Assignment on Systems of linear Equations: Due February 12th

1. Write each system of linear equations in matrix form:

$$x + y = 1 \qquad\qquad 3x + y + z = 1$$
$$y - z = 1 \qquad\qquad x - y - z = 0$$
$$x + z = 0$$

2. Write a system of linear equations equivalent to the matrix equation

$$\begin{pmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \end{pmatrix} \begin{pmatrix} w \\ x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 13 \\ 14 \\ 15 \end{pmatrix}$$

3. Solve the systems in the first problem by a sequence of elementary operations applied to both sides of the equations.

4. Row reduce the following matrices to echelon form and solve the associated matrix equations: $A\mathbf{x} = \mathbf{0}$.

$$\begin{pmatrix} 1 & 2 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 1 & 1 \end{pmatrix} \begin{pmatrix} 1 & 2 & 0 & 0 \\ 0 & 0 & 1 & 3 \\ 0 & 0 & 3 & 9 \end{pmatrix} \begin{pmatrix} 1 & 2 & 3 & 4 \\ 0 & 5 & 6 & 7 \\ 0 & 0 & 8 & 9 \\ 0 & 0 & 0 & 10 \end{pmatrix}$$