Problem M
Clubs

The 3rd Universal Cup, Stage 40: Potyczki. Limits: 1024 MB, 1 s. *21.06.2025*

Clubs is a game for two players who cooperate to achieve an *optimal contract*. Each of them holds cards, some of which are clubs. Each player knows how many clubs they have, but not how many the other player has. The optimal contract depends on the total number of clubs both players have in hand — if it is **less** than X, then the optimal contract is N, otherwise it is $N + 1$.

The contract is reached through bidding. The first player starts by proposing a contract — a positive integer. Then the players alternate turns. On their turn, a player may either accept the last proposed contract or propose a different, higher contract (also a positive integer). The bidding ends when one of the players accepts a contract; it is a success if this is the optimal contract.

Algosia and Bajtek are playing Clubs. They both know X, N, and that the number of clubs in Algosia's hand is one of the values $a_1, a_2, \ldots, a_k$, while the number of clubs in Bajtek's hand is one of the values $b_1, b_2, \ldots, b_l$. Just before the game begins, each of them learns the exact number of clubs in their own hand.

They are interested in finding the minimum N for which there exists a bidding strategy that guarantees success. Algosia is always the first player. It can be proven that such a minimal value of N exists.

Input

The first line contains three integers X, k, and l ($1 \leq X \leq 10^9$; $1 \leq k, l \leq 1000$), representing respectively the total number of clubs in both players' hands required for the optimal contract to be $N + 1$, and the number of possible club counts in Algosia's and Bajtek's hands.

The second line contains k integers $a_1, \ldots, a_k$ ($1 \leq a_1 < a_2 < \ldots < a_k \leq 10^9$), representing the possible numbers of clubs in Algosia's hand. The third line contains l integers $b_1, \ldots, b_l$ ($1 \leq b_1 < b_2 < \ldots < b_l \leq 10^9$), representing the possible numbers of clubs in Bajtek's hand.

Output

Print a single integer — the smallest N such that there exists a strategy enabling Algosia and Bajtek to guarantee reaching the optimal contract.

Example

For the following input:

```
13 5 3
1 5 7 10 12
2 6 9
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the correct output is:

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3
```

Whereas for the input:

```
2 1 1
1
1
```

the correct output is:

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0
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Explanation of the examples:

In the first example, for $N = 3$, the following strategy may be used:

- Algosia proposes the contract 1 if she has 5, 7, or 10 clubs.
  - Bajtek responds with 2 if he has 6 clubs.
    - Algosia responds with 3 if she has 5 clubs. Bajtek accepts (They have 11 clubs in total).
    - Algosia responds with 4 if she has 7 or 10 clubs. Bajtek accepts (They have 13 or 16 clubs in total).
  - Bajtek responds with 3 if he has 2 clubs. Algosia accepts (They have 7, 9, or 12 clubs in total).
  - Bajtek responds with 4 if he has 9 clubs. Algosia accepts (They have 14, 16, or 19 clubs in total).
- Algosia proposes 2 if she has 1 or 12 clubs. Regardless of his club count, Bajtek responds with 3.
  - Algosia accepts if she has 1 club (They have 3, 7, or 10 clubs in total).
  - Algosia responds with 4 if she has 12 clubs. Bajtek accepts (They have 14, 18, or 21 clubs in total).

It can be proven that no suitable strategy exists for $N = 2$.

In the second example, for $N = 0$, Algosia bids $1 = N + 1$, and Bajtek accepts the contract.