DMOPC '18 Contest 6 P4 - Tank

Time limit: 2.5s   **Memory limit:** 256M

Kiran is playing a tactical RPG! His signature move is to field a tanky unit, end the turn, and watch all the enemies fail to kill it. He wants to figure out which of his N units is the best tank. Each unit has two corresponding defensive traits: defense and resistance. Defense, represented as u_i, mitigates physical attacks. Resistance, represented as v_i, mitigates magical attacks. More precisely, the amount of damage a unit takes from a physical attack is $\max(\text{Att} - \text{Def}, 0)$ and the amount of damage a unit takes from a magical attack is $\max(\text{Att} - \text{Res}, 0)$.

In the next battle, Kiran will need his tank to survive against P physical attacks and M magical attacks. The ith physical attack will have attack stat a_i and the jth magical attack will have attack stat b_j. Help Kiran determine which of his units will take the least total amount of damage.

Constraints

$1 \le u_i, v_i, a_i, b_i \le 1\,000\,000$
$1 \le N, P, M \le 200\,000$

Input Specification

The first line will contain three space-separated integers, N, P, M.
The next N lines will each contain two space-separated integers, u_i and v_i, representing the defense stat and resistance stat of the ith unit.
The following line will contain P space-separated integers, $a_1, a_2, \ldots, a_P$, representing the physical attacks.
The final line will contain M space-separated integers, $b_1, b_2, \ldots, b_M$, representing the magical attacks.

Output Specification

Output the index of the best tank for the next battle. If there are ties, output the smallest index.

Sample Input 1

```
3 4 2
40 32
37 29
33 41
33 42 36 39
48 45
```

Sample Output 1

```
3
```

Explanation for Sample 1

Kiran's first unit will take $0 + 2 + 0 + 0 = 2$ damage from the physical attacks and $16 + 13 = 29$ damage from the magical attacks, resulting in 31 total damage. Kiran's second unit will take $0 + 5 + 0 + 2 = 7$ damage from the physical attacks and $19 + 16 = 35$ damage from the magical attacks, resulting in 42 total damage. Kiran's third unit will take $0 + 9 + 3 + 6 = 18$ damage from the physical attacks and $7 + 4 = 11$ damage from the magical attacks, resulting in 29 damage. So Kiran should use his third unit.

Sample Input 2

```
4 3 3
37 26
37 19
40 24
38 26
51 47 50
62 43 46
```

Sample Output 2

```
3
```

Explanation for Sample 2

The total damage to each unit is 110, 131, 107, and 107 respectively. There is a tie between the third and fourth unit, so the smaller index, 3 is the answer.