1. Input Layer:

$$x_0 = [1 \quad x_1 \quad x_2]$$

2. First Hidden layer:

Weights W_1^T are applied to x_0:

$$W_1^T = \begin{bmatrix} w_{10} & w_{11} & w_{12} \\ w_{20} & w_{21} & w_{22} \end{bmatrix}$$

$$S_1 = W_1^T x_0 = [h_1(x) \quad h_2(x)]$$

3. Second Hidden layer:

Weights W_2^T are applied to x_1 (assuming $x_1 = [1 \quad h_1(x) \quad h_2(x)]$:

$$W_2^T = \begin{bmatrix} -1.5 & 1 & -1 \\ -1.5 & -1 & 1 \end{bmatrix}$$

$$S_2 = W_2^T x_1 = \begin{bmatrix} -1.5 + h_1(x) - h_2(x) \\ -1.5 - h_1(x) + h_2(x) \end{bmatrix}$$

Then apply the sign function to each element to S_2 to get x_2.

4. Output Layer:

Finally, weights W_3^T are applied:

$$W_3^T = [1.5 \quad 1 \quad 1]$$

$$S_3 = W_3^T x_2$$

$$= 1.5 + \text{sign}(-1.5 + h_1(x) - h_2(x)) + \text{sign}(-1.5 - h_1(x) + h_2(x))$$

5. Compute f:

$$f = \text{sign}(S_3)$$

$$f = \text{sign}(\text{sign}(-1.5 + h_1(x) - h_2(x)) - \text{sign}(1.5 + h_1(x) - h_2(x)) + 1.5)$$