

Prefmex

2023/2024 SEASON – SECOND ROUND



You have gone out with your MEXican friends for tacos. Every taco has a number and your friends have prepared you a yummy game. For every prefix of tacos you can eat only the one with a number equal to the MEX value of this prefix. Your task is to find these values. They might repeat, but don't worry, in the end, everything will be devoured.

MEX ("minimum excluded value") is defined as the smallest non-negative integer that does not belong to a given set. For instance, MEX of {2,2,1} is 0.

Input

The first line of the file **prefmex.in** contains an integer n – the number of tacos. The next n lines consist of n non-negative numbers - $a_1, a_2 \dots, a_n$, describing the sequence of tacos.

Output

On the first line of the file **prefmex.out** print n numbers denoting the MEX values of every prefix.

Constraints

$$1 \leq n \leq 10^6$$

$$0 \leq a_i \leq 10^6$$

Time limit: 0.6 sec.

Memory limit: 256 MB

Samle test

Input (prefmex.in)	Output (prefmex.out)
6 3 4 3 0 1 4	0 0 0 1 2 2