Gathering Sharks

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

You are the leader of a swarm of n sharks living in a one-dimensional ocean. The sharks are positioned from left to right, with each adjacent pair separated by a distance of one unit.

As the leader, you want all the sharks to gather at a common point to form a single group. Initially, no two sharks belong to the same group; for each $i = 1, \ldots, n$, the i-th shark from the left forms its own group, uniquely numbered a_i, consisting of only itself.

To achieve your goal, you can command the sharks to perform the following actions $n - 1$ times.

1. You shout out an integer b that meets both conditions:
   - There exists a group numbered b.
   - There exists at least one group numbered strictly smaller than b.
2. Afterward, letting c be the **largest existing** group number strictly smaller than b, all the sharks in the group numbered b simultaneously move to the position of the group numbered c, and the two groups merge.
3. The merged group is numbered b, and the group numbered c ceases to exist.

All sharks move at a constant speed of one unit distance per unit time. Commands must be executed sequentially, with no overlap in execution. Once a command is completed, the next one can begin immediately.

Compute the minimum time required for all the sharks to gather at a common point by commanding the sharks $n - 1$ times optimally.

Input

The first line of input contains an integer n ($2 \leq n \leq 500$). The second line contains n pairwise distinct integers $a_1, a_2, \ldots, a_n$ ($1 \leq a_i \leq n$).

Output

Output the minimum time required for all the sharks to gather at a common point.

Examples

standard input	standard output
4 3 2 4 1	4
9 1 2 4 5 7 8 3 6 9	17

Note

Explanation for the sample input/output #1

You can command the sharks to perform the following actions:

1. You shout out 3. The leftmost shark moves to the position of the second-leftmost shark, and they form a group numbered 3. This takes 1 unit of time.

2. You shout out 4. The second rightmost shark moves to the position of the group numbered 3, and they form a group numbered 4. This takes 1 unit of time.

3. You shout out 4. The sharks in the group numbered 4 move to the rightmost position, forming a group of four sharks. This takes 2 units of time.

The total time is $1 + 1 + 2 = 4$. It can be shown that 4 units of time is optimal.