

Problem E. DaLaBombBa

Time limit 3000 ms

Memory limit 256MB

Problem Description

A long, long time ago, there were n huge dragons that suddenly appeared, bringing chaos and disaster, as they kidnapped the princess and disappeared.

The kingdom was in crisis. Who was the bravest in the world? n heroes rushed in and shouted: "We will bring the best sword, cross the highest mountain, go through the deepest forest, and bring the princess back to you!"

The king was very delighted and desperately asked what they would do. The heroes said that:

- According to the analysis, the heroes know their powers h_i and the difficulties d_j in killing each dragon.
- The heroes must assign one of themselves to each dragon, and no hero can be assigned to more than one dragon.
- It would take $a \times b$ seconds for a hero to kill a dragon, where a is the hero's power and b is the difficulty of killing the dragon.
- The efficiency is determined by the longest time it takes for any hero to kill their assigned dragon.

Before starting their journey, the heroes decided to do some training. In one training step, a hero could reduce their power by 1, as long as it does not go below 0. However, no time to waste, so the n heroes can do at most K steps of training in total.

How efficient can the heroes be (**i.e.**, what is the minimum longest time among all possible situations) if they distribute the training steps optimally?

Input format

The first line contains 2 integers n ($1 \leq n \leq 2 \times 10^5$) and K ($0 \leq K \leq 10^9$), the numbers of both heroes and dragons and the maximum of the training steps.

The second line contains n integers h_1, h_2, \dots, h_n ($1 \leq h_i \leq 10^6$), the powers of each hero.

The third line contains n integers d_1, d_2, \dots, d_n ($1 \leq d_i \leq 10^6$), the difficulties to kill each dragon.

Output format

Output a single integer, which is the minimum longest time to kill the dragons.

Subtask score

Subtask	Score	Additional Constraints
1	10	$n, K \leq 1000; h_i, d_i \leq 100$
2	35	$K = 0$
3	25	$K = 1$
4	30	No constraints

Sample

Sample Input 1

```
3 5
4 2 1
2 3 1
```

Sample Output 1

```
2
```

Sample Input 2

```
11 14
3 1 4 1 5 9 2 6 5 3 5
8 9 7 9 3 2 3 8 4 6 2
```

Sample Output 2

```
12
```

Notes

In sample 1, we can reduce h_1 to 1, h_2 to 1, and h_3 to 0. Then let hero 1 beat dragon 1, hero 2 beat dragon 3, and hero 3 beat dragon 2. The efficiency is $\max\{2, 1, 0\} = 2$.