

$$\begin{array}{l}
 1 \rightarrow 1+9 = 10 \\
 3 \rightarrow 3+3 = 6 \\
 6 \rightarrow 6+6 = 12 \\
 3 \rightarrow 3+3 = 6 \\
 9 \rightarrow (1-9) \bar{w}_8^0 = -8 \\
 3 \rightarrow (3-3) \bar{w}_8^1 = 0 \\
 6 \rightarrow (6-6) \bar{w}_8^2 = 0 \\
 3 \rightarrow (3-3) \bar{w}_8^3 = 0
 \end{array}$$

Decompose Step 1

$$\begin{array}{l}
 \begin{bmatrix} 10 \\ 6 \\ 12 \\ 6 \end{bmatrix} \rightarrow \begin{array}{l} 10+12 = 22 \\ 6+6 = 12 \\ (10-12) \bar{w}_4^0 = -2 \\ (6-6) \bar{w}_4^1 = 0 \end{array}
 \end{array}$$

$$\begin{array}{l}
 \begin{bmatrix} -8 \\ 0 \\ 0 \\ 0 \end{bmatrix} \rightarrow \begin{array}{l} -8+0 = -8 \\ 0+0 = 0 \\ (-8-0) \bar{w}_4^0 = -8 \\ (0-0) \bar{w}_4^1 = 0 \end{array}
 \end{array}$$

Decompose stage 2

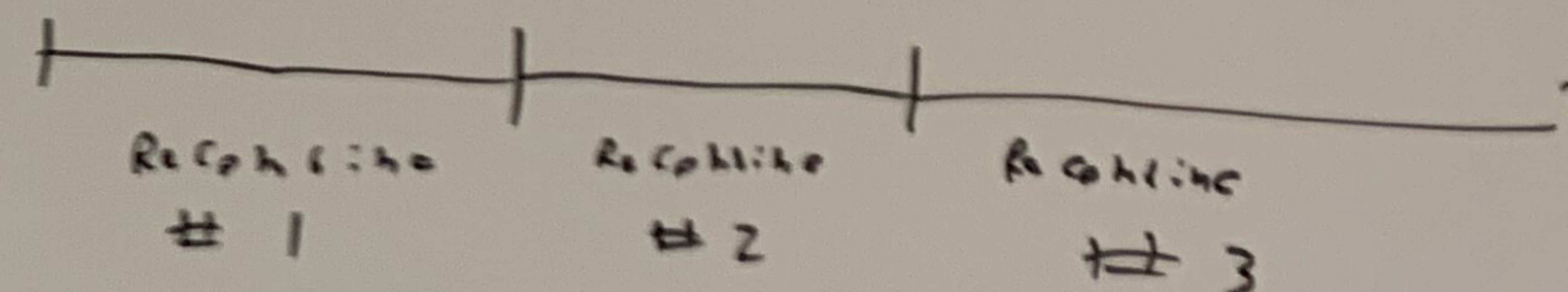
$$\begin{array}{l}
 \begin{bmatrix} 22 \\ 12 \end{bmatrix} \rightarrow \begin{array}{l} 22+12 = 34 \\ (22-12) \bar{w}_2^0 = 10 \end{array} \\
 \begin{bmatrix} -2 \\ 0 \end{bmatrix} \rightarrow \begin{array}{l} -2+0 = -2 \\ (-2-0) \bar{w}_2^0 = -2 \end{array}
 \end{array}$$

$$\begin{array}{l}
 \begin{bmatrix} -8 \\ 0 \end{bmatrix} \rightarrow \begin{array}{l} -8+0 = -8 \\ (-8-0) \bar{w}_2^0 = -8 \end{array}
 \end{array}$$

$$\begin{array}{l}
 \begin{bmatrix} -8 \\ 0 \end{bmatrix} \rightarrow \begin{array}{l} -8+0 = -8 \\ (-8-0) \bar{w}_2^0 = -8 \end{array}
 \end{array}$$

Decompose stage 3

$$\begin{array}{l}
 \begin{bmatrix} 34 \\ 10 \\ -2 \\ -2 \end{bmatrix} \rightarrow \begin{bmatrix} 34 \\ 6 \\ -2 \\ -2 \end{bmatrix} \rightarrow \begin{bmatrix} 34 \\ -2 \\ 10 \\ -2 \end{bmatrix} \rightarrow \begin{bmatrix} 34 \\ -8 \\ -8 \\ -8 \end{bmatrix} \rightarrow \begin{bmatrix} 34 \\ -8 \\ -2 \\ -8 \end{bmatrix}
 \end{array}$$



Answer =

$$\begin{bmatrix} 34 \\ -8 \\ -2 \\ -8 \\ 10 \\ -8 \\ -2 \\ -8 \end{bmatrix}$$