

# No Change

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Chad has been looking for a rare anime garage kit for years.

He just learned about the seller that has exactly what he wants. The seller is a character known for strange rules of trade: she never gives any change.

The price of the garage kit is  $M$ . Chad has brought  $N$  coins with him such that the  $i$ -th coin has value  $a_i$ . He is determined to get the garage kit and is willing to pay more than  $M$ , if necessary, but he wants to overpay as little as possible. Moreover, he wants to minimize the number of coins he uses.

Please help him figure out which coins he should use for the purchase.

## Input

The first line contains one positive integer  $M$ , the price of the garage kit. The price will not exceed 10,000.

The following line contains one positive integer  $N$ , the number of coins Chad has,  $N \leq 100$ .

The next  $N$  lines contain positive integers indicating the value of each coin that Chad has. The values are any positive integers no greater than 10,000.

Chad has brought enough money to buy the kit, so the total value of his coins will always be equal to or greater than the price of the kit.

## Output

Output a single line containing two integers: the total amount paid and the total number of coins used.

### Example 1

Input :

14  
3  
5  
10  
20

Output :

15 2

### Example 2

Input :

5  
3  
2  
3  
5

Output :

5 1

# Array Partition

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Given an array A of N natural numbers and a number M ( $1 \leq M \leq N$ ). Split the given array into M consecutive subarrays such that the maximum sum of the values in the subarrays is minimal.

For example: A = [4,3,2,1], M = 3. The optimal split is {4}, {3}, {2,1}. The maximum sum of all subarrays is 4, which is minimum possible for 3 splits. (Any other split would result in at least one subarray whose sum of values is greater than 4.)

## Input

The first line contains 2 integer N, M as described above.  $1 \leq M \leq N \leq 10^5$ .

In the next line, there are N natural numbers indicating the elements of the array.  $0 \leq A[i] \leq 10^9$  for  $1 \leq i \leq N$

## Output

Output one integer followed by a newline, indicating the minimal maximum sum of any subarray in the optimal split.

### Example 1

```
Input:
4 3
4 3 2 1

Output:
4
```

### Example 2

```
Input:
4 1
4 3 2 1

Output:
10
```

### Example 3

```
Input:
3 2
3 2
1 100 2

Output:
101
```

## Badminton Class

Kou school is preparing for badminton championship. In this championship players are mixed doubles. The coach is creating the pairs/teams for the championship according to students' skill levels based on their previous year performance. He wants to place the male student with the highest skill levels with the top female student. Then the second ranking male student with the second ranking female students. And so on and so forth until the largest number of mixed doubles is built.

Your task is to determine how many male students are left unmatched and smallest skill level of such unmatched student.

### Input

The first line of the input contains two integers M ( $1 \leq M \leq 10000$ ) and F ( $1 \leq F \leq 10000$ ), representing the number of male and female students, respectively. Each of the following M lines describe the skill levels of the male students. Then each of the following F lines describe the skill level of the female students. All skill levels are between 2 and 60.

### Output

You should print a line that contains the number of male students that could not be matched. If this number is not zero, you should also print an additional number indicating the skill level of the least skilled unmatched male student.

### Example 1

Input :

4 4

26

25

2

21

35

25

23

24

Output :

0

### Example 2

Input :

1 2

20

30

40

Output :

0

### Example 3

Input :

4 2

5

5

10

15

20

18

Output:  
2 5

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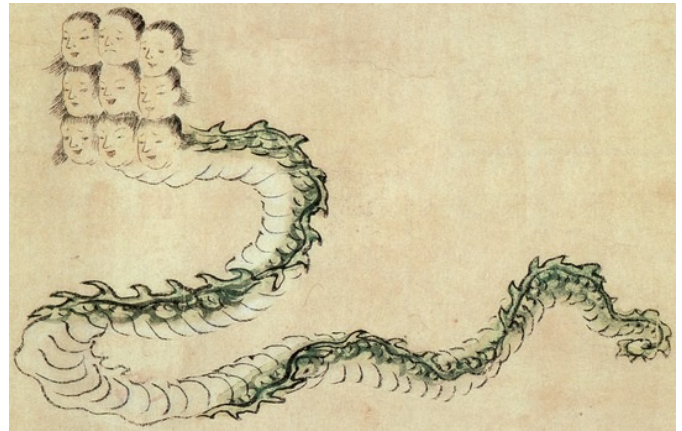
# Xiangliu

Polycephalic or multi-headed animals are rare in biology but common in mythology and heraldry: multi-headed snakes, like the 8-headed Yamata no Orochi in Japanese mythology, the 9-headed Lernaean Hydra in Greek mythology and 3-headed Cerberus in Greek mythology.

Xiangliu, known in the Classic of Mountains and Seas, is a N-headed snake monster that brings flooding and destruction in Chinese mythology.

Now it appears at the plain of Xia Kingdom. The king Yu is alarmed, and calls on his archers to slay the serpent and save the kingdom.

To slay Xiangliu and stop flooding, the archers must shoot down all its heads. There are **M archers** in the kingdom. Each archer can shoot down one of the snake's heads. The heads of the snake are of different sizes. In order to shoot down a head, an archer have to be able to draw a longbow which had a draw weight proportional to the size of that head. The archers demand that for shooting down a head, an archer must be paid a wage equal to one gold coin per each pound of the archer's maximum draw weight.



After having lost a lot of money due to flooding, Yu wants to minimize the expense of slaying Xiangliu. Your job is to help the king, decide how many and which archers to hire.

## Input

The first line contains 2 integers, indicating the number **N of heads that Xiangliu has**, and the **number m of archers** in the kingdom.  $1 \leq N, M \leq 10^5$ .

The next N lines contain positive integers no greater than  $10^9$  that give the sizes of the snake's heads. The i-th integer  $a_i$  means that the archer needs to be able to draw a longbow with a draw weight no less than  $a_i$  pounds to shoot down the i-th head of Xiangliu.

The following M lines each contain a positive integer no greater than  $10^9$ , and specify the maximum draw weights of the archers in the kingdom, also in pounds.

## Output

Output a number followed by a newline, indicating **the minimum number of gold coins that the kings needs to pay** to slay the serpent. If it is not possible for archers of Xia to slay the dragon, output the line "Xia is doomed!".

## Example 1

Input :

2 3

4

5

4

8

7

Output :

11

## Example 2

Input :

3 1

```
1
1
1
100
```

```
Output:
Xia is doomed!
```

### Example 3

```
Input:
3 2
1 100 2
```

```
Output:
101
```

# Sprinklers

Farmer John has a large field, and he is thinking of planting sweet corn in some part of it. After surveying his field, FJ found that it forms a horizontal strip  $l$  meters long and  $w$  meters wide.

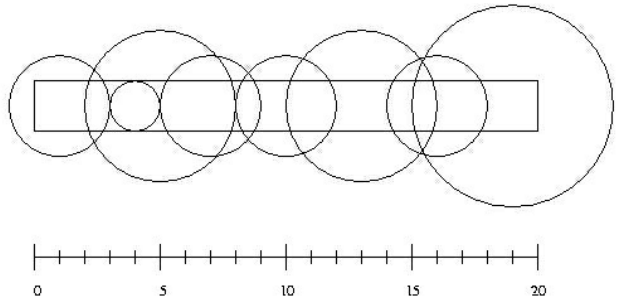
There are  $n$  sprinklers installed at the horizontal center line of the strip. For each sprinkler you are given its radius of operation and its position as the distance from the left end of the center line. Farmer John wants to plant sweet corn in the whole field, but he wishes to turn on as few sprinklers as possible to save the water.

Find the minimum number of sprinklers that need to be turned on in order to water the entire field.

## Input

The first line contains integer numbers  $n$ ,  $l$  and  $w$  with  $1 \leq n \leq 10,000$ ,  $1 \leq l \leq 10,000,000$ , and  $1 \leq w \leq 100$ . The next  $n$  lines contain two integers giving the position  $x$  ( $0 \leq x \leq l$ ) and radius of operation  $r$  ( $1 \leq r \leq 1000$ ) of a sprinkler.

The picture above illustrates the first case from the sample input.



## Output

Output one integer followed by a newline: the minimum number of sprinklers needed to water the entire strip.

If it is impossible to water the entire strip, output -1.

**Example 1** (shown in the image above)

Input :

8 20 2

5 3

4 1

1 2

7 2

10 2

13 3

16 2

19 4

Output :

6

## Example 2

Input :

3 10 1

3 5

9 3

6 1

Output :

2

## Example 3

Input:

3 10 1

5 3

1 1

9 1

Output:

-1