

D2. Magic Powder - 2

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

The term of this problem is the same as the previous one, the only exception — increased restrictions.

Input

The first line contains two positive integers n and k ($1 \leq n \leq 100\,000$, $1 \leq k \leq 10^9$) — the number of ingredients and the number of grams of the magic powder.

The second line contains the sequence a_1, a_2, \dots, a_n ($1 \leq a_i \leq 10^9$), where the i -th number is equal to the number of grams of the i -th ingredient, needed to bake one cookie.

The third line contains the sequence b_1, b_2, \dots, b_n ($1 \leq b_i \leq 10^9$), where the i -th number is equal to the number of grams of the i -th ingredient, which Apollinaria has.

Output

Print the maximum number of cookies, which Apollinaria will be able to bake using the ingredients that she has and the magic powder.

Examples

input
1 1000000000 1 1000000000
output
2000000000

input
10 1 1000000000 1000000000 1000000000 1000000000 1000000000 1000000000 1000000000 1000000000 1000000000 1000000000 1 1 1 1 1 1 1 1 1 1
output
0

input
3 1 2 1 4 11 3 16
output
4

input
4 3 4 3 5 6 11 12 14 20
output
3