\[ A = \begin{bmatrix} 2 & 6 & 2 \\ -3 & -8 & 0 \\ 4 & 9 & 2 \end{bmatrix} \quad E_{21} = \begin{bmatrix} 1 & 0 & 0 \\ \frac{3}{2} & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad E_{31} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -2 & 0 & 1 \end{bmatrix} \quad E_{32} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 3 & 1 \end{bmatrix} \]

\[ U = \begin{bmatrix} 2 & 6 & 2 \\ 0 & 1 & 3 \\ 0 & 0 & 7 \end{bmatrix} \]

\[ M = E_{32} E_{31} E_{21} = \begin{bmatrix} 1 & 0 & 0 \\ \frac{3}{2} & 1 & 0 \\ \frac{5}{2} & 3 & 1 \end{bmatrix} \]

\[ MA = U \]
\[ \mathbf{L} = \mathbf{M}^{-1} = \]
\[
\begin{bmatrix}
1 & 0 & 0 \\
-\frac{3}{2} & 1 & 0 \\
2 & 0 & 1
\end{bmatrix}
\begin{bmatrix}
1 & 0 & 0 \\
0 & 1 & 0 \\
0 & -3 & 1
\end{bmatrix}
\]

\[ \mathbf{E}_{21}^{-1} = \begin{bmatrix} 1 & 0 & 0 \\ -\frac{3}{2} & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \]
\[ \mathbf{E}_{31}^{-1} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 2 & 0 & 1 \end{bmatrix} \]
\[ \mathbf{E}_{32}^{-1} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & -3 & 1 \end{bmatrix} \]

You just write the "multipliers" in the same places they are in the $E_{ij}$ inverses.

Then $\mathbf{A} = \mathbf{LU}$.
Once \( A = LU \), we are now ready to solve

\[ A \bar{x} = b \quad \Rightarrow \quad (LU) \bar{x} = b \]

\[ \Rightarrow L(U \bar{x}) = b, \quad \text{Set} \quad \bar{y} = U \bar{x} \]

and solve \( L \bar{y} = b \). Say \( b = \begin{bmatrix} -\frac{1}{2} \\ 1 \\ -\frac{1}{2} \end{bmatrix} \)

\[
\begin{bmatrix}
1 & 0 & 0 \\
-\frac{3}{2} & 1 & 0 \\
2 & -3 & 1
\end{bmatrix}
\]

by forward substitution.

\[ x = 1 \]
\[ -\frac{3}{2} (1) + y = -1 \quad \Rightarrow \quad y = \frac{1}{2} \]
\[ 2(1) - 3(\frac{1}{2}) + z = 2 \quad \Rightarrow \quad z = 3 \frac{1}{2} \]

Now solve \( U \bar{x} = \bar{y} \)

\[
\begin{bmatrix}
2 & 6 & 2 \\
0 & 1 & 3 \\
0 & 0 & 7
\end{bmatrix}
\]

by back substitution.

\[ z = \frac{5}{2} \]
\[ y + 3 \left( \frac{5}{2} \right) = \frac{1}{2} \quad \Rightarrow \quad y = -\frac{1}{2} \]
\[ 2x + 6 \left( -\frac{1}{2} \right) + 2 \left( \frac{5}{2} \right) = 1 \quad \Rightarrow \quad x = \frac{5}{7} \]