Step-1

Two vectors *a* and *b* are said to be orthogonal provided the following is true:

$$a^{T}b = 0$$

This is same as

$$(a_1, a_2, a_3)\begin{bmatrix} b_1 \\ b_2 \\ b_3 \end{bmatrix} = 0$$
$$a_1b_1 + a_2b_2 + a_3b_3 = 0$$

Step-2

Suppose if possible, let the vector $(1,1,0)$ be in the row space and the vector $(0,1,1)$ be in the nullspace of a vector space.

But this means:

$$\begin{aligned} 0 &= (1,1,0)\begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} \\ &= 1\times 0 + 1\times 1 + 0\times 1 \\ &= 1 \end{aligned}$$

This is impossible.

Step-3

Therefore, it is impossible to have a matrix, whose row space contains the vector $(1,1,0)$ and whose nullspace contains the vector $(0,1,1)$.