Linear Algebra 1: Tutorial 1

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Exercise 1. *For each of the matrices below, determine which of the following three statements is true:*

(a) the matrix is in ***reduced row echelon form****;*

(b) the matrix is in ***row echelon form****, but* ***not*** *in reduced row echelon form;*

(c) the matrix is ***not*** *in row echelon form.*

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

$$C = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix} \qquad D = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 1 \end{bmatrix}$$

$$E = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix} \qquad F = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 2 & 0 \\ 3 & 0 & 0 \end{bmatrix}$$

Exercise 2. *Using elementary row operations, find the reduced row echelon form of the following matrices (the entries are assumed to be in* $\mathbb{R}$*).*

$$A = \begin{bmatrix} 0 & 1 & 2 & -1 \\ 1 & 0 & 0 & 2 \\ 1 & 1 & 2 & 1 \end{bmatrix} \qquad B = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 2 & 0 \\ 1 & 2 & 3 \end{bmatrix}$$