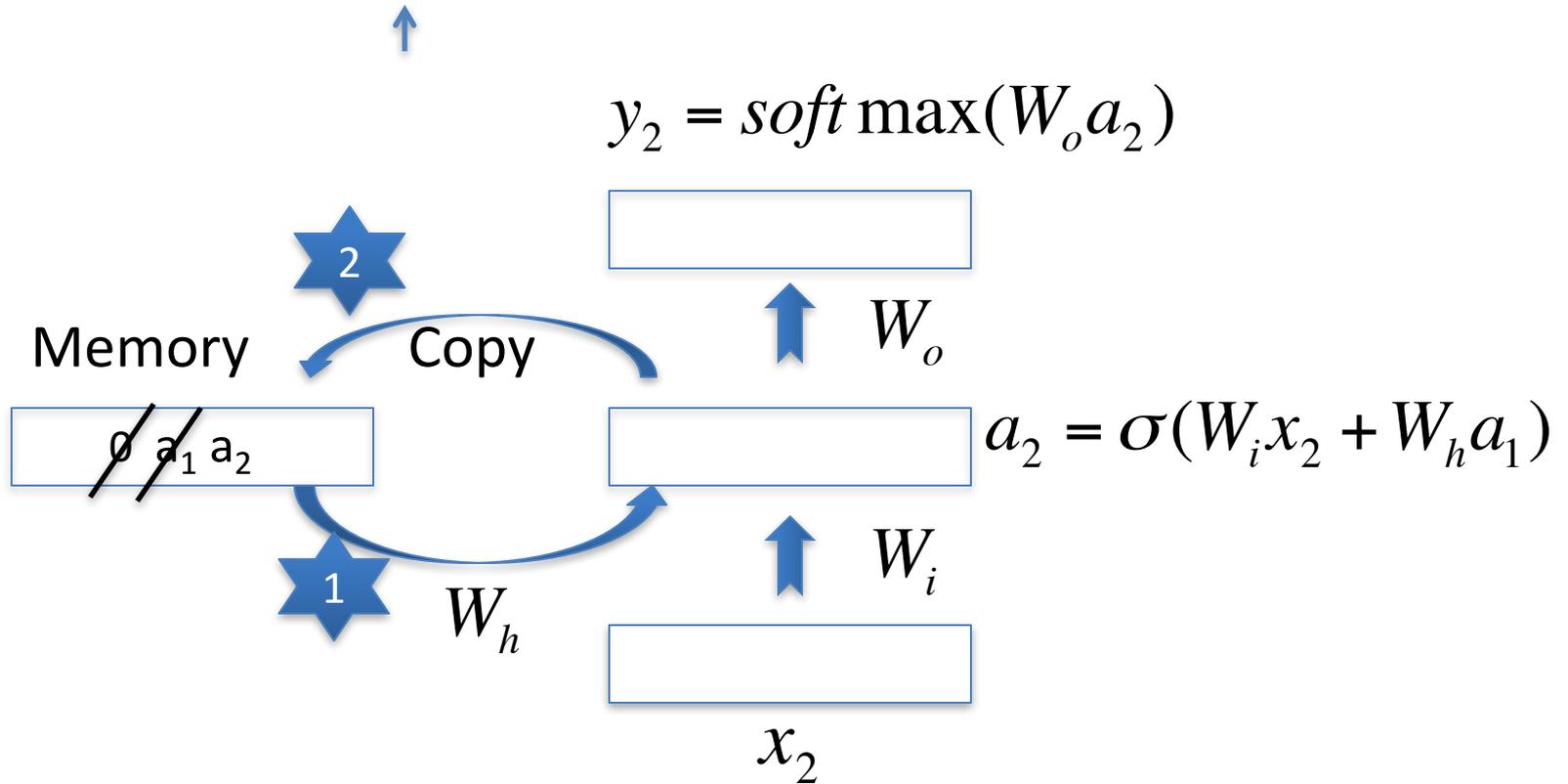$$y_1 = soft\max(W_o a_1)$$

Memory

$$a_1 = \sigma(W_i x_1 + W_h 0)$$

W_o

W_i

W_h

0

x_1

RNN

- Input data: $\left[x_1, x_2, x_3, ..., x_n\right]$

$$y_1 = soft\max(W_o a_1)$$

Memory Copy

$a_1 = \sigma(W_i x_1 + W_h 0)$

a_1

W_o

W_h

W_i

x_1

RNN

- Input data: $\left[x_1, x_2, x_3, ..., x_n \right]$

$$y_2 = soft\max(W_o a_2)$$

Memory   Copy

W_o

ø a₁ a₂

$a_2 = \sigma(W_i x_2 + W_h a_1)$

W_i

W_h

x_2

RNN

- Input data: $\left[x_1, x_2, x_3, ..., x_n \right]$

$$y_3 = soft\max(W_o a_3)$$

Memory | Copy | W_o

0 a_1 a_2 a_3

$$a_3 = \sigma(W_i x_3 + W_h a_2)$$

W_h

W_i

x_3

RNN
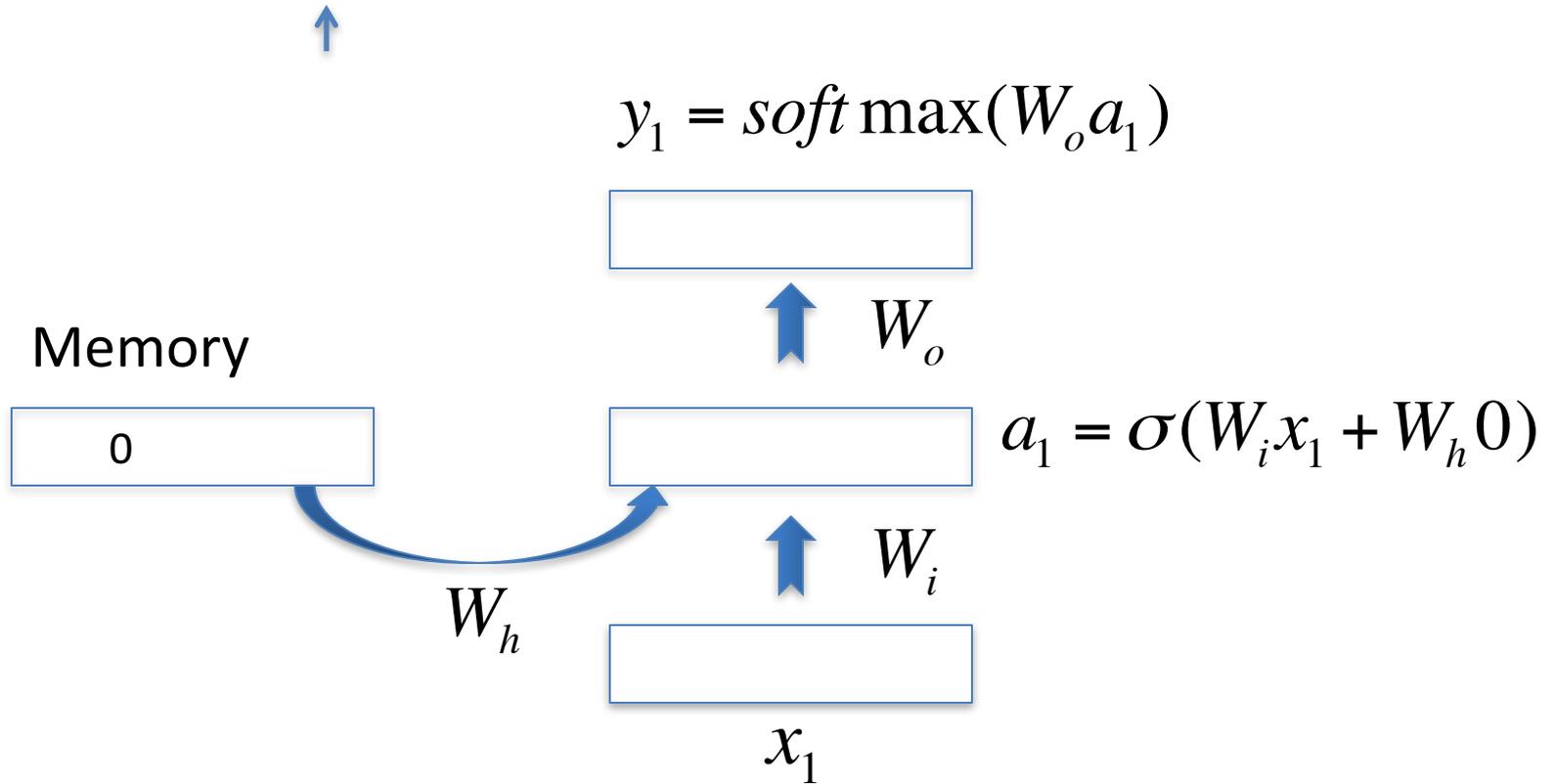
- Input data: $\left[x_1, x_2, x_3, ..., x_n \right]$

RNN

- Input data: $\left[x_1, x_2, x_3, ..., x_n \right]$

$$y_1 \qquad\qquad y_2 \qquad\qquad y_3$$

$$W_o \qquad\qquad W_o \qquad\qquad W_o$$

$$W_h \qquad\qquad W_h \qquad\qquad W_h$$

$$W_i \qquad\qquad W_i \qquad\qquad W_i$$
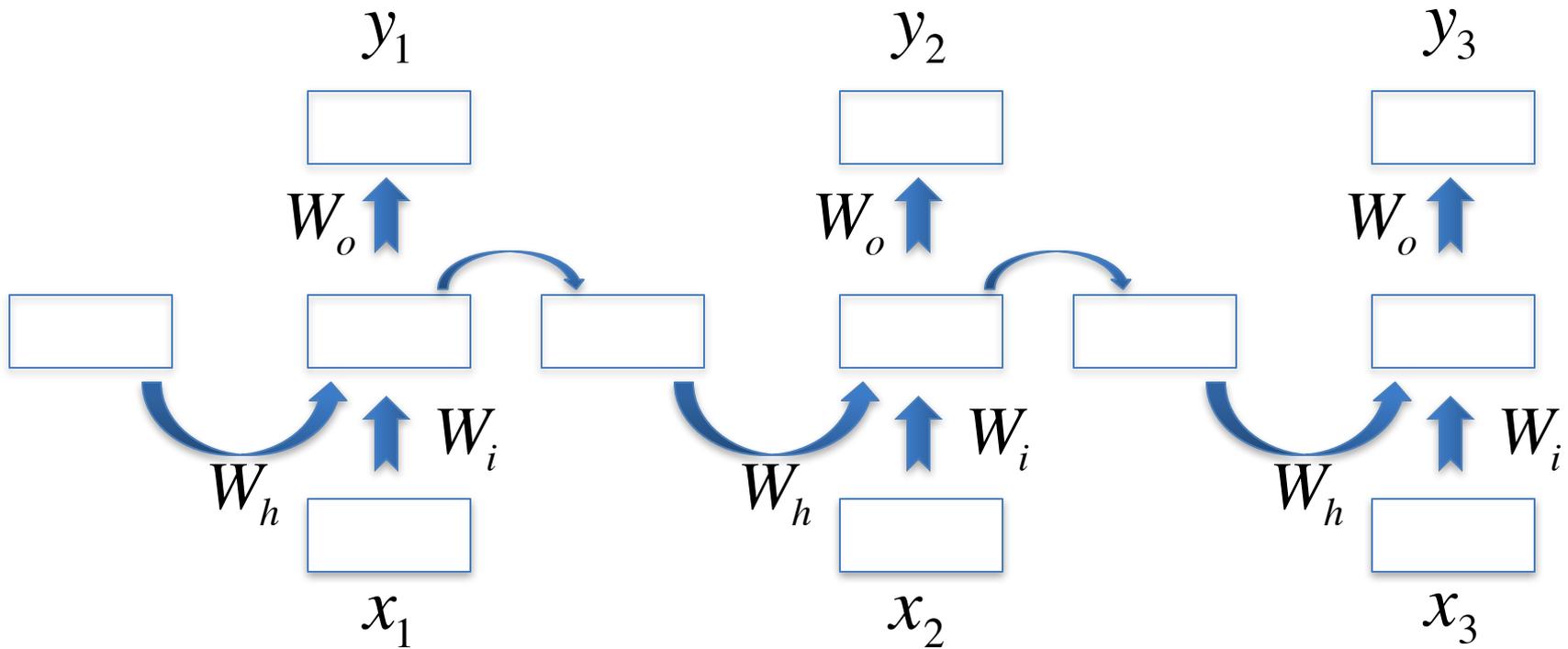
$$x_1 \qquad\qquad x_2 \qquad\qquad x_3$$
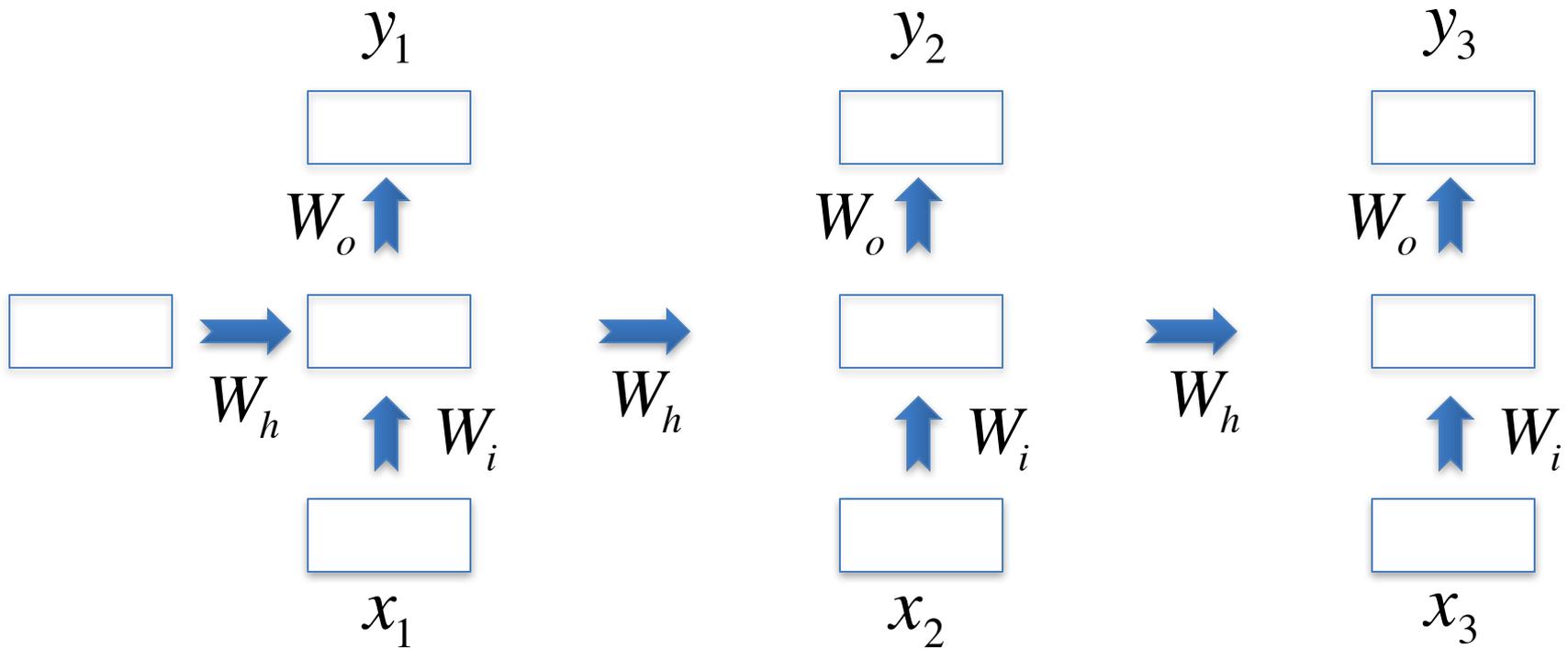
Unfolding Computational Graphs