

K-th Smallest Stream

time limit per test: 1 second (1 second for Python)
memory limit per test: 976.6 megabytes
input: standard input
output: standard output
points: 100 · problem code: kthsmalleststream

You are given a stream of n integers and an integer k .

After each new integer arrives, report the k -th smallest value among all numbers seen so far. If fewer than k numbers have been seen, print `-1` for that step.

Input

The first line contains two integers n and k .

The second line contains n integers $a_1, a_2, \dots, a_n$, where a_i is the i -th value in the stream.

Output

Print n lines. On line i , print:

- the k -th smallest value among $a_1, a_2, \dots, a_i$, or
- `-1` if $i < k$.

Constraints

- $1 \leq k \leq n \leq 2 \cdot 10^5$
- $-10^9 \leq a_i \leq 10^9$

Example 1

Input

```
8 3
5 2 7 1 9 3 4 6
```

Output

```
-1
-1
7
5
5
3
3
3
```

Explanation

After the first 3 values (5, 2, 7), the 3rd smallest is 7. After 6 values (5, 2, 7, 1, 9, 3), sorted order is 1, 2, 3, 5, 7, 9, so the 3rd smallest is 3.

Example 2

Input

```
5 1
10 -4 8 8 0
```

Output

```
10  
-4  
-4  
-4  
-4
```