Step-1

Consider the following expression

$$\min_{\substack{y_i \geq 0 \\ y_1+y_2=1}} \max_{\substack{x_i \geq 0 \\ x_1+x_2=1}} (x_1y_1 + x_2y_2)$$

The above expression is equivalent to following matrix

$$A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Step-2

Let us start with the inner maximum expression.

The inner maximum is the larger of y_1 and y_2.

Now, *x* concentrate on that one.

Subject to the condition, $y_1 + y_2 = 1$, the minimum of the larger *y* is $\boxed{\frac{1}{2}}$