

Buttons

Memory limit : 32 MB

Bajtek found an interesting toy. This toy has $n + 1$ buttons. Above each of the first n buttons, there is a small counter, initially showing zero. Pressing the button under the counter increases the number displayed by 1.

The toy would quickly bore Bajtek if it weren't for the curious operation of the $n + 1$ -th button. After using it, all counters start displaying the highest value seen so far on the toy. For example, if $n = 5$ and the successive counters show the numbers 1, 2, 3, 4, 2, then after pressing the $n + 1$ -th button, all counters will show 4.

Knowing which buttons Bajtek pressed in sequence, we want to determine the values of all counters after the play is over.

Input

The first line of the standard input contains two integers n, m ($1 \leq n, m \leq 10^6$), indicating the number of counters on the toy and the number of operations performed by Bajtek, respectively. The second line of input contains m integers a_1, a_2, \dots, a_m ($1 \leq a_i \leq n + 1$), indicating the numbers of the successive buttons pressed by Bajtek.

You can assume that in tests worth at least 50% of the points, the additional conditions $1 \leq n, m \leq 10,000$ are met.

Output

The first and only line of standard output should contain n integers separated by a single space, indicating the values on the successive counters after the play is over.

Examples

For the input data :

```
5 7
3 4 4 6 1 4 4
```

the correct answer is :

```
3 2 2 4 2
```

For the input data :

```
7 10
1 1 1 8 1 1 1 8 2 7
```

the correct answer is :

```
6 7 6 6 6 6 7
```

For the input data :

```
8 10
1 9 2 9 3 9 4 9 5 9
```

the correct answer is :

```
5 5 5 5 5 5 5 5
```