The following task is left as an challenge and is ungraded. Please do NOT submit your answer.

Task D [0%]

The problem is the same as Task A, except that the range of n is different.

Input

The first line contains an integer n.

In the second line, there are n distinct integers $a_1, a_2, \ldots, a_n$ separated by a space.

Specifications	
$1 \leq n \leq 10^6$	$1 \leq a_i \leq n$ for $1 \leq i \leq n$; $a_i \neq a_j$ for $1 \leq i, j \leq n$ and $i \neq j$.

Output

Output one integer representing the maximum dh_x in the binary search tree after inserting all the integers.

Example

standard input	standard output
- See sampleD1.in -	- See sampleD1.ans -

Note

Sample 1 satisfies $n = 1,000,000$.

No Submission

Do NOT submit your solution.

Hint

- A reasonable solution takes $O(n)$ time.