

Problem C. Tree Average Weight

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 256 mebibytes

Consider a labeled tree with its vertices numbered from 1 to n .

Let us define the weight of the tree as the sum over all edges uv of values $u \cdot sz_{uw}(u) + v \cdot sz_{vu}(v)$, where $sz_{vu}(v)$ is the size of subtree containing v after deleting edge (vu) .

You are given an array a of size n . Elements of the array are either integers between 1 and $n - 1$ (inclusive), or equal to -1 . The v -th element corresponds to the degree of vertex v . We say that a tree with n vertices is *good* if for all v such that $a_v \neq -1$, it is true that the degree of v equals to a_v . In other words, if $a_v = -1$, then v can have any degree, and otherwise, its degree is fixed and equal to a_v .

Let us choose one of the *good* trees randomly with equal probability. Denote the expected value of the weight of this tree as E . Find **the integer part** of E .

Input

The first line of input contains an integer n : the size of the tree ($2 \leq n \leq 10^6$).

The second line of input contains an array of size n . Each element of the array is either an integer between 1 and $n - 1$ (fixed degree), or equal to -1 (arbitrary degree). It is guaranteed that the sum of absolute values of elements is not greater than $2n - 2$.

Output

Print **the integer part** of E .

Examples

standard input	standard output
5 1 -1 -1 -1 -1	67
5 -1 -1 -1 -1 1	52
4 1 1 1 3	42
4 1 1 2 2	38