° Determine the LDL^T factorization of this matrix:

$$A = \begin{bmatrix} 1 & 2 & -1 & 1 \\ 2 & 3 & -4 & 3 \\ -1 & -4 & -1 & 3 \\ 1 & 3 & 3 & 0 \end{bmatrix}$$

✳ matrix is symmetric

⇓

multipliers: $\frac{2}{1}, \frac{-1}{1}, \frac{1}{1}$

$$A = \begin{bmatrix} 1 & 2 & -1 & 1 \\ 0 & -1 & -2 & 1 \\ 0 & -2 & -2 & 4 \\ 0 & 1 & 4 & -1 \end{bmatrix}$$

multipliers: $\frac{-2}{-1}, \frac{1}{-1}$

$$\Rightarrow A = \begin{bmatrix} 1 & 2 & -1 & 1 \\ 0 & -1 & -2 & 1 \\ 0 & 0 & -2 & 2 \\ 0 & 0 & 2 & 0 \end{bmatrix}$$

multiplier: $\frac{2}{-2}$

$$\Rightarrow A = \begin{bmatrix} 1 & 2 & -1 & 1 \\ 0 & -1 & -2 & 1 \\ 0 & 0 & 2 & 2 \\ 0 & 0 & 0 & -2 \end{bmatrix}$$

$$L = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 2 & 1 & 0 & 0 \\ -1 & 2 & 1 & 0 \\ 1 & -1 & -1 & 1 \end{bmatrix}$$

$$D = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 2 & 0 \\ 0 & 0 & 0 & -2 \end{bmatrix}$$

$$L^T = \begin{bmatrix} 1 & 2 & -1 & 1 \\ 0 & 1 & 2 & -1 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$DL^T = \begin{bmatrix} 1 & 2 & -1 & 1 \\ 0 & -1 & -2 & 1 \\ 0 & 0 & 2 & 2 \\ 0 & 0 & 0 & -2 \end{bmatrix}$$

✳ $U = DL^T$

$LU = LDL^T$

$A = LDL^T$

$A^T = LDL^T$