

Papa and Baby Frog

Input File	Output File	Time Limit	Memory Limit
standard input	standard output	1 second	256 MiB

Papa and Baby frog live among a line of n **equally-spaced** stones, numbered 1 to n , from left to right. Stone i has a positive integer height h_i .

The frogs can jump between stones, and do so, according to the following rules:

- A single jump moves Papa frog to the **closest** stone that has a **strictly greater** height than his current stone. If there are multiple options, he chooses the **rightmost** among these;
- A single jump moves Baby frog to the **closest** stone that has a **strictly smaller** height than her current stone. If there are multiple options, she chooses the **rightmost** among these.

Papa frog would like to choose a stone to be *home*, and a **different** stone to be *school*. He requires that:

- Papa frog can jump from home to school, in no more than k jumps; and
- Baby frog can jump from school to home, in no more than k jumps.

A stone is called a *potential home* if there is **at least one** other stone that can be chosen as school, if this stone is chosen as home.

Your task is to help the frogs determine which stones are potential homes.

Subtasks and Constraints

For all subtasks, you are guaranteed that:

- $n \geq 2$
- $1 \leq k \leq n$
- For all stones i , $1 \leq h_i \leq 1\,000\,000\,000$

Additional constraints for each subtask are given below.

Subtask	Points	n	k
1	10	$n \leq 2000$	$k = 1$
2	10	$n \leq 2000$	$k \leq 5$
3	20	$n \leq 2000$	$k \leq 100$
4	20	$n \leq 2000$	$k \leq n$
5	20	$n \leq 100\,000$	$k \leq 5$
6	10	$n \leq 100\,000$	$k = n$
7	10	$n \leq 100\,000$	$k \leq n$

Input

The first line of input contains the two integers, n and k .

The second line of input contains n integers h_1, \dots, h_n , which are the heights of the stones.

Output

The output should contain a string of n characters on a single line. The i -th of these characters should be 1, if stone i is a potential home, or 0, otherwise.

Sample Input 1

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

Sample Output 1

```
0001
```

Sample Input 2

```
7 2
3 1 2 1 2 2 3
```

Sample Output 2

```
0101010
```

Sample Input 3

```
10 3
10 5 6 4 7 3 8 2 9 1
```

Sample Output 3

```
0000010001
```

Explanation

In the first example, only stone 4 can be chosen as home, when stone 3 is chosen as school. Hence, stone 4 is the only potential home.

In the second example:

- Stone 2 can be chosen as home, when stone 1 is chosen as school. Papa frog jumps through stones $2 \rightarrow 3 \rightarrow 1$, whereas Baby frog jumps directly from stone 1 to stone 2.

- Stone 4 can be chosen as home, when stone 5 is chosen as school. Papa and Baby frog both jump directly between home and school, and vice-versa.
- Stone 6 can be chosen as home, when stone 7 is chosen as school. Papa and Baby frog both jump directly between home and school, and vice-versa.

Hence, stones 2, 4 and 6 are potential homes.

In the third example:

- Stone 6 can be chosen as home, when stone 1 is chosen as school. Papa frog jumps through stones $6 \rightarrow 7 \rightarrow 9 \rightarrow 1$, whereas Baby frog jumps through stones $1 \rightarrow 2 \rightarrow 4 \rightarrow 6$.
- Stone 10 can be chosen as home, when stone 9 is chosen as school. Papa and Baby frog both jump directly between home and school, and vice-versa.

Hence, stones 6 and 10 are potential homes.