Problem E
Sum of Squares

Time Limit: 1 second
Memory Limit: 512 megabytes

Mr. Nhat has a problem consisting of N steps. At the i^{th} step, Nhat is given 2 numbers A_i and B_i, then Nhat has to choose a real number R_i such that R_i is not larger than the numbers chosen in the previous steps. The score of the problem is defined as $\sum_i (A_i - R_i * B_i)^2$ of all N steps.

What is the smallest score that Mr. Nhat can get?

Input

The first line contains an integer N. ($2 \leq N \leq 5 \times 10^5$)

The second line contains N space-separated integers $A_1, A_2, \ldots, A_N$

The third line contains N space-separated integers $B_1, B_2, \ldots, B_N$.

($1 \leq A_i, B_i \leq 1000$)

Output

The smallest score Mr. Nhat can get. Your answer is considered correct if its absolute or relative error does not exceed 10^{-6}.

Sample Input	Sample Output
2 2 5 1 8	0.000000000000000
5 7 9 1 4 3 9 8 6 13 1	12.247238031469687
10 66 23 51 81 60 7 26 127 66 8 9 88 77 12 2 38 7 63 90 111	17698.696831405897683