SOLVE THE SYSTEM

$$\begin{bmatrix} 4 & -1 & 0 \\ -1 & 4 & -1 \\ 0 & -1 & 4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 2 \\ 4 \\ 10 \end{bmatrix}$$

'OPTIMAL SOLN'
ASSUME THIS IS EXACT SOLN... CALLED OPTIMAL BECAUSE APPROXIMATE METHODS ARE USED... ITERATIVE METHODS ARE APPROXIMATE

$$(L+D)x^{(k+1)} = -Ux^{(k)} + b$$

$$x_i^{(k+1)} = \frac{1}{a_{ii}}\left[b_i - \sum_{j=1}^{i-1} a_{ij} x_j^{(k)} - \sum_{j=i+1}^{n} a_{ij} x_j^{(k)}\right]$$

$i = 1$
$j = 1$
$k = 1$

$$x_1^{(2)} = \frac{1}{4}\left[2 - \sum_{j=1}^{0} a_{1j} x_j^{(1)} - \sum_{j=2}^{n} a_{1j} x_j^{(1)}\right]$$

$\sum_{j=1}^{0} a_{1j} x_j^{(1)} = ?$

$\sum_{j=2}^{n} a_{1j} x_j^{(1)} = ?$

$i = 1, \ldots, n$
$= 1 = n$

$$x_1^{(2)} = \frac{2}{4} = \frac{1}{2}$$

OPTIMAL SOLN

$$x = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$$

$i = 2$
$i = 1, \ldots, n = 2$
$n = 1, \ldots ?$