

Elevator

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 512 megabytes

There are n elevators participating in a speed race starting at second 0 in a building of m floors numbered 1 through m .

The i -th elevator will start at second x_i at floor 1 and will ascend at the speed of 1 floor per second. Besides, there is a button on each floor **except floor 1 and floor m** , which, if **pressed**, will make the first elevator that reaches this floor stop for 1 second. If more than one elevator reaches a floor at the same time, only the elevator with the smallest index will be regarded as the first one. There are **no** buttons pressed now, but you can press the buttons on some floors before the start of the race. Notice that you can **not** press the button after the race starts.

Now you wonder whether you will be able to manipulate the race by pressing the buttons to make the i -th elevator be the first to reach floor m , and how many buttons you have to press at least if you can. If more than one elevator reaches floor m at the same time, only the elevator with the smallest index will be regarded as the first one.

Input

The first line contains two positive integers n, m ($1 \leq n \leq 5 \cdot 10^5, 2 \leq m \leq 10^9$), denoting the number of elevators and floors.

The second line contains n positive integers x_1, \dots, x_n ($1 \leq x_i \leq 10^9$), denoting the start time of the elevators.

Output

Output n lines. The i -th line should contain the minimum number of buttons you have to press to make the i -th elevator to be the first to reach floor m . Output -1 instead if it is impossible.

Example

standard input	standard output
6 20	0
3 8 12 6 9 9	8
	-1
	4
	13
	14