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## E - Hungry Takahashi

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Time Limit: 3 sec / Memory Limit: 1024 MiB

Score : 450 points

### Problem Statement

There is a grid with  $H$  rows and  $W$  columns. Let  $(i, j)$  denote the cell at the  $i$ -th row from the top and  $j$ -th column from the left. Some coins are placed on each cell, and there are  $A_{i,j}$  coins on cell  $(i, j)$ .

Takahashi is initially at cell  $(1, 1)$  and has  $x$  coins. Over the next  $H + W - 1$  days, several events will occur. On the  $k$ -th day ( $1 \leq k \leq H + W - 1$ ), the following things happen in order:

1. Takahashi collects all the coins placed on the cell where he is currently located.
2. Hungry Takahashi consumes  $P_k$  coins from his hand to buy food. However, if he has fewer than  $P_k$  coins, he cannot buy food and collapses from hunger.
3. If  $k < H + W - 1$ , Takahashi moves either one cell right or one cell down. He cannot leave the grid. If  $k = H + W - 1$ , he does nothing.

When there exists a way for Takahashi to finish the next  $H + W - 1$  days without ever collapsing from hunger, find the minimum non-negative integer  $x$  that can be the number of coins Takahashi initially has.

### Constraints

- $H, W \geq 1$

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- $H \times W \leq 2 \times 10^5$
- $1 \leq A_{i,j} \leq 10^9$
- $1 \leq P_k \leq 10^9$
- All input values are integers.

## Input

The input is given from Standard Input in the following format:

```

H W
A1,1 A1,2 ... A1,W
A2,1 A2,2 ... A2,W
⋮
AH,1 AH,2 ... AH,W
P1 P2 ... PH+W-1
```

## Output

Output the answer.

### Sample Input 1

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```

2 2
3 2
4 1
1 3 6
```

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### Sample Output 1

Copy

```
2
```

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When  $x = 2$ , Takahashi can act as follows to avoid collapsing from hunger:

- Initially, he is at cell  $(1, 1)$  and has 2 coins.
- Day 1:
  1. He collects 3 coins placed on cell  $(1, 1)$ , so he has 5 coins.
  2. He consumes 1 coin to buy food, so he has 4 coins.
  3. He moves to cell  $(2, 1)$  which is 1 below.
- Day 2:
  1. He collects 4 coins placed on cell  $(2, 1)$ , so he has 8 coins.
  2. He consumes 3 coins to buy food, so he has 5 coins.

3. He moves to cell  $(2, 2)$  which is 1 to the right.

- Day 3:

1. He collects 1 coin placed on cell  $(2, 2)$ , so he has 6 coins.

2. He consumes 6 coins to buy food, so he has 0 coins.

When  $x$  is 1 or less, Takahashi will collapse from hunger at some point no matter how he acts. Therefore, the answer is 2.

## Sample Input 2

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```
1 1
5
3
```

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## Sample Output 2

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```
0
```

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Even if Takahashi initially has no coins, he will not collapse from hunger.

## Sample Input 3

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```
4 7
35 29 36 88 58 15 25
99 7 49 61 67 4 57
96 92 3 49 49 36 90
72 89 40 44 24 53 45
55 43 23 71 77 6 94 19 27 21
```

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## Sample Output 3

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```
20
```

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