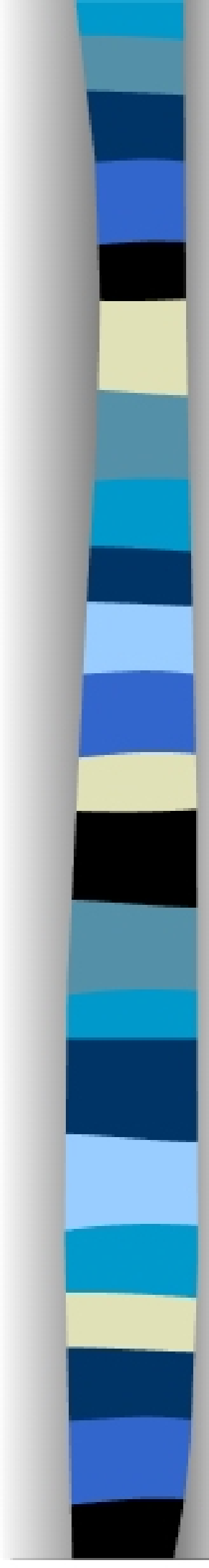


# Back Substitution



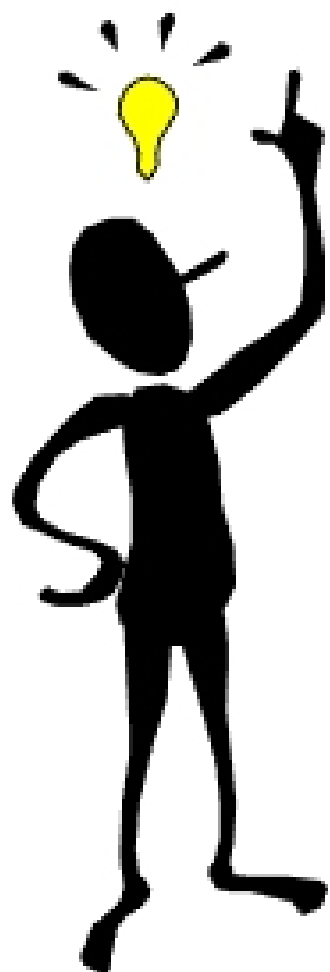
## Matrices Solutions

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In systems that are higher than the 2 dimensional systems you have just studied, it is important to learn how to extend the Gauss-Jordan elimination method to a system with 3 unknowns. However, we do not have to do the entire Gauss-Jordan elimination method in order to obtain a solution.

By using a combination of back substitution and Gaussian elimination (to be explained later) we can get a solution for our system with less work.



Less work, now that's an idea!

Consider the following system:

$$\begin{aligned}x - 2y - 2z &= -3 \\2x + y - z &= 7 \\3x - 2y + 5z &= 10\end{aligned}$$

First we convert the system above into a matrix:

$\begin{bmatrix} 1 & -2 & -2 &   & -3 \\ 2 & 1 & -1 &   & 7 \\ 3 & -2 & 5 &   & 10 \end{bmatrix}$	By Gaussian elimination we end up with a matrix that looks like this: $\longrightarrow$	$\begin{bmatrix} 1 & -2 & -2 &   & -3 \\ 0 & 5 & 3 &   & 13 \\ 0 & 0 & 1 &   & 1 \end{bmatrix}$
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Instead of having zeroes above and below the diagonal

We just produce zeroes below the main diagonal.