

File System II

Time Limit: 1.5 Second
Memory Limit: 2048 MB

Mattox just invented another new file system that runs faster than an existing ones (including the one he invented earlier)! In the new system, the file system is represented as a binary search tree, and each file is a leaf in the tree. To access a specific file, you need to start at the root and go down the tree until the file is reached (i.e. the cost of accessing a file is the number of edges from the root).

Obviously, the design of the file system depends on the probability of accessing each file. Now Mattox wants you to help him design the file system given the probability of accessing each file in the system, so that the expected cost of accessing the files is minimized. More formally, given that the probability of accessing the i -th file is p_i , your goal is to find the minimum value of $\sum p_i c_i$, where c_i is the cost of accessing the i -th file.

Input

The first line of input contains a single integer n ($1 \leq n \leq 5000$) - the number of files in the system.

The second line of input contains n real numbers p_1, \dots, p_n ($0 \leq p_i \leq 1$, $\sum p_i = 1$) - the probability of accessing each file.

Output

Output a single real number denoting the minimum expected cost of accessing the files. Your answer will be accepted if it has an absolute or relative error within 10^{-6} .

Sample Inputs

4
0.1 0.2 0.3 0.4

Sample Outputs

1.9
