The example given is class was to find a basis for the row and column spaces of the matrix

\[
A = \begin{pmatrix}
1 & 1 & 1 & 1 & 12 \\
1 & 2 & 0 & 5 & 17 \\
3 & 2 & 4 & -1 & 31
\end{pmatrix}.
\]

We then can row reduce this matrix to the matrix

\[
E = \begin{pmatrix}
1 & 1 & 1 & 1 & 12 \\
0 & 1 & -1 & 4 & 5 \\
0 & 0 & 0 & 0 & 0
\end{pmatrix}.
\]

Now we have that a basis for \( \text{Row}(A) \) is \( \{(1, 1, 1, 1, 12), (0, 1, -1, 4, 5)\} \) since those are the nonzero rows of \( E \) (these were given correctly in class). However, the basis I gave for the column space of \( A \), namely \( \{(1, 0, 0), (1, 1, 0)\} \), is not correct. Rather, the two columns we choose in \( E \) are columns 1 and 2 since they contain the leading ones, but this means that the basis for \( \text{Col}(A) \) will be the first two columns back in the original matrix \( A \). Thus a basis for \( \text{Col}(A) \) is \( \{(1, 1, 3), (1, 2, 2)\} \).

Sorry about the mix-up.

- Brian

Note: In the first section I gave a second example of a matrix \( E \) and gave the basis for that column space incorrectly there as well. For that example, we would need to know the original matrix \( A \) to find the correct basis.