See example in lecture (1/30/01) for $\lambda = \lambda_1 = 5$

Starting with $\begin{bmatrix} -7 & 2 & -3 \\ 2 & -4 & -6 \\ -1 & -2 & -5 \end{bmatrix} \underline{x}^{(1)} = \underline{0}$

Simplify by Gauss Elimination:

$$\left[\begin{array}{ccc|c} -7 & 2 & -3 & 0 \\ 2 & -4 & -6 & 0 \\ -1 & -2 & -5 & 0 \end{array}\right]$$

Not that this matters. Column of zeros will not change.

$\frac{1}{2}$ row2 $\rightarrow$
$$\left[\begin{array}{ccc|c} -1 & -2 & -5 & 0 \\ 1 & -2 & -3 & 0 \\ -7 & 2 & -3 & 0 \end{array}\right]$$

row2 + row1
row3 − 7(row1)
$$\left[\begin{array}{ccc|c} -1 & -2 & -5 & 0 \\ 0 & -4 & -8 & 0 \\ 0 & 16 & 32 & 0 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} -1 & -2 & -5 & 0 \\ 0 & 1 & 2 & 0 \\ 0 & 1 & 2 & 0 \end{array}\right]$$

−1 row1
row3 − row2
$$\left[\begin{array}{ccc|c} 1 & 2 & 5 & 0 \\ 0 & 1 & 2 & 0 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

<= You can stop here to find $\underline{x}^{(1)}$

or

row1 − 2 row2
$$\left[\begin{array}{ccc|c} 1 & 0 & 3 & 0 \\ 0 & 1 & 2 & 0 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

<= go one step further to simplify