

Suitable Envelope

Problem author: Pavel Skobelin, developer: Margarita Sablin

Note that the width and height of the envelope must match the height and width of one of the postcards (not necessarily the same one) — they cannot be less than the height and width of any postcard; if we make the sides larger than the sides of the postcards, the result will not be optimal. Let us assume that if the postcard i does not have equal height and width, the height h_i will be considered the smaller of the two sides, and the width w_i — the larger of the two sides. We will choose an envelope whose height H_{max} will be the largest of all postcard heights, and whose width W_{max} will be equal to the maximum width of the postcards. Note that it is not possible to take an envelope with smaller side values: we cannot take a smaller width because we have chosen the largest from all width values, and any height is less than or equal to any width. $\forall i: w_i \leq W_{max}, \forall i: h_i \leq w_i$. It is not possible to take an envelope with a smaller height because it will not fit the postcard with the largest height. Thus, this solution minimizes H and W , and therefore minimizes $H \cdot W$.