

lunch-with-the-CIA

You have a rectangular L times W linseed snack bar for your k bird friends, who are part of the CIA. The bar is very large and you can only make horizontal or vertical cuts on an independent segment of the bar. Because your birds only eat snack bars of certain rectangular sizes, you want to cut the bar into rectangles of those sizes—you can make more than one of each size—and minimize the total area that is not part of any specific bar size.

Bounds:

$1 \leq k \leq 500$, $1 \leq L \leq 2,000,000$

Input:

In line 1, you are given L , the length of the bar, W , the width of the bar, and k , the number of friends.

In the next k lines, you are also given the sizes of the rectangles that the birds would like to eat, also in the form of length, width. For simplicity, assume you cannot rotate the rectangles.

Format:

L W k

l_1 w_1

...

l_k w_k

Output:

Print the minimum area wasted.

Sample Input:

5 5 3

4 2

3 1

4 1

Sample Output:

5

Explanation:

We're given a 5x5 grid, with three different bar types. The dimensions are 4x2, 3x1, and 4x1. We can depict the grid as follows, with each color representing a different bar. Blue bars are 4x1, red bars are 4x2, and white squares are wasted. Note that bars can be used multiple times, in the case of 4x2. Some bars, such as 3x1 bars, may also be unused. 5 squares are wasted at minimum.

