1.   Write the matrix A as a product of elementary matrices.

a. $A = \begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix}$

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

2.   Factor the given matrix into a product of an upper and a lower triangular matrices.

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

3. Use forward and backward substitution to solve the given system

$$\begin{cases} x+2y=3 \\ x+y=2 \\ x+z=2 \end{cases}$$

4. Compute the transfer matrix of the network in the figure.

Let $\mathbf{A} = \begin{bmatrix} 4/3 & -12 \\ -1/4 & 3 \end{bmatrix}$, Design a ladder network whose transfer matrix is A by finding a suitable matrix factorization of A.