

Find the Maximum

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

A tree with n vertices is a connected undirected graph with n vertices and $n - 1$ edges.

You are given a tree with n vertices. Each vertex has a value b_i . Note that for any two vertices there is exactly one single path between them, whereas a simple path doesn't contain any edge more than once. The length of a simple path is considered as the number of edges in it.

You need to pick up a simple path whose length is not smaller than 1 and select a real number x . Let V be the set of vertices in the simple path. You need to calculate the maximum of $\frac{\sum_{u \in V} (-x^2 + b_u x)}{|V|}$.

Input

The first line contains a single integer n ($2 \leq n \leq 10^5$), indicating the number of vertices in the tree.

The second line contains n integers b_1, b_2, \dots, b_n ($-10^5 \leq b_i \leq 10^5$), indicating the values of each vertex.

Each line in the next $n - 1$ lines contains two integers u, v , indicating an edge in the tree.

Output

The output contains a single real number, indicating the answer.

Your answer will be accepted if and only if the absolute error between your answer and the correct answer is not greater than 10^{-4} .

Example

standard input	standard output
2	1.562500
3 2	
1 2	