Integer Reaction

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

There is a sequence of n integers, numbered from 1 to n from left to right. These integers come in two colors, 0 and 1, with each integer having exactly one color. These integers enter a multiset S_1 in the order of their numbering from 1 to n.

Whenever a new integer x enters S_1, you must choose an integer y in S_1 whose color is different from x to react with x, causing x and y to disappear and the reaction product $x + y$ to be inserted into another set S_2. If no such y exists, no reaction occurs and only x will be inserted into S_1.

Given the sequence of integers and the color of each integer, find the maximum possible value of the smallest element in S_2 after processing the last element.

Input

The first line contains an integer n ($2 \leq n \leq 10^5$), representing the number of integers.

The second line contains n positive integers $a_1, a_2, \ldots, a_n$ ($1 \leq a_i \leq 10^8$), representing the sequence of integers.

The third line contains n integers $c_1, c_2, \ldots, c_n$ ($c_i \in \{0, 1\}$), where c_i represents the color of the i-th integer.

It is guaranteed that there is at least one i such that $c_i = 0$, and at least one j such that $c_j = 1$.

Output

Output a single integer, representing the answer.

Examples

standard input	standard output
4 1 3 2 4 0 0 1 1	5
6 1 3 4 2 5 6 0 1 0 1 0 1	4
7 3 3 4 4 5 3 1 0 0 1 1 1 0 0	7