Step-1

Let $b = \begin{bmatrix} b_1 \\ b_2 \end{bmatrix}$, where b_1 and b_2 are to be fixed.

For any $x = (x_1, x_2)^{\mathrm{T}}$, such that $x \geq 0$, we want $Ax \ngeq b$.

We have,

$$\begin{aligned} Ax &= \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} \\ &= \begin{bmatrix} x_1 \\ -x_2 \end{bmatrix} \end{aligned}$$

Step-2

Since $x \geq 0$ and $Ax = \begin{bmatrix} x_1 \\ -x_2 \end{bmatrix}$, this gives us the idea that if b_2 is positive, $-x_2 < b_2$.

Therefore, let $b = [0, 1]^{\mathrm{T}}$.

Step-3

Similarly, let $y = [y_1, y_2]$.

Consider the following:

$$\begin{aligned} yA &= [y_1, y_2] \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix} \\ &= [y_1, -y_2] \end{aligned}$$

Step-4

Let $c = [c_1, c_2]$.

We want $yA \nleq c$. This gives us the idea that if c_1 is negative, then $c_1 < y_1$. Therefore, let $c = [-1, 0]$.

Step-5

Thus, in order to have both feasible sets empty, let $\boxed{b = [0, 1]^T}$ and let $\boxed{c = [-1, 0]}$.