GAUSS - SIEDEL METHOD

$$2x_1 - x_2 = 1$$
$$-x_1 + 2x_2 = 1$$

$$2x_1^{(k+1)} = x_2^{(k)} + 1$$
$$2x_2^{(k+1)} = x_1^{(k+1)} + 1$$

$$\Rightarrow \quad x_1^{(k+1)} = \frac{1}{2}\left[x_2^{(k)} + 1\right]$$
$$x_2^{(k+1)} = \frac{1}{2}\left[x_1^{(k+1)} + 1\right]$$

k	$x_1^{(k)}$	$x_2^{(k)}$
0	0	0
1	1/2	3/4
2	7/8	15/16
3	31/32	63/64

GENERALLY $\longrightarrow$ $x_i^{(k+1)} = \frac{1}{a_{ii}} \ldots$

WTF IS THE SUPER-SCRIPT?

JACOBI: $D x_{k+1} = -(L+U)x_k + b$

$$a_{11}x_1 + a_{12}x_2 + a_{13}x_3 = b_1$$
$$a_{21}x_1 + a_{22}x_2 + a_{23}x_3 = b_2$$
$$a_{31}x_3 + a_{32}x_2 + a_{33}x_3 = b_3$$

$\longrightarrow$ CONVERGES FASTER THAN JACOBI

$$a_{11}x_1^{(k+1)} = -a_{12}x_2^{(k)} - a_{13}x_3^{(k)} + b_1$$

THE SUPERSCRIPT DENOTES ITERATION, SINCE SUBSCRIPT IS OCCUPIED