$$X \; W \; W' \; = \; Y$$

| Input Vector X *(One hot encoding)* | **x** | Embedding Matrix W | **=** | Embedding Of word i | **x** | Context Matrix W' | **=** | Output Y (Softmax) |

Vocab x1 — 0
Vocab x2 — 0
Vocab x3 — 0
0
0
0

N

Vector of word i

h1
h2
h3
h4

V

Vector of word j

Vocab y1 — 0
Vocab y2 — 0
Vocab y3 — 0
0

x V **=** $\vdots$ **x** N

Vocab xi (observed) 1

1 Vocab yj

0
0
0

0
0
0
0
0
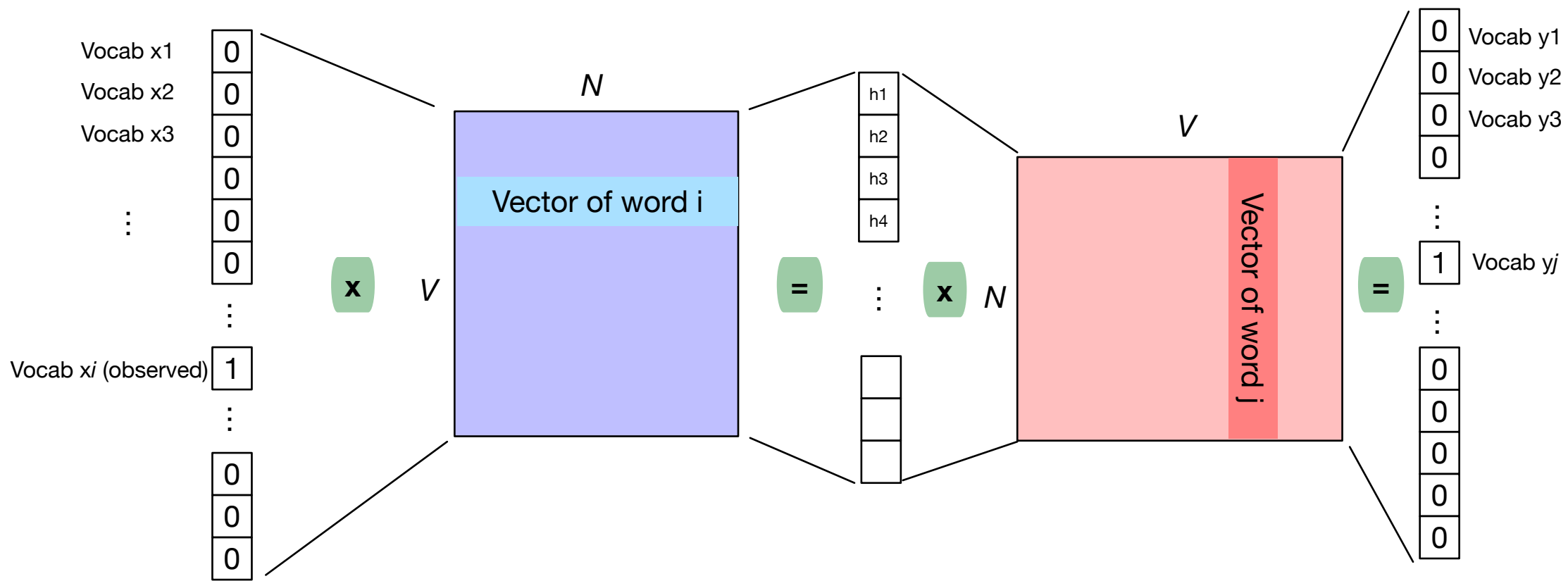
Matrix Representation

Input Layer
V values

Hidden Layer
N neurons

Output Layer
V neurons

x1   x2   x3   h1   h2   y1   y2   y3
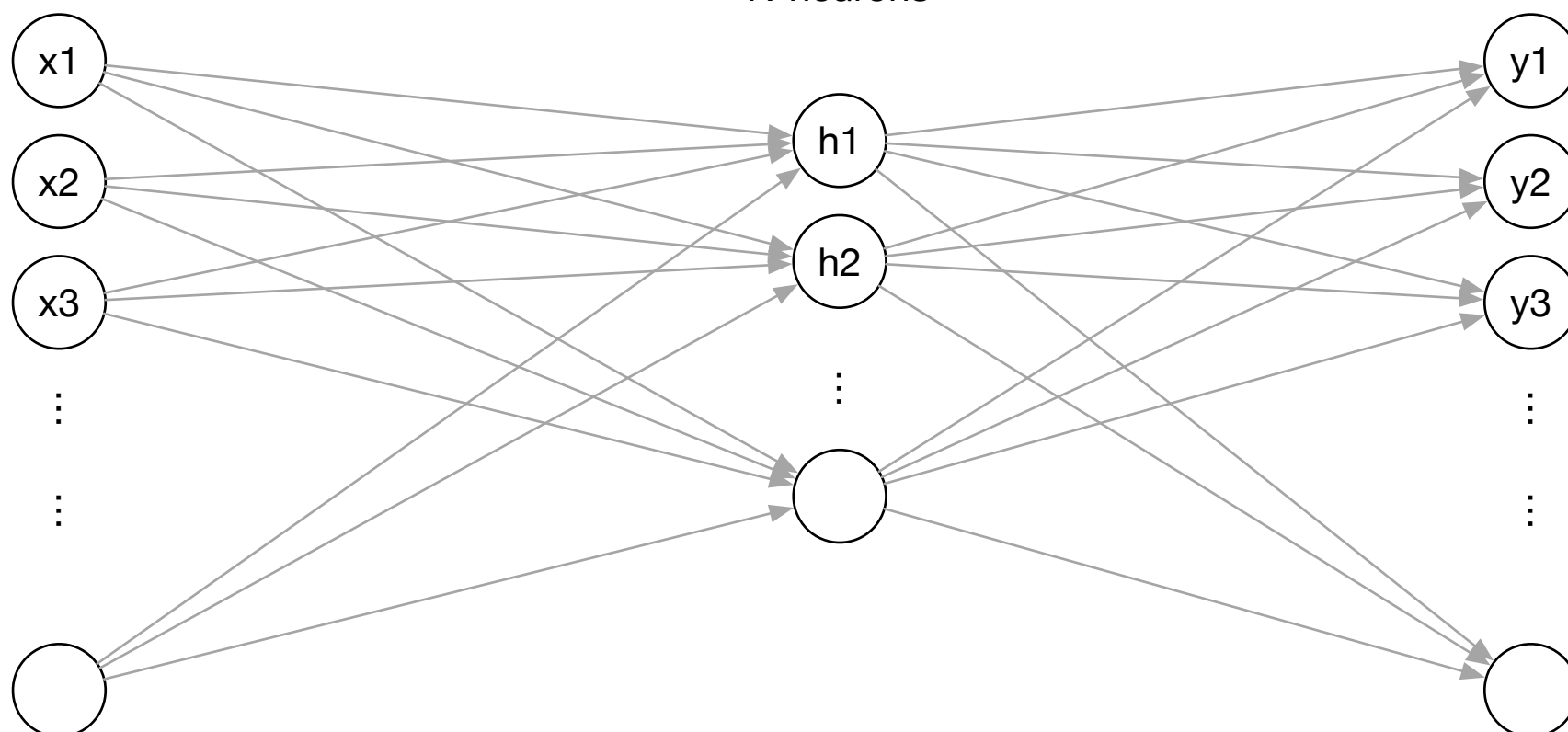
Neural Networks Representation