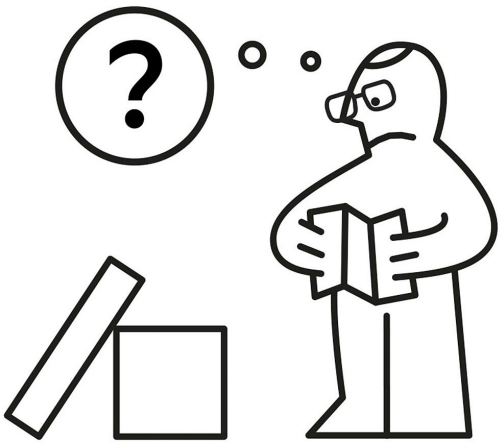
Fold it Felix! 2 (felix2)

Felix the carpenter and his friend Travis are back. Their furniture company made a large profit last year and they are expanding their business. Travis is always hunting the newest drawers launched in the market and he landed his eyes on the new Ragnarock drawer and he is trying to convince his partner Felix to buy a stock of them.

These drawers comes with a very long instruction sheet that is very peculiar, since it can be folded in many different ways, to fit differength lengths. It is a very long piece of paper with filding lines that separate each page of the instruction sheet. Pages are numbered from 1 to N and each page have different length to fit all the instructions needed for one step of the assembly of the drawer (although there might be two pages of the same length). The folding lines can only be folded in a clockwise direction by 90 degrees. If a folded page spans a folding line then that line cannot be folded and you can fold page i only if no page $i < j \leq N$ has been folded. Finally, the end of the last page can be in the middle of the folded insctruction sheet. The folded instruction sheet will be two dimensional.



Travis did it again! He bought one Ragnarock drawer to show Felix how beautiful it is, however Travis was too happy for his new drawer that when he unboxed it he forgot to take a picture of the folded instruction sheet and now he does not remember which is the smallest length (as sum of the lengths on both dimensions) the instruction sheet can be folded into.

Help Felix and Travis finding which is the smallest length the instruction sheet can be folded into.

> ☞ Please note that the final shape of the instruction sheet will no longer be flat - after multiple folds, it will instead resemble a spiral, and its height and width are what you need to measure.

Input

The file contains two lines. The first line contains one integer N with the number of pages of the instruction sheet. The second line contains N integers $\ell_1, \ldots, \ell_N$ each one reporting the length of each page in the same order they can be folded.

Output

You need to write a single line with an integer: the smallest length for the folded instruction sheet.

Constraints

- The number of Pages N is between 2 and 10 000.
- The length of each page is between 1 and 1, 000 000.

Explanation

In the **first sample case** depicted in Figure 1 at first we have the unfolded instruction sheet with the four pages numbered 1, 2, 3, and 4 of lengths 4, 3, 2, and 2 respectively, with the folding lines A, B, and C.

- In the first step we fold the folding line A.
- In the second step we fold the folding line B.

  Note: Since page 1 overlaps partially page 4, **folding line C is blocked** and cannot be folded.
- The smallest folding length for the instruction sheet is given by pages 2, 3, and 4 whose sum is 7.

  Note: The end of page 4 is at the end of the folded instruction sheet.

> ☞ The order of folding the pages **must** be from page 1 to page 4 and equivalently from folding line A to folding line C. I.e., we **cannot** fold folding line C, then folding line B, then folding line A.

> ☞ Folding line B and then folding line C produces an invalid folding since the end of page 4 is not at the end of the folded sheet.

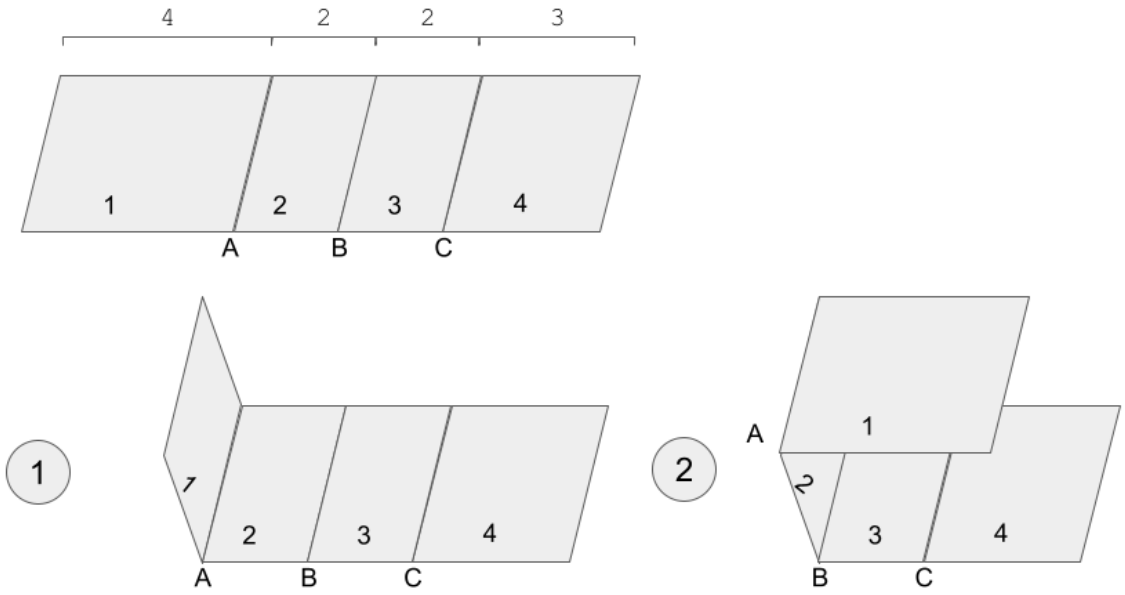


Figure 1: Detailed example.

Examples

input	output
4 4 2 2 3	7
10 5 6 3 4 8 6 2 1 8 5	22