Step-1

We have

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

The cofactors of the elements of A are:

$$\begin{aligned} C_{11} &= \begin{vmatrix} 2 & -1 \\ -1 & 2 \end{vmatrix} \\ &= 4 - 1 \\ &= 3 \end{aligned}$$

Step-2

And

$$\begin{aligned} C_{12} &= -\begin{vmatrix} -1 & -1 \\ 0 & 2 \end{vmatrix} \\ &= -(-2 - 0) \\ &= 2 \end{aligned}$$

$$\begin{aligned} C_{13} &= \begin{vmatrix} -1 & 2 \\ 0 & -1 \end{vmatrix} \\ &= 1 - 0 \\ &= 1 \end{aligned}$$

Step-3

Then

$$\begin{aligned} C_{21} &= -\begin{vmatrix} -1 & 0 \\ -1 & 2 \end{vmatrix} \\ &= -(-2 - 0) \\ &= 2 \end{aligned}$$

$$\begin{aligned} C_{22} &= \begin{vmatrix} 2 & 0 \\ 0 & 2 \end{vmatrix} \\ &= 4 - 0 \\ &= 4 \end{aligned}$$

Step-4

And

$$
\begin{aligned}
C_{23} &= -\begin{vmatrix} 2 & -1 \\ 0 & -1 \end{vmatrix} \\
&= -(-2-0) \\
&= 2
\end{aligned}
$$

$$
\begin{aligned}
C_{31} &= \begin{vmatrix} -1 & 0 \\ 2 & -1 \end{vmatrix} \\
&= 1-0 \\
&= 1
\end{aligned}
$$

Step-5

Now

$$
\begin{aligned}
C_{32} &= -\begin{vmatrix} 2 & 0 \\ -1 & -1 \end{vmatrix} \\
&= -(-2-0) \\
&= 2
\end{aligned}
$$

$$
\begin{aligned}
C_{33} &= \begin{vmatrix} 2 & -1 \\ -1 & 2 \end{vmatrix} \\
&= 4-1 \\
&= 3
\end{aligned}
$$

Step-6

So, the matrix of cofactors is $C = \begin{bmatrix} 3 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 3 \end{bmatrix}$

Then $C^T = \begin{bmatrix} 3 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 3 \end{bmatrix}$

Step-7

And

$$AC^T = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}\begin{bmatrix} 3 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 3 \end{bmatrix}$$

$$= \begin{bmatrix} 6-2+0 & 4-4+0 & 2-2+0 \\ -3+4-1 & -2+8-2 & -1+4-3 \\ 0-2+2 & 0-4+4 & 0-2+6 \end{bmatrix}$$

$$= \begin{bmatrix} 4 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 4 \end{bmatrix}$$

$$= 4I$$

Step-8

We can also see $\det A$

$= 2.\text{cofactor of } 2 + (-1)\text{cofactor of } (-1)(\text{cofactor expansion along first row})$

$= 2(3) + (-1)2$

$= 6 - 2$
$= 4$

Step-9

So, we observe that $\frac{1}{\det A}.C^T = A^{-1}$

Hence

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