

CS 451 Activity 10
Solution

$$\begin{aligned}
 6. \quad & \left[\begin{array}{ccc|c} 0 & 2 & 2 & 4 \\ 1 & 2 & 1 & 4 \\ 0 & 1 & -1 & 0 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 2 & 1 & 4 \\ 0 & 2 & 2 & 4 \\ 0 & 1 & -1 & 0 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 2 & 1 & 4 \\ 0 & 1 & 1 & 2 \\ 0 & 1 & -1 & 0 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 0 & -1 & 0 \\ 0 & 1 & 1 & 2 \\ 0 & 1 & -1 & 0 \end{array} \right] \\
 & \rightarrow \left[\begin{array}{ccc|c} 1 & 0 & -1 & 0 \\ 0 & 1 & 1 & 2 \\ 0 & 0 & -2 & -2 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 0 & -1 & 0 \\ 0 & 1 & 1 & 2 \\ 0 & 0 & 1 & 1 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 2 \\ 0 & 0 & 1 & 1 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \end{array} \right]
 \end{aligned}$$

Thus original system has a unique solution $x_1 = x_2 = x_3 = 1$.

$$\begin{aligned}
 7. \quad & \left[\begin{array}{ccc|c} 1 & 1 & 0 & 2 \\ 0 & -1 & 2 & 3 \\ 0 & 1 & 1 & 3 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 0 & 2 \\ 0 & 1 & -2 & -3 \\ 0 & 1 & 1 & 3 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 2 & 5 \\ 0 & 1 & -2 & -3 \\ 0 & 1 & 1 & 3 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 2 & 5 \\ 0 & 1 & -2 & -3 \\ 0 & 0 & 3 & 6 \end{array} \right] \\
 & \rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 2 & 5 \\ 0 & 1 & -2 & -3 \\ 0 & 0 & 1 & 2 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & -2 & -3 \\ 0 & 0 & 1 & 2 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 2 \end{array} \right]
 \end{aligned}$$

Thus the original system has the unique solution $x_1 = 1, x_2 = 1, x_3 = 2$.