DMOPC '18 Contest 1 P1 - Sorting

Time limit: 2.0s   **Memory limit:** 64M
Java: 2.5s
Python: 2.5s

Roger has a list of N positive integers $A_1, A_2, \ldots, A_N$. However, his list is not yet finalized. Some of these numbers are *wildcards* which will be represented as zeroes in the list. Roger will try to assign the wildcards a value so that

- The list A is sorted from least to greatest
- All wildcards have the same value, which is a positive integer

Help Roger find out if this is possible. Output YES if he can assign the wildcards a value so that A is sorted and NO otherwise.

Constraints

$0 \le A_i \le 1\,000\,000$ for all $1 \le i \le N$.
If $A_i = 0$, then it is a wildcard, otherwise $1 \le A_i \le 1\,000\,000$.

Subtask 1 [30%]

$1 \le N \le 100$

Subtask 2 [30%]

$1 \le N \le 1\,000$

Subtask 3 [40%]

$1 \le N \le 200\,000$

Input Specification

The first line contains a single integer N.
The next line contains N space-separated integers, $A_1, A_2, \ldots, A_N$.

Output Specification

Output a single string: YES if it is possible and NO otherwise.

Sample Input 1

```
6
0 0 1 5 5 5
```

Sample Output 1

```
YES
```

Explanation for Sample Output 1

The first two elements are wildcards. Setting them to 1 gives a sorted list.

Sample Input 2

```
6
1 5 5 5 5 1
```

Sample Output 2

```
NO
```

Explanation for Sample 2

There are no wildcards, so Roger cannot do anything. A is not sorted so the answer is no.

Sample Input 3

```
6
1 0 2 0 3 0
```

Sample Output 3

```
NO
```