

# Problem 1: Maximal Rising Subsequence

*(Medium)*

I have an array of  $N$  integers,  $A$ .

A *rising subsequence* of  $A$  is a subsequence  $S$  (not necessarily contiguous) of  $A$  such that the elements of  $S$  are **strictly increasing**. Formally, a sequence  $S$  that contains integers  $A[i_1], A[i_2], \dots, A[i_k]$  where  $i_1 < i_2 < \dots < i_k$  for some integer  $k$  is a rising subsequence if  $A[i_1] < A[i_2] < \dots < A[i_k]$ .

Find the length of the longest rising subsequence of the array  $A$ .

## Input Format

The first line of input contains the number  $N$ , representing the size of the array  $A$ .

The next  $N$  lines of input contain an integer  $A_i$ , representing the  $i$ th element of the array  $A$ .

## Constraints

- $1 \leq N \leq 1000$
- $-10^6 \leq A_i \leq 10^6$

The time limit for this problem is 2 seconds.

## Output Format

The only line of output should be an integer, representing the length of the longest rising subsequence of  $A$ .

## Sample Input

```
16
0
8
4
12
2
10
6
14
1
9
5
13
3
11
```

7  
15

## Sample Output

6

## Explanation

The **bolded** elements in the list form one possible longest rising subarray.

**0**, 8, 4, 12, **2**, 10, **6**, 14, 1, **9**, 5, 13, 3, **11**, 7, **15**

Other possible solutions are:

**0**, 8, **4**, 12, 2, 10, **6**, 14, 1, **9**, 5, 13, 3, **11**, 7, **15**

**0**, 8, 4, 12, **2**, 10, **6**, 14, 1, **9**, 5, **13**, 3, 11, 7, **15**

**0**, 8, **4**, 12, 2, 10, **6**, 14, 1, **9**, 5, **13**, 3, 11, 7, **15**

## Hint

Ybatrfg Vapernfvat Fhofrdhrapr.